

Remarks on the morbid retentions of urine.

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521
R E M A R K S
O N
M O R B I D R E T E N T I O N S
O F
U R I N E.

B Y
C H A R L E S B R A N D O N T R Y E,
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M E M B E R O F T H E C O R P O R A T I O N O F S U R G E O N S I N L O N D O N , A N D
S U R G E O N T O T H E G E N E R A L I N F I R M A R Y , I N G L O C E S T E R .

Ne illud quidem physici est, credere aliquid esse minimum.
CICERO. DE FIN. BONOR. & MALOR.

G L O C E S T E R :
P R I N T E D B Y R . R A I K E S .
A N D S O L D B Y
J . M U R R A Y , F L E E T - S T R E E T , L O N D O N ;
E V A N S A N D H A Z E L L , A N D S . H A R W A R D , G L O C E S T E R .
M . D C C . L X X X I V .

R. E. M. A. R. K.

WORLD KATHYIONS

E. I. N.

MARKS & BRANDS

ALL THE MARKS & BRANDS
OF THE WORLD ARE HERE
RECORDED IN THIS BOOK

AND THE NAMES OF THE
OWNERS ARE ALSO
GIVEN IN THE SAME

ORDER AS
THEY ARE
REGISTERED BY THE
LAW

AND THE
MARKS & BRANDS
OF THE WORLD ARE
HERE
RECORDED IN THIS BOOK

JOHN SHELDON, Esq. F. R. S.

PROFESSOR OF ANATOMY

IN THE ROYAL ACADEMY OF ARTS,

AND

TEACHER OF ANATOMY, PHYSIOLOGY, AND SURGERY,

IN LONDON,

THE

FOLLOWING PAGES ARE INSCRIBED

AS A TRIBUTE OF

GRATITUDE, FRIENDSHIP, AND ESTEEM,

BY HIS FAITHFUL,

AND OBEDIENT HUMBLE SERVANT,

THE AUTHOR.

JOHN SHELDON, F.R.S.

PROFESSOR OF ANATOMY

IN THE ROYAL ACADEMY OF ARTS

AND

LECTURER OF ANATOMY, PHYSIOLOGY, AND SURGERY

IN LONDON

THE

FOLLOWING PAGES ARE INSERTED

AS A TESTIMONY

TO HIS VIRTUES AND MERITS

BY HIS PATRONS

AND COLLEAGUES

THE AUTHOR.

P R E F A C E.

IT was my intention to have postponed to a future period the publishing of the following Remarks, in hopes by farther observation to have rendered them more full and satisfactory. But the opinions of some respectable professors of our Art, have induced me to take a different resolution. Indeed, if it be true, that my paper contains some useful hints, the more early they are communicated, the greater will be the probability of its conducing to the public good.

I have

I have confined my remarks to what is the result of my own experience and observation, chusing rather to treat my subject imperfectly, than to have recourse to a multitude of quotations.

I do not propose to give a complete account of the methods of cure of Retentions of Urine. Had I undertaken that task, I must have traversed a very wide field, and have particularly considered a variety of circumstances which are connected with the subject before me, and which may retard the restoration of the patient to his perfect health; for instance, fistulæ in perineo, strictures of the urethra &c.—I have little more in view than to explain what is to be done for the immediate preservation and present relief of the patient.

The

The sketch which is given of the structure and physiology of the bladder and urethra may appear extremely trifling] to adepts in anatomy; but will render the subsequent sections more intelligible to those who are little versed in that science.

I have omitted details of the cases, from which I drew my observations, from a belief that they would answer no other purpose than that of multiplying pages.

Upon the whole, if unfortunately the reader should experience little satisfaction from this publication, its brevity will preserve me from the reproach of having greatly trespassed upon his time and patience.

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R E M A R K S

O N

Morbid Retentions of Urine.

S E C T. I.

EVERY improvement, however trifling, in an art of so much importance as Surgery, in lessening the natural evils of mankind, is an object in every respect worthy to engage the attention of the philosopher, and of the man.

