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AN

INAUGURAL DISSERTATION  
ON  
PERMANENT STRICTURES  
OF THE  
URETHRA :

SUBMITTED TO THE PUBLIC EXAMINATION OF THE  
TRUSTEES AND PROFESSORS OF THE COLLEGE  
OF PHYSICIANS AND SURGEONS IN THE  
UNIVERSITY OF THE STATE OF  
NEW-YORK,

SAMUEL BARD, M. D. PRESIDENT,

FOR THE DEGREE OF  
DOCTOR OF MEDICINE,

ON THE 1ST DAY OF MAY, 1815.

BY JAMES C. BLISS,

*Licentiate in Medicine and Member of the American Aesculapian Society.*

TROY:

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.....  
April, 1815.



TO  
**SAMUEL BORROWE, M. D.**

ONE OF THE SURGEONS OF THE NEW-YORK HOSPITAL.

SIR,

PERMIT me to dedicate this DISSERTATION to you, as a testimony of my respect for your distinguished professional character; as well as my regard for you as a Gentleman, Friend, and Instructor.

JAMES C. BLISS.



TO

**DR. ELY BURRITT,**

THIS THESIS IS INSCRIBED

AS A

**TRIBUTE OF GRATITUDE**

FOR HIS VALUABLE INSTRUCTION IN THE EARLY PART  
OF MY EDUCATION,

AS WELL AS AN

**EXPRESSION OF ESTEEM**

FOR HIS PRIVATE VIRTUES.

**JAMES C. BLISS.**

THE  
TODAY YESTERDAY

BY JAMES M. COYNE

WITH ILLUSTRATIONS BY THE AUTHOR

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BY JAMES M. COYNE

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DISSERTATION  
ON PERMANENT  
STRICTURE OF THE URETHRA.

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INTRODUCTORY REMARKS.

LITTLE was known with regard to the nature of Stricture, till the accurate investigations of Mr. John Hunter were made public.

This gentleman not only gave us the first accurate account of the affection, but suggested one of the most important improvements in its treatment. The bougie was known as early as the year 1535, as mentioned by Alphonius Ferrus; but it does not appear that its use was generally adopted till recommended by Daran. Even as late as the year 1750, Mr. Hunter informs us, that the common bougie employed in the first Hospitals in London, was either a piece of lead or a small wax candle.

Mr. Hunter has been seconded with much zeal and industry, by his kinsman, Mr. Home, who has given to the world one of the most elaborate and at the same time the best practical treatise on the disease, which we possess.

Few diseases have more engaged the attention of surgeons, within a few years, than the one now the subject of remark : hence we have been furnished with a great number of publications on Stricture, possessing various degrees of merit.

The bold manner in which the caustic was first recommended, gave rise to some controversy among surgeons ; and although much ingenuity has been displayed and labour expended, yet little practical advantage has resulted from this discussion.

Although we must acknowledge much has been written recently on this subject, deserving little consideration among the great number of publications which have appeared, yet many important observations have been made, and valuable inferences drawn well entitled to the regard of the surgeon.

Mr. Charles Bell has written an excellent little treatise on diseases of the Urethra ; and has suggested some novel ideas with regard to the nature of Stricture and its treatment.

It is proper here, also, to mention the excellent pathological observations of Mr. Ramsden, on diseases of the Testicle, as connected with primary affections of the Urethra, in which are developed many important facts which had before eluded the observation of surgeons.

We are indebted to a surgeon of our own country, Dr. Physick, of Philadelphia, for the proposed method of treating Strictures, under certain circumstances, by the use of a cutting instrument : a mode which the

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*successfully*

Doctor himself has sufficiently put in practice, in a number of instances.

Wiseman, first suggested the use of caustic in the treatment of Stricture, but it does not appear that it was ever employed to any extent, till revived by Mr. Hunter, who is justly entitled to the credit of originality, for it does not appear that at the time he published the account of his treatment of Stricture by caustic that he was acquainted with the fact, that it had before been proposed by Wiseman.

The introduction of caustic in the cure of Stricture, was doubtless one of the greatest improvements ever made in the treatment of this formidable disease, and Mr. Hunter for this, as well as other improvements in surgery, is justly entitled to the character of a benefactor of mankind.

Wilemanus in his book *De rebus bellicis* says that the best  
method of attack is to surround the camp and to reduce  
the number of the enemy by cutting off their supplies. This  
was done at the battle of Hastings when the English  
had surrounded the Saxon camp and cut off all supplies.  
Hence, when we see a small company of men coming  
out of the camp to collect supplies or to collect the dead  
we must be ready to meet them for it shows that they  
are on the point of attacking us. So when we see such  
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## DISSERTATION, &c.

I. THE Urethra is a tube extending from the neck of the bladder to the extremity of the glans penis, and through the greater part of its course runs in the inferior part of the penis. It serves the purpose of conveying the urine from the bladder, and the semen to the vagina of the female.

It is lined by a mucous membrane, similar in structure to the mucous membranes lining other passages of the body. Its sensibility is exceedingly acute, and its sympathies extensive and remarkable.

This membrane, from its structure and office, experiences sudden dilatations, as in the expulsion of the urine, &c. and is equally liable to fall into a collapsed state, when the distending cause is removed. In its collapsed state, like the membranes lining the stomach, bladder, &c. under similar circumstances, it falls into folds, which project into the canal.

It has been observed, under certain circumstances, to possess the power of contraction; this power is remarkable in inflammation attendant on *gonorrhœa virulenta*, in which disease, in some instances, the canal

is so contracted that the urine passes in a very small stream or by drops. Every surgeon has been accustomed to notice the firm manner in which the bougie is frequently embraced, when an attempt is made to withdraw it after its introduction into the urethra. The stream of urine, likewise, has long been noticed to be contracted when the acrimony of this fluid is increased by the watery parts of the blood being dissipated, in warm seasons and in warm climates, by perspiration.

From these facts has arisen the opinion, that the urethra possesses muscularity. This opinion was particularly advocated by Mr. Hunter.

It has been urged, that its muscularity is evinced by spasms occurring in Stricture and under other circumstances. This contraction, however, is evidently analogous to that which takes place in other membranes, when acted upon by a proper stimulant.

This is more particularly exemplified in the contraction of the skin ; which, in stricture, is more nearly allied to the mucous membranes, than to any other membranes of the body.

The particular form of Stricture, has been mentioned as another proof of the existence of muscular fibres, the canal appearing as if a pack-thread or riband was tied around it.