This consideration induces me to offer to the public a few observations, which, I flatter myself, will not prove altogether useless, on a disease always distressing, frequently dangerous, and not uncommonly fatal.

No part of the practice of surgery is attended with greater difficulty than the treatment of the diseases of the bladder and urethra; the true nature of them is often extremely obscure; and when discovered, it is not easy to direct the proper means of relief.

I make use of the term Morbid Retention in preference to the ordinary one of suppression of urine, because it more particularly expresses the nature of the disease; for the latter term is more vague, and may be extended to the secretion itself; while the former implies, that the kidneys have done their office of secreting the urine, but that this fluid cannot be expelled, on account of some impediment being formed to its passage out of the body.

To obtain a clear idea of any local affection it is necessary, that we should previously inform ourselves of the structure and physiology

logy of the parts, which are the seat of the disease in question.

The seat of urine, morbidly retained, may be either the ureter and the pelvis of the kidney, or the bladder, and urethra.

We sometimes find a ureter enlarged to a prodigious size, as well as the pelvis of the corresponding kidney, from the descent of the urine into the bladder being obstructed by a stone lodged in the inferior portion of the ureter.

These parts have been likewise found very much dilated with urine, when an uncommon quantity of that fluid has been accumulated, and involuntarily retained in the bladder.

But as the surgeon's art is incapable of immediately relieving affections of the ureters and kidneys, we shall decline taking any further no-

tice of them, and confine our observations to the bladder and urethra,

S E C T. II.

THE bladder is a bag made up partly of muscular fibres, and partly of cellular substance, with a due supply of blood-vessels, nerves, and absorbents. Its irritability is considerable; its sensibility not very acute; but both may by disease be encreased to the most exquisite degree.

It terminates in the urethra, which passes through the prostate gland, is continued from thence along the perineum, and lower parts of the penis, until it makes an opening in the glans.

As the bladder is a receptacle of a fluid often highly stimulating, and the urethra is a canal through which that fluid is to be conveyed

veyed in its passage out of the body, it is necessary that the internal surface of these parts should be defended with mucus.

In the bladder this is secreted by vessels opening upon its surface; in the urethra, partly by vessels opening upon its surface, and partly in the lacunæ of the urethra, which may be considered as receptacles in which the exhaling vessels deposit their mucus.

These lacunæ, it may be right to observe, are admirably well constructed for the purpose they are to answer; their orifices are turned obliquely towards the opening of the urethra in the glans; so that the pressure of a stream of urine drives the mucus before it out of the lacunæ into the common canal of the urethra.

The urethra has a considerable degree of muscular power; its irritability is very great; its sensibility is infinitely greater than that of the bladder.

It

It must be evident, that I have hitherto been speaking of the male urethra.

The female urethra is very short, and has no prostate gland; it is much more capacious than that of the male. Sometimes in retentions of urine, especially those which occur in the early months of pregnancy, its diameter will be greatly lessened, insomuch, that it will with difficulty admit a small male catheter; and its length will be considerably encreased. By disease it may become extremely irritable and sensible; but in a natural state it seems much less so than the male urethra.

S E C T. III.

THE ureters opening obliquely within the bladder distil into it the urine *guttatim*, so that the distention of the bladder goes on insensibly. When a certain quantity is accumulated, a sense of uneasiness in the part is perceived. The bladder

bladder being muscular is excited to contract; the abdominal muscles, and sometimes those subservient to inspiration, sympathizing with it assist its contractile powers by making a pressure upon its external surface; and the retentive powers, which we shall hereafter speak of, giving way, the urine is expelled through the canal of the urethra, and the bladder then contracts within so small a space that its cavity is almost obliterated.

This evacuation of the urine is an operation partly voluntary, and partly involuntary.

The contractile power of the bladder is altogether independent of the will, but we can assist it by voluntary action with the muscles of the abdomen, and of inspiration; yet the power of sympathy, between the bladder and those muscles, is sometimes so strong, that they will fall into action, although not excited by the will, and even contrary to its impulse.

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S E C T. IV.

TO complete this brief account of the anatomy and physiology of the bladder, let us enquire by what means the urine is retained in the bladder, while all the parts preserve their natural structure and health.

Whoever examines the bladder anatomically, will be satisfied that near the opening of it into the urethra, its muscular structure is more evident, the fasciculi are stronger and seem to take a circular figure, but that a distinct sphincter muscle is not to be traced by the nicest dissection. We may properly enough consider the bladder as one hollow muscle, the fibres of which run in every direction. Now, we know, that different, and even opposite actions, are performed by different parts of the same muscle. In conformity with this idea, we readily conceive, that, when the muscular

cular fasciculi at the neck or mouth of the bladder contract, then the urine will of necessity be retained in the bladder; but when the muscular powers of the body of the bladder produce contraction, if the muscular fasciculi about the opening of the bladder into the urethra do not make too strong a resistance, that then the urine will be thrown out, provided there be no obstruction in the urethra.

But there is also another power, which concurs in producing the retention of the urine; and that is the contraction of the urethra. This canal, as we observed in §. 2. has a muscular power, and can therefore spontaneously lessen its dimensions.

Every man, who has been accustomed to the passing of catheters, or bougies, must be convinced of this; for he frequently finds the urethra embracing the instrument so closely,

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that,

that, without more than usual force, it is not to be withdrawn. The urethra contracting itself must afford additional means of retaining the urine in the bladder, 'till a quantity is accumulated, too great to be longer endured, without inconvenience; and then the expulsive powers beginning to act, and the retentive giving way, a stream of urine is continually thrown off, 'till the bladder ceases to contract.

That the urine may be properly and regularly evacuated, the dilatation of the urethra must be synchronous with the contraction of the bladder, and must be in proportion to the force and velocity with which the bladder contracts.

S E C T. V.

HAVING so far investigated the structure and functions of the bladder, let us proceed to
 speak

ſpeak of the cauſes of Morbid Retentions of Urine, and of the proper modes of treating them.

It is not my intention to give a compleat account of the ſubject I have choſen; for I profeſs to go no farther into it, than my own experience and obſervations have led me.

Preternatural Retentions of Urine may be partial or total, and may ariſe from either of the following cauſes:

(a.) A want of tone in the muſcular fibres of the body of the bladder; by which it will be deprived of the power to contract.

(b.) A paralytic affection of the bladder; in which caſe, it will not receive a diſpoſition to contract.

(c.) An inflammation, or spasm of the muscular fasciculi, which surround the opening of the bladder into the urethra.

(d.) The canal of the urethra being rendered incapable of dilatation, by

Inflammation,

Spasm,

Stricture, or

Pressure.

(e.) An extraneous body, as a stone, lying upon the opening of the bladder, or lodged in the urethra.

(f.) There is also another cause of Retention of Urine, of which I have seen two fatal instances; this is a bursting or laceration of the coats of the bladder.

For the sake of precision, we will consider the Retention produced by each of these causes as a different species of the disease.

S E C T.

S E C T. VI.

THE diminution of the tone of the bladder (*a.*) is almost always brought on by an accumulation of urine producing a very great distention of its coats.

The less sensible the bladder may have been rendered, or the more it may have been weakened by former complaints, the more liable it will be to fall into this state: for it must be evident, that the less sensible it is, the more backward it will be in giving intelligence to the animal of the necessity to evacuate the urine contained in it. Hence it will suffer its coats to become so much distended, that they will at length lose the power of overcoming the resistance given by the urine. It is equally certain, that the weaker the bladder is become, the sooner distention must suspend or destroy its power of contracting.

From

From these premises, it will be readily understood, why women (of this country especially) and old men, particularly those who have addicted themselves to drinking, are most frequently afflicted with retention from want of tone.

Women are not only in general of a weaker fibre than men, but are also more liable to this complaint from the delicacy prevailing among the sex, which often induces them to bear an accumulation of urine for a length of time, at the expence of their ease.

Add to this, that their occupations being mostly sedentary, they are generally inclined to resist as long as possible the calls of nature, rather than suspend their employments.