But there appears to be no reason why this contraction, if it depended upon muscular action, should take place in one part, and not another. Further, it is a well known fact, that a very great proportion of Strictures of the urethra, do not consist in a diminution of

+ What membrane? the pleura, the peritoneum, or the pia dura-mater: were these ever

the whole circumference of the canal, but are frequently confined to a very small part of it. Now, it is very evident, that no action of a transverse or circular fibre, would produce such an effect.

The difference of the stream in the evacuation of urine, and in the emission of semen, has been adduced as another evidence of the muscularity of the urethra. But this difference can be accounted for by the compression which the canal suffers in the distended state of the cells of the penis, the strong manner in which the prepuce embraces the penis at the *corona glandis*; and the violent and convulsive action of the *ejaculator*  
/*seminalis* muscle.

That the formation of Stricture, near the bulb of the urethra, is influenced by the action of the muscles connected with this part is probably true; as this is one of the most common seats of Stricture and of spasm: but it does not necessarily follow that the formation of Stricture depends upon muscular contraction, or even upon spasm.

The urethra has a great number of lacunæ opening into its passage. They run in a longitudinal direction, from behind forwards. There are two near the glans penis, more conspicuous than the rest. These lacunæ are frequently so far enlarged by disease, as to interrupt the free passage of the bougie or catheter; the point of the instrument lodging in them.

From a cast, which Mr. Home made of the urethra of a man at 80 years of age, it appears that this canal is seven-twentieths of an inch in diameter in the

narrowest part, and eleven-twentieths in the widest. In a subject at thirty years, there was some considerable variation.

It appears, also, from these casts, that the passage is most contracted in those parts of the canal most liable to Stricture, viz. at four and a half and seven and a half inches from the external orifice.

II. The older surgeons had formed a very imperfect and indistinct notion, with respect to the real nature of Stricture.

They had ascribed it to fungus and caruncles, or fleshy tumours similar to the polypus of the nose and rectum.

It was not till the nature of Stricture was more completely unfolded by morbid dissections, that these opinions were abandoned. But notwithstanding these opinions were relinquished, one, perhaps more objectionable, was embraced by Mr. Hunter; which was, that the disease consisted in a mere contraction of the fibres of the lining membrane of the urethra. This contraction was supposed to be partial, in the first instance, but eventually to become so considerable as completely to obstruct the passage of urine.

This opinion we do not feel disposed to admit, for the reasons already given. It can hardly be supposed that a Permanent Stricture can be induced in this canal by the contraction of a single or a set of fibres, if these fibres be endowed with the properties of muscularity to which relaxation as well as contraction is essential.<sup>+</sup> This supposed unyielding tonic spasm, has no

<sup>+</sup> Does not permanent contraction of muscles take place sometimes - as in tetanus &c?

analogy with any phenomenon exhibited in any other part of the body, in health or disease.

We should, therefore, hardly be willing to admit, even if muscular fibres were found to exist in this membrane, that their contraction could be productive of Stricture. This opinion is more particularly indulged, from taking into consideration the extreme degrees of relaxation and tension which this membrane in rapid succession undergoes.\* We are by no means drove to the necessity of attributing the formation of this disease to such a cause, when we reflect, that in the most healthy state of this canal, this membrane is puckered and thrown into a great number of loose folds, by the compression which the canal suffers from distension of the cells of the penis, when erected, and the violent action of the muscles surrounding the bulb of the urethra, in the expulsion of the urine and semen.

The real cause of the simplest form of Stricture, which gives the idea of the passage being embraced by a cord, appears to be inflammation of the Urethra ;† causing a thickening of the internal membrane of this passage. Another consequence of this process, and one which contributes to the obstruction, is an effusion of lymph exterior to this membrane ; by which

\* In the London Medical Review, vol. 3d, a case is related of a boy, aged four years, in whom the urethra was dilated to such an extent by means of sponge, that it permitted three calculi of the size of a large nutmeg to pass. They were of an irregular wedge-like shape, and weighed, on an average, from sixty to seventy grains each.

† This opinion has been advocated by Mr. C. Bell, and other distinguished Surgeons.

means adhesions take place, the cells of the penis are glued together, and a ridge is formed which projects into the urethra. The broad or riband Stricture, appears to assume this form, by a diminution of the canal taking place in the interspace between two simple Strictures, which previously existed. This kind of Stricture is also induced by inflammations ; and, in some instances, acquires almost a cartilaginous hardness, and calls for the most assiduous perseverance in the use of caustic for its removal.

The Stricture in which there is a thickening, or folding of the internal membrane, forming a ridge in the side of the canal, is obviously owing to the same cause as those before mentioned. Two or three of this kind are frequently met with in the course of the urethra, and can, in general, be readily distinguished, by the impression which they make on the bougie.

Inflammation and spasm are frequent concomitants of Permanent Stricture of the Urethra. The latter probably arises from the sympathy which exists between the *sphincter vesicæ* and the lining membrane of the passage. Any cause which gives rise to irritation in the Urethra, will produce spasm ; as the introduction of the bougie, the application of caustic, coition, intemperance in drinking, exposure to the vicissitudes of weather, violent exertions, non-compliance with the calls of nature in evacuating the bladder, &c. &c.

When from any of these causes spasm is induced, bleeding, the warm bath, and anodynes, generally afford relief.

As has been before observed, Strictures most commonly occur about seven inches from the external orifice, just at the point where the membranous part of the urethra terminates in the bulb.

This point, it has been fully ascertained, is the most irritable part of the urethra. We are in possession of facts which lead to the belief that it is the seat of spasm in strangury, induced from the application of blisters. Another fact which proves this part to be more peculiarly irritable, is, that it is sympathetically affected, if we may be allowed the expression, with inflammation in *gonorrhœa virulenta*. These circumstances, without doubt, give rise to the more frequent occurrence of obstructions in this part of the canal.

The next most frequent seat of the disease, is at the point where the penis takes its bend from the pubis, about four and a half inches from the extremity of the glans.

Why this part should be more than commonly subject to Stricture, is obvious from the circumstance of the canal at this point, instead of being left loose and free, as in other parts of its course, being supported by the *ligamentum suspensorium*, by which means an acute bend is made, and this part receives the whole force of the urine in its expulsion.

Irritation and inflammation from *gonorrhœa*, or any other cause, extending to this part, is kept up by this means, and results in the formation of Stricture. Obstructions very frequently occur within two or three inches of the extremity of the urethra ; the occur-

rence of them at this part is doubtless owing to its being the usual seat of inflammation in *gonorrhœa*.

Besides those parts already mentioned, Strictures sometimes take place just at the extremity of the canal; but these cases are comparatively rare.

III. From the view which we have taken of the subject, it is obvious that Stricture may arise from any cause producing inflammation of the urethra.