Dr. DENMAN has fully proved, that the retroversion of the uterus, in the early months of pregnancy, is always owing to this species
of

of retention* ; and which, for the most part, is occasioned in the manner I have been describing.

Old men, especially those who habituate themselves to drinking, are more subject to this complaint, than those of a less advanced period of life, from the diminished sensibility and irritability of their bladder ; and from the frequent unnatural distention of it, produced by the immoderate use of liquors, and the general custom of sitting as long as possible without making water.

S E C T. VII.

PARALYTIC affections of the bladder, (*b.*) commonly arise from some injury done to the spinal-marrow, either by accident, or by disease.

* See DENMAN'S *Introduction to the Practice of Midwifery*.

The too ordinary consequence of a paralysis of the bladder, will be a destruction of its tone; and then the want of a disposition to act, will be complicated with a want of power.

And here the bladder, except that the living principle preserves it from putrefaction, is nearly in similar circumstances with the bladder of a dead person.

The urine may go on accumulating, 'till the mere weight of the fluid has acquired a force superior to that of the resistance made by the proportionably weakened retentive powers, and then the water will dribble away.

It is now generally supposed, that the patient is relieved from his complaint, and is rendered able to make water himself; but this is a mistake: no relief is in fact obtained;

ed; the bladder remains distended to a great degree, and the quantity of water expelled in a given time is scarcely equal to that which is secreted in the same time. When the malady increases to this degree, it is very rarely indeed, that the bladder recovers its health.

S E C T. VIII.

LET us consider the third cause of Morbid Retentions of Urine, which is (c) an inflammation, or spasm of the muscular fasciculi situated round the opening of the bladder into the urethra.

It is a known law in the animal œconomy, that, when a muscular part becomes inflamed, it is preternaturally contracted, and its mobility is diminished.

D

We

We can easily then discover, how the inflammation of these fasciculi shall produce a retention of urine ; for,

1st, The part is incapable of spontaneous dilatation.

2dly, By the pain produced by every effort to evacuate the urine, the abdominal muscles are deterred from co-operating, in due time, with the involuntary muscular powers of the bladder, which latter alone are unable to overcome the obstructing force.

S E C T. IX.

SIMILAR effects must follow an impediment, to the course of the urine, existing in the urethra itself, whether from inflammation, spasm, or stricture, of that canal ; and they are to be explained upon the same principles. The same thing will happen, if the obstruction

be

be made by the sides of the canal being pressed together by any tumor, as when the prostate gland is very much enlarged *, or when any swelling or abscess is formed in either of the three corpora spongiosa.

S E C T. X.

IT is scarce worth while, but for the sake of precision, to speak of the fifth species (*e*). Every one must be aware, that a stone, situated as it is there described, may prove cause of obstruction; and comprehend, after what has been said, the effects of such a cause.

I will here venture to mention a cause of the urine being retained, which I have the authority of more than one surgeon of ex-

* A very common cause of difficulty in voiding the urine, in old men.

perience and distinction, for believing the existence of, although I have never seen an instance of it myself; which is, an excrescence just at the termination of the bladder in the urethra, which, acting as a valve yielding inwards only, prevents the escape of the urine.

S E C T. XI.

THE last cause of Retention, which I have enumerated, is a bursting or rupture of the coats of the bladder (*f*). Of this, I said, I have seen two fatal instances; the first, of a person, over whose abdomen the wheel of a loaded carriage had been driven. The other of a man, whose body had been jammed between a barge and the bank of a river. In neither of these patients was there any wound of the common integuments.

In both cases, a ramus of the os pubis was fractured; the ends of the bone had lacerated
the

the bladder in that part, which is uncovered by the peritoneum; the patient lost the power of bringing his thighs together, and of voiding his urine; which escaping through the wound in the bladder, insinuated itself into the cellular substance of the lower part of the pelvis, of the scrotum, of the upper part of the thighs, buttocks, &c.

The catheter was repeatedly introduced, but little water could ever be drawn off.

Symptoms of general irritation arising destroyed the patients, the one in two days, the other in three.

In the first, the scrotum and the circumjacent parts became gangrenous; and on making deep scarifications into the cellular membrane, the urine freely ran out from the incisions.*

S E C T.

N O T E S.

Diseases of the uterus, beside the retroversion of it in its impregnated state, will sometimes occasion very
obstinate

S E C T. XII.

LET us now dwell a little upon the consequences of these obstructions to the free passage of the urine.

If

obstinate Retentions of Urine; the hæmorrhoids may likewise produce similar consequences; and in these cases the Retention will not go off, till the complaints which gave rise to it are relieved.

Inflammations and abscesses of the cellular substance in the vicinity of the rectum may occasion similar effects; but the Retention produced by these affections, will be either spasmodic, or will depend upon the inflammation extending itself to the bladder or urethra.

Another cause of a Retention may be, the hernia or displacement of the bladder; I have never seen it myself; but will take the liberty of giving a short account of it, collected from Mr. JUSTAMOND's Lectures on Surgery: —

“ The

If the impediment be in the passage from the cavity of the bladder to the exterior orifice of the urethra, and arise suddenly, as in case of inflammation, or of spasm, the bladder itself being in an healthy state; the patient will very soon experience a desire to make water, and the muscular powers of the bladder will cause it to contract, and endeavour to overcome the re-

“ The cystocele or hernia of the bladder may prove a cause of suppression of urine; it may be either simple or complicated; if simple, it may be distinguished by the softness of the tumor; by a sense of fluctuation; by the absence of the symptoms of a strangulated gut; by a suppression of urine, with a frequent desire of evacuating it; by the disappearance of the tumor upon pressure; and by the flow of the urine from raising the scrotum, and pressing it gently.

“ If complicated with the bubonocoele, the fore-mentioned symptoms will be joined with those of a strangulated gut; and in this case, the bladder will lie to one side of, or perhaps under, the hernial sac, between that and the spermatic cord.”

distance

sistance given to it. This it will be unable to do ; it will then exert still more violent efforts, but equally unsuccessful ; and these will be almost every minute repeated, but without effect.

If the obstructing cause be not speedily removed either by nature, or by art, the worst consequences will ensue ; the whole internal surface of the bladder will be inflamed, and afterwards fall into a state of gangrene ; the patient will suffer the most excruciating torture ; violent symptoms of general irritation will come on ; and the patient in a short time will fall a victim to the disease.

Upon dissection, the kidneys will often be found to have partaken of the general inflammation (sometimes both, sometimes one alone) and the pelvis, with the infundibula, filled with a bloody exudation.

The bladder will be found thickened, and its internal surface discoloured.

The urine contained in it will be of a dark brown colour, intolerably putrid and offensive; and sometimes small clots of blackish blood of a loose texture will be seen diffused through that fluid, or lying upon the bladder. Indeed the urine drawn off during life, but late in the disease, will be extremely foetid and discoloured.

S E C T. XIII.

IF the obstruction should gradually become greater, and the retention at first be only partial, and that in a slight degree; then

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the bladder will gradually increase its force of contraction, in proportion to the increase of the resistance.

The violence of the action of all involuntary muscles is increased in proportion to the resistance it meets with; and the more they are used, provided the living principle in them be not destroyed by the violence of their actions, they become more irritable and more ready to fall into action.

Thus the bladder will not at length allow of the natural degree of distention, before it begins to contract; because it is unnaturally susceptible of action: and when it does contract, it is with an increased force; because
its

its muscular powers have been improved, and it exerts itself more violently to overcome the resistance.

When the Retention becomes total, the bladder is placed in circumstances like those described in § 12.; but with this difference, that the bladder takes on inflammation, and the subsequent gangrene more slowly in the present case, than when the passage of the urine has been suddenly obstructed.

In some cases, in which, after a continuance of the obstruction for two or three days, the Urine has been discharged, either with, or without the assistance of the catheter; I have seen the first part of the stream preceded by, or accompanied with, a quan-

tity of purulent matter; and the same circumstance has been repeated the three or four following times of emptying the bladder.