One of the most common causes, therefore, is *gonorrhœa virulenta*. This so commonly gives rise to it, that we may venture to assert, that five cases out of six arise from this disease. The effects of it are precisely such as we have described as producing Stricture. In the first instance, a thickening of the membrane takes place; the inflammation extending deeper into the reticular membrane of the penis, an effusion of lymph follows, adhesions form, and the sides of the canal are thrown into more immediate contact. When irritation has once begun, it is kept up; the Stricture becomes firmer and more perfect, till an almost total interruption to the passage of urine is induced.

Another very common cause of Stricture, is the use of strong injections, or the employment of them at an improper period for the cure of *gonorrhœa*.

The passage of calculi through the urethra, which from the mechanical violence produced, causes inflammation, though seldom acknowledged as a cause of Stricture, is doubtless much more common than is generally admitted.

Frequent and long continued action of the muscles surrounding the urethra, as in difficult micturition,

and *in coitu*, becomes likewise another source of Stricture, from the irritable and inflamed state of the urethra induced thereby. The intemperate use of vinous and fermented liquors, the mechanical violence done to the parts, and the formation of abscesses in the penis, have been frequent causes of Stricture.

Deep and foul chancres have in some instances been followed by Stricture, in consequence of the inflammation extending to the lining membrane of the urethra. The unnatural vice of self-pollution, also, hæmorrhoids, and other affections of the rectum, may be included among the causes of this disease.

IV. It has been generally remarked, that the symptoms of Stricture in the first instance, give so little inconvenience that they pass unnoticed by the patient. A diminution in the stream of urine, with more frequent calls than natural to evacuate the contents of the bladder, uneasiness experienced in the course of the urethra and at the neck of the bladder, and a gleety discharge from the canal, are among the symptoms which first excite the patient's attention.

Most of these symptoms are aggravated by any thing which produces irritation in these parts : as excesses in drinking ; violent exercise, particularly on horseback, or in a carriage ; indulgences with women ; disobedience to the calls of nature in evacuating the bladder ; an attack of *gonorrhœa* ; exposure to cold, &c. &c.

These causes frequently give rise to spasm, and a total suppression of urine is the consequence. A very painful sensation is sometimes experienced in the

course of the urethra, in the act of coition, and the semen instead of passing in its proper channel is thrown back into the bladder.

In other instances, considerable smarting takes place, and a discharge from the urethra follows, which is liable to be mistaken for *gonorrhœa*. The Stricture becomes more complete, the patient is continually harrassed with a desire to pass urine; which is evacuated in a small stream or by drops, and is obliged frequently to rise from bed in the course of the night.

Violent pain is experienced in the small of the back and in the loins: uneasiness in the groins perinæum and upper part of the thighs.

The patient has involuntary emissions of semen; and very frequently, from loss of power in the bladder, has incontinence of urine. The system at large partakes of disease from sympathy. A paroxism of fever, resembling, in every essential point, an attack of intermittent, very frequently occurs in those affected with Stricture. Any slight excess, exposure to vicissitudes of weather, undue exertions of body, the introduction of a bougie and application of caustic, may all be exciting causes of a fit.

Other very common attendants are, derangements of the stomach, want of appetite, nauseæ and vomiting. To these may be added, those peculiar sensations which are the usual accompaniments of nervous diseases.

V. Strictures of the urethra frequently throw the unfortunate patient into the most dangerous and loathsome state.

The portion of the canal between the Stricture and bladder becomes dilated, from the circumstance of its experiencing, in a greater degree, the expulsive efforts of the bladder. Inflammation follows ; sometimes so acute as speedily to destroy the patient. Under other circumstances, it is more slow in its progress : ulceration is produced ; the urine becomes effused into the surrounding cellular membrane ; foul and sloughy abscesses form, which burst externally and form fistulæ, through which the urine constantly escapes. These fistulæ are frequently extended by the formation and bursting of new abscesses.

The patient's general health, under these circumstances, suffers to a great degree. He has repeated paroxysms of fever, loss of appetite, profuse sweats, great debility, and not unfrequently this complicated suffering is terminated by death.

In some instances, the urine becomes so extensively effused into the cellular membrane, that instead of a formation of matter being the consequence, sphacelus is immediately induced, and the patient is at once destroyed.

One effect of Permanent Stricture, is to increase the thickness of the coats of the bladder. This is probably, in part, to be ascribed to irritation or a less degree of inflammation being produced by distention of the bladder, and the frequent efforts which are made to pass urine : but, it appears, in a great mea-

ure, owing to the increase of power requisite for the expulsion of the urine, and the consequent increase of the muscular fibres of this organ.

When a total obstruction to the passage of urine occurs, great distention of the bladder, inflammation and sphacelus, are frequent consequences. Ulceration of the bladder, in some instances, also takes place, and is accompanied with a discharge of pus with the urine. The ulceration, it appears from dissections, has extended quite through the coats of the bladder, and the urine has been effused into the cavity of the abdomen. In other instances it has not extended through the peritoneal coat, but the urine has passed into the cellular substance behind this membrane.

The effects of stricture frequently extend beyond the bladder. The *ureters* become much enlarged, and at times very much inflamed. The kidneys likewise become distended and inflamed, by the accumulation of urine, and the inflammation not unfrequently extends to the surrounding cellular membrane.

The fever consequent to obstructions in the urethra, and accumulation of urine, has frequently terminated in effusions on the brain. The fluid thus effused has also, in some instances, been observed to have a urinous smell.

VI. Whatever might have been the opinions, existing formerly, relative to the treatment of Strictures, there can be but one, at present, among the intelligent of the profession. The bougie and the caustic have rendered the treatment of this disease so safe, and at the same time so perfect, that we can not look for

any material improvement. Perhaps in no surgical disease involving such important consequences, is the treatment more perfect and so much to be relied on.

The commonly received opinion, that the bougie operates by dilating a Permanent Stricture like the operation of a wedge, is evidently erroneous: nor, perhaps, is the opinion that its success depends on the production of ulceration, less exceptionable. Believing, as we do, that Permanent Stricture does not depend upon the contraction of a single or a set of fibres, we cannot, for one moment, suppose, that its cure is attributable to the dilatation of a contraction which never existed.

That ulceration, in some instances, takes place by the use of the bougie, and that a cure is by this means effected, is without doubt true; and it is equally true, that when a cure is thus effected, an unwarrantable and even a hazardous degree of violence must have been employed.