Here I imagine that the internal surface of the bladder must have undergone a supuration, as I cannot believe the pus to have been formed in the urethra; for in that case the matter would have been discharged at other times as well as in voiding the urine, and especially, in striving to go to stool,---But the truth of this opinion I have never ascertained by dissection.

S E C T.

S E C T. XIV.

WHEN the Retention arises from a paralysis or atony of the bladder, a prodigious degree of distention will be endured by that viscus, even to its containing two or three quarts of urine, without the symptoms of irritation coming on, or the patient suffering any considerable pain.

I have known a woman, whose bladder was so distended, that her abdomen appeared like that of a person far advanced in pregnancy, walk nearly a mile for advice; and who suffered so little uneasiness in her bladder,

der, as not to have the least suspicion of the cause of the tumor.

A surgeon will readily distinguish such a swelling of the abdomen from pregnancy, and from ascites; from the former by the very evident fluctuation, as well as by an examination taken *per vaginam*; from the latter, by the tumor being circumscribed; and from both, by the history of the disease given by the patient.

If this kind of Retention continues for a length of time then the retentive powers also will become weakened, and the urine will dribble away. For an explanation of this phænomenon, see § 7.

It is not unusual in this species of the disease for the urine to be discharged of a wheyish colour; this is probably owing to an alteration in the secretion of the mucous membrane of the bladder, and the matter secreted having blended itself with the urine.

We may observe a material difference between the effects of this species of Retention, and of that described in the two preceding sections.

For supposing the patient to remain a length of time without relief, and then the urine to be drawn off by the catheter, or to dribble away, its fœtor and discolouration will be less than in the other species.

Symp-

Symptoms of irritation do not appear, or do not rise at least to any remarkable height. If the patient is ultimately destroyed by the disease, he seems to die from weakness, exhausted, and worn out by a kind of hectic.

In the other species the tongue is always dry, hard, and rough like a file, and generally covered almost to the very edge with a dark brown crust. But in this, the tongue is not in general furred, wants the brownish crust, is sometimes moist, and if dry, is still smooth.

In the others, the disease, if not relieved, is fatal in a few days. In this the patient

tient may live for many weeks, his urine in the mean time continually dribbling from him.

In the former, the patient's body will have a strong urinous smell from the absorbents of the bladder taking up the foetid urine, and carrying it into the blood, from which it is again separated in the different secretions. In this species, if proper attention be paid to cleanliness, the foetor is little if at all perceptible; because the urine is in itself less foetid, and the lymphatics (here weakened in common with all the other parts of the bladder) are less active in absorbing it.

The former, probably, never proves fatal without coma, alienation of mind, and other affections of the nervous system.

S E C T. XV.

IF the Retention from a stricture in the urethra (§ 8.) should continue for some time without the obstruction giving way, the urine being drawn off, or the symptoms of irritation or a gangrene destroying the patient; it is not uncommon for an ulceration of the urethra to arise in the part which is the seat of the stricture; and the urine insinuating itself into the cellular substance of the perineum and scrotum, to produce inflammation,

mation, suppuration, and ultimately what are called fistulæ in perineo.

S E C T. XVI.

PRESUMING I have taken a satisfactory, though a brief, survey of the history of Retentions of Urine, let me now offer what hints I think will conduce to the proper treatment of the disease.

S E C T. XVII.

THAT the Surgeon may avoid mistakes, it will be necessary that he fully inform himself of the history of the disease from its first commencement; for greatly indeed must

the treatment differ in the different species of Retention.

When the complaint arises from atony or paralysis (§ 5. *a.* *b.* § 7. 8.) it would be with me a decided maxim, always to have the earliest recourse to the catheter, at what period of the disease so ever I might be called in, having no reliance either on nature or medicine, unless that instrument be previously introduced.

I should also, from what I have seen of the utility of the plan, be led to repeat the use of the catheter three, four, or five times in twenty-four hours. For the bladder should by no means be suffered to be distended even
to

to that degree which was customary in time of health. It should be habituated to contract frequently, or at least to be brought into that state, which is as like to contraction as possible.