The simple fact appears to be, when the bougie is judiciously employed, that the pressure of the instrument causes an absorption of the new formed substance, between the folds of the lining membrane forming the ridge in the canal. The effect of pressure, in promoting absorption, is very remarkable, and well illustrated in aneurism and in an ulcerated leg. In the latter instance, the luxuriant granulations are absorbed, and the remote edges brought into more immediate contact, by absorption from the cellular membrane of the matter producing swelling; both of which effects are brought about by the equal and gen-

tle pressure of a roller bandage. By this mode of using the instrument, a very large majority of Strictures may be overcome; whilst those dreadful evils, which are the result of the most undue and barbarous violence, are avoided. It is by using the bougie in such a manner as to produce the effect above mentioned, that the surgeon is freed from the censure of having made false passages; of having laid the foundation of incurable fistulæ, and of having paved the way to a fatal mortification of the parts. It is by the adoption of such practice alone, that he can be acquitted of the imputation of censurable ignorance.

Perhaps in every case where a bougie can be passed into a Stricture, and the irritation is such as to be easily borne, this instrument ought to be relied on for its removal.

It is true that this mode of treating Stricture renders the cure tedious; and it is equally true, that the permanency of the cure is in some measure uncertain. Yet the prejudices of patients are so strong against the use of caustic, that in general it is better to give way to them and adopt this mode of practice, in preference to giving alarm and exciting unnecessary fears.

The gum elastic bougie, in general, may be preferred, for the cure of Strictures situate in the part of the canal anterior to the bulb of the urethra; but for those beyond this point the common plaster bougie is preferable; as it more readily takes the curve in the urethra, and is less liable to find for itself a new passage.

As it regards the length of time the bougie should be permitted to remain in the urethra, we ought, in

every instance, to be governed by the degree of irritation which is produced, and the sensibility of the patient to its application. It may, in general, be laid down as a rule, that the longer the instrument can be retained without material inconvenience, the better. The urethra, most generally, in a short time becomes accustomed to its stimulus, and the cure advances with much more rapidity than when it is applied at long intervals and for a short period of time.

But whilst the persevering application of the bougie is thus insisted upon, in those cases in which the irritation in the urethra is slight and the inconvenience of the application inconsiderable, yet, whenever much pain is excited, followed by inflammation, the further use of it becomes a question. There can be little doubt, that in many instances, it aggravates the disease for the cure of which it is employed.

A pretty accurate opinion can be formed of the nature of the Stricture, by the impression made on the point of the instrument, and by the sensation communicated to the finger. If it should be one in which the diminution is equal throughout the whole circumference of the canal, the impression will correspond on the point of the instrument.

In like manner, if but a part of the circumference is diseased, but a part of the circumference of the bougie will receive the impression. If the Stricture is unusually indurated, a sensation will be communicated to the finger as if the instrument encountered a hard resisting body. This sensation is similar to that which would be communicated by the instrument coming in

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+ Like that of a bulb-head - as Prof: Mott

contact with a piece of cartilage. This variety of the disease, if it exist to great extent, is seldom materially benefitted by the bougie; it rarely yields but to the use of caustic.

VIII. The application of caustic, to a part of such importance as the urethra, is well calculated to excite alarm in the minds of those unacquainted with its operation. This alarm would not probably be lessened from observing the acute sensibility of this canal, and the intimate relation its healthy state has with important functions of the body.

So strong have been the prejudices against this remedy, that notwithstanding the undeniable testimony we have of its superior efficacy, we are not wanting in men, standing high in the profession, who would shrink from its employment.

Like many other new remedies, it has without doubt, in many instances, been abused. It has like most new remedies been used almost indiscriminately; and we are not to be surprised that its use should in some instances have been attended with injurious consequences. But this does by no means militate against its general efficacy and value as a remedy.

Much of the opposition to it has unquestionably arisen from a mistaken notion relative to its operation, as well as a want of experience with regard to its effects: Hence, those whose observation and experience have been most extensive, have been the most strenuous advocates for its employment.

In those cases in which a bougie can not, without violence, after persevering efforts, be passed through

a Stricture, there can be no doubt that caustic deserves the precedence. The irritation consequent to its application, bears no comparison to that which follows the violence usually employed in passing the bougie into this kind of Stricture.

There are cases in which the smallest sized instrument can not even be passed into the Stricture. Under these circumstances, the bougie ought to yield to the more efficacious and even safe application of the caustic. Every practitioner who has had much experience in this disease has met with cases in which there was an extremely irritable state of the strictured part.

This peculiar state of the canal frequently remains obstinately unyielding to the use of the most efficacious remedies ordinarily employed for its relief. The use of the bougie, under these circumstances, aggravates the affection to an almost insupportable degree. But this irritation will frequently yield to one or two applications of the caustic, by which means the sensibility of the part is deadened in the same manner as the pain of an extremely irritable ulcer is removed by the use of the same remedy.\*

There is yet another kind of Stricture, which can be dilated to a certain extent, but which will again recover itself and resist our persevering efforts with the bougie. This form of Stricture requires for its radical removal the caustic. Some remarks on the operation of this remedy would not perhaps be improper in this place.

\* An ulceration of the cornea which is rendered extremely irritable and painful by the constant passage of the tears over the part, is also relieved by caustic.

The effect of the caustic commonly employed, is not to produce a deep and extensive slough of the parts to which it is applied. Its operation is more superficial. When applied to a fungous excrescence, it appears rather to operate by stimulating the absorbent vessels to remove the part, than by producing an absolute destruction in the living principle.

Its effects are well illustrated on that kind of ulcer which has a surface covered with spongy and luxuriant granulations.

These granulations will rapidly disappear by the use of caustic, and a florid healthy surface is presented, strongly disposed to heal.

In an ulcer of an indolent character, in which the discharge is thin and gleety, and the granulations languid and flabby, by its stimulating operation it converts the diseased part into a simple purulent ulcer, discharging well formed pus and throwing up healthy granulations.

It would appear, therefore, from these facts, that its operation does not wholly consist in causing a destruction of parts, but that it has the peculiar effect of changing the diseased action, and of promoting the absorption of morbidly formed parts.

The manner of applying this remedy, as commonly recommended, is perhaps, generally speaking, unexceptionable. We first pass a moderate sized bougie, well besmeared with oil, down to the Stricture, and mark on the instrument the distance of the Stricture from the external orifice. After the bougie is with-

drawn we oil the armed instrument, and having given it the proper curve, introduce it into the urethra and pass it steadily forward till it encounters the Stricture.

The length of time the caustic should be permitted to remain in contact with the Stricture, must be influenced altogether by the sensibility of the patient to its application. In general, half a minute will be sufficient; in some instances it cannot be retained so long, whilst in other cases no great inconvenience is experienced from its being applied a greater length of time.

Whilst house surgeon to the New-York hospital, I had an opportunity of observing the effects of another mode of applying caustic, which was first suggested and employed by the distinguished and *practical* surgeon doctor Richard S. Kifflam, one of the surgeons of that institution.

This method of applying caustic does not, in principle, essentially differ from those which have heretofore been recommended; but under certain circumstances it appears to possess a decided superiority. It consists in first dipping the extremity of a small sized gum elastic bougie into a saturated solution of caustic. The instrument is then to be laid aside, for a short time, that the caustic may concrete. A canula is afterwards introduced into the urethra, and carried down to the obstruction, and the bougie thus armed is passed through this instrument into the Stricture.

In Strictures extending some distance in the course of the canal, this manner of employing caustic promises to be peculiarly useful.

Many of these Strictures are remarkably firm and indurated, and their cure by the application of caustic, in the common manner, is often tedious and protracted. This can in a great measure be obviated by employing the bougie dipped in a caustic solution.

It possesses all the combined advantages of the caustic and common bougie, and not only operates in destroying the stricture in the same manner as the common armed instrument, but it also acts laterally on the strictured part, by which means the disease is cured with much more facility than when the ordinary method is employed.

The application of the common armed bougie is sometimes followed by a total suppression of urine, which not only creates material inconvenience, but in some instances serious apprehensions for the safety of the patient.\* This effect is caused by the slough which is separated by the caustic; and probably, also, by the effused lymph obstructing the canal. As far as my observation extends, this effect never has nor is likely to follow the use of the bougie, armed with the caustic solution. I think I am further warranted in saying, that the irritation which follows the use of caustic in this way, is considerably less than what follows that of the common armed instrument. This probably is owing to the remedy being applied more extensively to the irritable surface, by which means its sensibility is diminished to a greater extent than by a more partial application of caustic. There is another mischiev-

? \* See case in the appendix.

ous effect avoided ; which is, the slipping of the caustic from the bougie into the urethra, during its application.

This mode of using caustic is more particularly applicable to Strictures situate anterior to the membranous part of the urethra ; but it may be applied beyond this point, without difficulty, if a silver or gum elastic catheter, the extremity of which has been removed, be used for a canula.

A solution of the lunar caustic may be employed for arming the bougie, or the corrosive muriate of mercury, both of which solutions should be saturated in excess, in order that a concretion may readily take place on the instrument.

Another caustic, and one which appears preferable to either of the above, is formed by the union of equal parts of the corrosive muriate of mercury and water, with the addition of sufficient of the muriate of ammonia to render the sublimate soluble. By dipping the extremity of the instrument into this solution, a small quantity remains on it and assumes a crystalized form.

It perhaps might be objected, that this caustic would probably be productive of too violent effects on so irritable a part as the urethra ; but the small quantity of caustic which adheres to the instrument, will effectually prevent any of those bad consequences which might be naturally apprehended.

I feel persuaded, from the trials which I have made of it, that if it is cautiously employed it is less likely

to be followed by inflammation than when the common mode of applying caustic is adopted.

With respect to the caustic potash, which has been so favorably spoken of by Mr. Whately, its use has been so limited in this country, as hardly to admit of an opinion being formed from the experience of our own surgeons. Its efficacy, however, has been fully tested by the surgeons of Europe, and it does by no means appear to have equalled the expectations formed of it upon the recommendation of so respectable authority.

## APPENDIX.

THE following cases are subjoined more particularly for the purpose of illustration, than from any peculiar circumstances attending them : for this reason the more prominent circumstances are briefly noticed, in preference to entering into a more minute detail. There are several, however, which may not be wholly uninteresting to those whose observation has been confined to the cases which ordinarily occur in private practice.

### *Cases of Simple Stricture, in which the common Bougie was employed.*

P—r D—y, aged 59 years, seaman, was admitted into the New-York hospital, August 30, 1814, with Stricture of the urethra. He had been affected with the disease 15 years. He voided his urine some times by drops, at others in a forked stream.

The use of the common bougie was directed night and morning for his relief : the employment of the instrument was followed by considerable hemorrhage from the urethra, at every application, but no material irritation ensued.

On the 4th of September, the Stricture was passed, and on the 28th the patient was discharged. At this time he could pass his urine in as full a stream as ever, although a bougie of the largest size had not been passed into the bladder.

J—n R—e, born in Scotland, aged 42 years, was received into the New-York hospital April 12, 1814, with Stricture. He began to experience difficulty in discharging

urine nine years before, and for the last six had passed it *guttatim*.

A Stricture was encountered at about five and a half inches from the extremity of the glans penis. By the assiduous employment of the elastic gum bougie, one of a small size was passed through three days after his admission. A larger instrument was then used, and the size gradually increased. On the 23d of April he was discharged from the hospital. Five months after this period he had no return of difficulty in evacuating his urine.

B——e H——d, born in the island of Cape de Verd, aged 33 years, seaman, was admitted June 16, 1814, with Stricture of the urethra, and syphilis. The Stricture was situate about six inches from the extremity of the glans. He passed his urine frequently and in a small stream; had pain in the loins, &c. He was put on the use of the usual remedies for the cure of syphilis, which disease he had in the form of chancre and bubo.

After the disappearance of these symptoms, a small sized gum elastic bougie was passed through the Stricture with some difficulty, and from the little irritation which the instrument produced, he was able to retain it in the urethra almost uninterruptedly.

At the time he was discharged, (July 27,) a bougie of large size could be readily introduced into the bladder, and the urine was discharged in a full stream.

J——s O'B——n, born in Ireland, aged 41 years, waiter, was admitted into the New-York hospital May 4, 1814, with Stricture. He contracted *gonorrhœa* about twelve months previously, and had experienced difficulty in evacuating his urine ever since that period. He had Stricture situated about two inches from the extremity of the penis. This one could be passed by a small sized bougie. There was also another about six inches from the external orifice. The patient had

pain in the lumbar region, and in the perinæum, a slight discharge from the urethra and scalding in making water.

The common bougie was employed in the usual manner for his relief, and on the 19th of May a small one was passed into the bladder. This instrument was afterwards exchanged for one of a larger size, and the patient was so completely relieved, that he was discharged from the hospital on the 13th of June.

J——n H——n, aged 26 years, was admitted on the 8th of November with Stricture. He had been laboring under the disease for two or three years. He passed his urine in a very small stream, with much difficulty, and had occasional attacks of ague with fever. A Stricture was passed at about six inches from the external orifice, by a moderate sized bougie. Its further progress was interrupted at about seven, by another Stricture. The bougie was several times passed into this, by which means the patient was enabled to evacuate his urine with freedom. The instrument, however, was never introduced into the bladder. The patient having been so materially relieved, refused to remain in the house till a cure could be effected.

*Cases of Stricture with Fistula relieved by the Bougie.*

J——n P——s, born in Grenada, aged 27 years, a colored servant, was admitted February 5, 1814. The patient, at the time of his admission, had incontinence of urine. He had also a fistulous opening a little anterior to the scrotum, through which the greater part of the urine was discharged. There was considerable hardness and thickening about the opening. The scrotum was swollen, thickened and hard; and the prepuce had undergone the same change and projected about two inches beyond the glans penis. The patient complained of great pain and soreness of the parts. This state of parts, it appeared from the patient's own account,

had arisen from the effusion of urine into the cellular membrane. He had, with his other symptoms, great pain in the loins and perinæum. His general health rather impaired. On passing a bougie into the urethra a Stricture was found to exist three and a half inches from the external orifice. He had been affected with clap six years before, and began to experience difficulty in discharging his urine six or eight months before his admission, attended with frequent and urgent desire to evacuate the contents of the bladder. Six weeks before he was admitted, the difficulty became so great that the urine could only be passed in drops, and in a short time he passed it involuntarily. About three weeks after this, ulceration took place, and the urine was discharged through the opening anterior to the scrotum. About this time the scrotum and prepuce became suddenly swollen, and from this period to that of his admission into the hospital, he experienced much pain. A small sized bougie was passed into the Stricture, and directed to be retained as long as the state of the parts would permit. The use of the instrument was continued till the 10th of February, at which time one Stricture was overcome: but another was immediately encountered, so that the symptoms of the patient were in no way relieved. On the 16th of February, he was directed to take of the Spir. Terebin. one drachm in an emulsion of gum Arabic daily; and a blister was applied to the perinæum. On the 20th he had not been benefitted by the remedies directed on the 16th. He complained of considerable pain at the neck of the bladder, which he attributed to his medicine. At this time the bougie could be introduced a little further. On the 17th of March a small sized instrument was passed into the bladder. On the 23d he was able to retain his urine half an hour, and but little was discharged by the fistulous opening. At this time a bougie of considerable size was passed into the bladder. The fistulous

opening was completely healed on the 9th of April. On the 16th of May, three and a half inches of the prepuce which had become elongated and converted into a peculiar ligamentous substance, was cut off. After this period a tumor made its appearance at the part where the opening had previously existed, anterior to the scrotum. This tumor suppurred and prevented the patient's being discharged till the 5th of August.

C—s K—y, born in England, aged 68 years, shoemaker, was admitted into the New-York hospital August 5, 1814, with *fistulae in perineo*, connected with sinuses in the neighboring parts. The urine was discharged in considerable quantities through the opening, and the patient's general health considerably impaired. There was a Stricture situated about four inches from the external orifice. He had once been affected with gonorrhœa. He was first affected with fistula three years before he was admitted, and it had been healed several times, and again broken out. After his reception the fistula was freely dilated to give a ready exit to the pus and urine. A bougie, also, of small size, was passed into the Stricture, and in the course of one week, by its cautious application, the Stricture was overcome. This was followed by immediate relief in all the symptoms of the patient; the fistula rapidly healed, and he was discharged on the 30th of August.

*Cases of Stricture with Fistula in Perineo, in which the common armed Bougie was employed.*

V—s J—ff, born in Germany, aged 53 years, who followed the profession of porter, was admitted 17th December, 1813, with Stricture. In July of the same year, the patient received a very severe injury in the perinæum, by falling astride the chime of a cask. This injury was followed by effusion of urine, and sloughing of the perinæum and

urethra. The urine was discharged through an opening *in perineo* two or three weeks after this period, but he was so far recovered as to be discharged from the hospital on the 10th of September following. The perinæum was several times ulcerated after he left the hospital, but he did not experience any material obstruction in the passage of his urine, till four days previous to his second admission. The common bougie was first employed. On the first of January the obstruction still continued, and the old *fistula in perineo* had again opened. The caustic at this time was directed to be used. The patient was discharged from the hospital on the 11th of March, cured of both affections.

C——ee W——d, born in Africa, was admitted into the hospital August 25, 1814. The patient, at the time of his admission, had a fistulous opening in the perinæum, through which the urine constantly escaped, and he passed it also *guttatim* by the natural passage. He was unable to give any satisfactory account of his previous disease. A Stricture was found to exist five inches from the extremity of the penis. A bougie of small size was introduced into the Stricture, and kept applied for some time every day. On the fourth day the Stricture was passed; a larger sized instrument was then employed. The *fistula in perineo* was healed in a fortnight after his admission, and he was discharged from the hospital on the 28th of June. On the 16th of September the patient again returned to the hospital, with *fistula in perineo*, and difficulty in passing his urine. With these symptoms he also had occasional febrile paroxysms. The common bougie was again resorted to, and was employed for some time with very little advantage: it was then laid aside, and the caustic applied. On its second application the principal Stricture, situate at about seven inches from the external orifice, was passed. The opening in the perinæum was very soon after this closed. In October, an ordinary fixed cathe-

ter was introduced into the bladder with ease. By the incautious use of the bougie, by himself, after this period, considerable inflammation was produced, which was succeeded by the formation of another fistulous opening in the perinæum. The patient was discharged from the hospital on the 18th of January, 1815, at which time the fistula had healed and he discharged his urine without difficulty.

*Cases of Stricture with incontinence of urine, treated by Caustic.*

W——m D——n, born in the state of Delaware, aged 39 years, seaman, was admitted 18th of January, 1814. He complained of incontinence of urine, and had a gleety discharge from the urethra. The patient also had pain in the loins and soreness of the groins and périnæum, with a sense of dragging and weakness. The progress of the bougie was stopped at four and a half inches from the extremity of the penis. The patient was affected with clap in February, 1813, for the cure of which he employed an injection, but with very little benefit. The disease was attended with violent *chordee*, which (as the patient supposed) caused a rupture of the urethra, and was followed by copious hemorrhage. He entered on board the frigate United States in the month of April; soon after which period the discharge from the urethra began to diminish, and at the same time he observed that the stream of urine was decreased in size. In July he had an attack of nervous fever; during which period the difficulty in discharging urine was increased, attended with great pain and frequent and urgent calls to evacuate the bladder. The bougie was employed a few times at this period, without any advantage. Soon after he began to pass his urine involuntarily, became much debilitated, and was discharged from the frigate unfit for duty. After his admission, the common bougie was employed for some time without affording him any relief; from this circumstance it was thought

advisable to apply the caustic. It was accordingly employed, and on the third application the Stricture was overcome. The pain in the loins, incontinence of urine, and other distressing symptoms, from this period left him, and he was discharged from the hospital on the 18th of February. Nine months after this period, he had experienced no difficulty from his previous disease.

P——o B——y, born in Philadelphia, aged 36 years, servant, was admitted 11th of February, 1814, with Stricture. He had incontinence of urine, pain in the loins and perinæum, and whenever the urine was discharged by voluntary exertions, it was in drops and with violent straining. The Stricture was situate three and a half inches from the extremity of the urethra. He had been affected with gonorrhœa five or six times. In March, 1813, he began to experience difficulty in passing his urine, which was discharged in a small stream, whilst his calls to pass it were very frequent. His disease was also attended with an ague and fever, as he termed it. Sometime in the following autumn he lost the power of retaining his urine altogether. After his admission, the common bougie was directed. This instrument was employed about a fortnight, without any benefit. The caustic was then directed to be applied, and after three applications he was enabled to retain his urine for a short time, and passed it in a small stream. By the 19th of March, one inch had been gained on the Stricture; his complaints much as before. In April the principal Stricture was passed; but another presented at about six inches from the extremity of the canal. The common bougie was employed to overcome this obstruction. On the 4th of May the patient had suppression of urine, which continued about twenty-four hours, but which yielded to the use of anodynes, warm bath and the bougie. Two days afterwards, a small instrument was introduced into the bladder, with but little difficulty.

The irritation in the urethra, however, became so great, that it required the use of the bougie to be suspended till the 18th. On the 20th a pretty large bougie was passed into the bladder. The patient was discharged from the house on the 10th of June.

*Case of Stricture with mortification of the scrotum, in consequence of the effusion of urine.*

W——m H——s, a coloured man, born in Massachusetts, aged about 50 years, was admitted into the New-York hospital June 3d, 1814. The patient had Stricture situate about seven inches from the external orifice. He had been twice affected with clap, had experienced difficulty in passing his urine twelve years, and had been under surgical treatment. Two or three days previous to his admission, he had more than usual difficulty in passing his urine, to relieve which he employed a bougie himself, but did not succeed in getting it into the bladder. The application of the instrument was made with such violence as to give great pain, and was followed by hemorrhage. After its introduction there was a total suppression of urine, and after straining violently to evacuate the bladder, the cellular membrane of the scrotum perinæum, &c. became much distended with urine, in which state it was at the time of his admission. The patient had great pain in the parts, with soreness to the touch. The abdomen likewise was tense and painful on being pressed, and he had general febrile symptoms. The urine, at this time was discharged by drops, by violent exertions. After his admission the scrotum was freely punctured with a lancet, by which means a very considerable quantity of urine was discharged from the cellular membrane. A spirituous lotion was directed to be applied to the part, and the bowels opened by an enema. After this, a small bougie was passed through the Stricture, which had the effect of producing a pretty

free flow of urine. Three or four days after his admission, an extensive mortification of the scrotum took place. He was then put on the use of bark, wine and a nutritious diet, and had the usual local applications to the mortified part. The bougie was at the same time used daily, to keep the urethra pervious. On the 15th of July, the scrotum was completely healed, and he was able at that time to discharge his urine in a full stream. On the 8th of August he was discharged from the house.

*Cases of Stricture in which the bougie armed with the caustic solution, was employed.*

It may be proper to premise, that in the following cases the caustic employed was formed of equal parts of the corrosive muriate of mercury, muriate of ammonia and water.

The author has had an opportunity of observing the effects of a solution of the nitrate of silver and of the corrosive sublimate, and can speak confidently of their efficacy; but as has been before observed, the solution of the triple salt of muriate of mercury and ammonia, is preferred.

N——m O——d, born in Canada, aged 32 years, carpenter, was admitted March 8th, 1814. At the time of his admission he had incontinence of urine, complained of pain in the back and loins; general health unimpaired. On introducing a bougie into the urethra, it was stopped by a stricture three inches from the orifice, which could not be passed by the smallest instrument. He had been affected with gonorrhœa four or five times. The last time he had the disease, it was followed by a dark coloured tumour on the dorsum of the penis, which suppurated, and was opened with a lancet. He began to experience difficulty in discharging his urine, immediately after the ulcer on his penis healed; and the power of retaining it was lost about two and a half years before his admission. On the 10th of March, the

common armed bougie was introduced, and applied about half a minute. The application was attended with considerable pain, and was followed by a suppression of urine and distention of the abdomen. He took a large anodyne at a late hour in the night, without any relief in his symptoms, and from his violent efforts to relieve the bladder the urine became effused into the cellular substance of the prepuce. This was freely punctured to permit the escape of the effused urine, and a small sized bougie was passed into the Stricture, and permitted to remain. In a few minutes the instrument was withdrawn, and the urine was afterwards discharged with tolerable freedom. Preventive means having been employed, no material inflammation of the penis supervened. The caustic was again applied several times in the course of the month, and the first Stricture was overcome. After this the common bougie was employed to overcome a Stricture of very great firmness. This instrument was exchanged on the 8th of May, for the bougie dipped in the caustic solution. A considerable quantity of stringy matter was discharged with the urine, after the use of it. By the 20th, after repeated applications of the bougie dipped in the caustic solution, an instrument could be passed two and a half inches further. The use of this caustic was continued till the 30th, at which time a bougie could be passed within a short distance of the bladder. On the 2d of June, a common bougie of considerable size was introduced into the bladder. This instrument was used till the 14th of June, at which time he was discharged.

R—d H—n, born in New-York; aged 28 years, seaman, was admitted July 8th, 1814, with gonorrhœa and Stricture. The patient had not been free from clap in eight months. He had been affected with the disease five different times and had experienced difficulty in discharging urine three months. At the time of his admission he passed urine

by drops, and occasionally in a small stream. He complained of pain in the loins, and a sense of weakness and soreness of the perineum. The usual remedies for gonorrhœa were first employed, and after the symptoms of this disease were subdued, the common bougie was resorted to. By the application of this instrument, five different Strictures were passed. Another one obstructed the passage at seven inches from the extremity of the penis. The common bougie was used twenty days to overcome this obstruction, without effect. The bougie armed with the caustic solution was then employed, and after two applications the Stricture was overcome. The common bougie was again employed for two weeks and the patient was discharged on the 14th of September.

H—h L—h, a patient labouring under diseased liver and dropsy, had also Stricture of the urethra. The latter affection caused much inconvenience. He had frequent and urgent calls to make water, and was generally out of bed every half hour for this purpose. His urine passed by drops for the most part, but at times in a very small stream. The bougie was interrupted in its course, four inches from the extremity of the urethra, by a Stricture. This was passed by the bougie; but another obstructed its further progress at seven inches. An attempt was made to pass this also, by a small sized instrument, but without success. The bougie armed with the caustic solution was then used, and on the second application the Stricture was passed. Considerable hemorrhage followed, but the patient experienced very great relief immediately afterwards, and was able to pass his urine with much freedom. After the irritation consequent to the use of the caustic had subsided, a catheter of moderate size was introduced into the bladder.

M——b B——a, a native of France, aged 20 years, mariner, was received from the medical department of the house April 14th, 1814. He had a firm Stricture situate two and a half inches from the orifice of the urethra. Complained of pain and weakness in the small of the back. He had experienced difficulty in passing his urine five or six years, and had been twice affected with gonorrhœa. His urine was discharged by drops, and at times in a very small stream. The common bougie was employed for a considerable length of time without material benefit. In May the bougie dipped in the caustic solution was employed a number of times, with the most decided advantage. Three Strictures were in succession encountered and passed. On the first of June the bougie could be introduced six inches, and on the 22d of the same month another very considerable Stricture was overcome by the above mentioned instrument. In September a large silver catheter could be passed very readily into the bladder.

W——m W——bb, born in Salem, Massachusetts, aged 42 years, seaman, was admitted 16th of August, 1814, with syphilis and a firm Stricture just at the extremity of the urethra.

He had, according to his own account, been affected with the venereal disease above thirty times, and the glans penis had been destroyed by previous chancre. He had experienced no very material inconvenience in passing urine, till a few days previous to his admission.

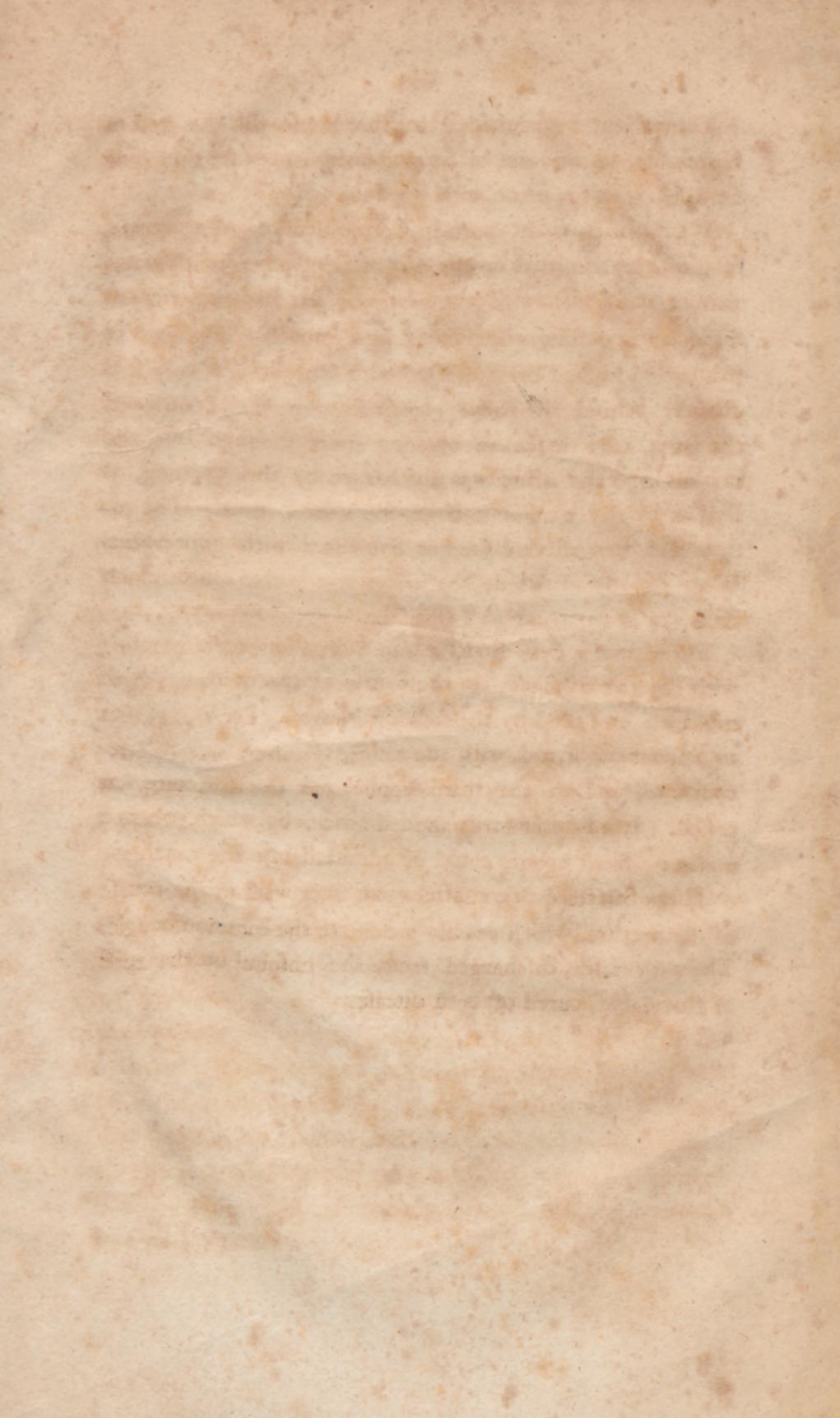
After his chancres had healed, a very small bougie, armed with the caustic solution, was passed into the Stricture. The application of the caustic was several times repeated, till the passage of a moderate sized bougie could be admitted. Two Strictures were afterwards encountered and overcome by this instrument.

The patient was detained in the house till the 22d of November, on account of an inflamed eye. At this time he discharged his urine with freedom.

W——m B——h, born in Connecticut, aged 27 years, seaman, was admitted on the 6th of September, with rheumatism and Stricture of the urethra. He had experienced difficulty in passing urine about four months. Previous to this period he had been affected with syphilis. A very foul chancre behind the *corona glandis* so completely destroyed the parts, as to make an opening quite through into the urethra, and the urine was discharged by this opening, as well as by the natural passage, for a short time. The patient had been affected four or five times with gonorrhœa. When he was admitted, the urine was passed with much difficulty in drops, or in a small interrupted stream.

There was a firm Stricture in a situation corresponding with the *corona glandis*, in the course of the urethra, which could not be passed by the smallest bougie. For this reason an instrument armed with the caustic solution was had recourse to, and on the third application the Stricture was passed. It was afterwards applied twice, by which means a moderate sized bougie could be admitted into the canal.

Three Strictures were afterwards met with in the course of the urethra, which readily yielded to the common bougie. The patient was discharged from the hospital on the 29th of November, cured of both diseases.





Med. Hist.  
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