As for what is to be done beside the use of the catheter; the Cold bath, or if the bath be objected to, throwing cold water with force upon the abdomen of the patient; rubbing the region of the bladder often with some stimulating liniment; clysters composed of substances, which specifically stimulate the urinary passages, joined with such internal remedies * as the physician may think expedient,

* Of these, the Tincture of Cantharides should seem to promise the greatest advantages from its specifically

expedient, will probably form the most promising plan of a cure.

A theory founded upon rational principles has led practitioners, in cases of atony and of paralysis of the bladder, to the application of blisters to the region of the † sacrum; and

specifically stimulating the urinary passages. But I cannot say I have seen it remarkably serviceable. It is probable indeed, that little is to be expected from the specific operation of any internal remedies, and that our attention must be directed to those medicines only, which alter the state of the tone and action of the solids in general, as for instance, mercury, bark, &c.

† The nerves of the bladder, excepting those which it receives from the intercostals, are formed from the fourth sacral nerve.

great

great advantages are said to have been derived from their use. Hitherto I have not had the good fortune to see them applied with success. The patient cannot conveniently go into the bath, while they are used.---But what other remedies so ever are recommended, we cannot enough insist upon the propriety of regularly emptying the bladder with the catheter as often in twenty-four hours as seems to be indicated, and to persevere in this practice, 'till the patient finds a return of the expulsive powers.

S E C T. XVIII.

IF the obstruction has arisen suddenly, as in the species (§ 5. c.) a dose of laudanum
and

and nitre should be immediately administered and repeated in the course of half an hour, or an hour, if relief be not obtained. If there be symptoms of inflammation the patient should be copiously bled. Let fomentations be applied to the abdomen, and emollient and gently aperient clysters be injected. But if the impediment do not give way, we should waste no great deal of time before we proceed to the use of the catheter; the introduction of which, if attempted with gentleness, caution, and skill, does far less injury, than the continuance of the Retention. For it will commonly happen, if the bladder be once emptied in an early stage of the disease, that the cause of the complaint will cease, before the bladder becomes again distended. It is impossible to
specify

specify the exact time a surgeon should wait before he has recourse to the catheter; that must be decided by the urgency of the symptoms. But I should hope to appear not too hasty in advising that measure, as soon as the practitioner has reason to fear he shall not give his patient speedy relief by any other means*.

* That my meaning may not be misunderstood, I will take the liberty to remark that I advise the use of the catheter upon the presumption only, that the surgeon has ascertained the bladder to be in a state of distention; for, few can want to be informed that very distressing symptoms, as violent pain, a frequent but ineffectual desire to make water, &c. will sometimes come on, when there is very little urine in the bladder.

These symptoms, when they do not depend upon distention, cannot be alleviated by the use of the catheter.

The warm bath is also highly adviseable, not only as a most powerful anodyne and relaxant, but also as disposing the patient to a copious perspiration. From this latter property of determining the fluids to the skin instead of the kidneys, it has a tendency to diminish the secretion by the latter.

Indeed, in all cases whatever, where it is thought adviseable, whether from any difficulty in the operation, or from some other motive, to delay the introduction of the catheter, the Warm Bath should by no means be neglected; and the patient should go into it as often as his strength will permit; for tho' it should not answer our end fully by occasioning the obstruction to give way, it will at least tend to keep the disease stationary.

nary, not only by making the accumulation of the urine gradual, but also by moderating the general symptoms of irritation. In this case camphor will be advantageously joined with the opiate recommended above, as rendering its action as a sudorific more certain.

Should the symptoms of inflammation, or spasm not readily give way, we may then administer a small dose of emetic tartar as one of the most efficacious of the class of internal relaxants, and repeat it frequently.

S E C T. XIX.

IF any thing is to be done in that lamentable case in which the bladder is burst without any external wound*, I should doubt whether the only possible resource will not be the frequent use of the warm bath, opiates and sudorifics, and in scarifying the cellular membrane of the scrotum, or any other part of the common integuments where the urine has insinuated itself. Indeed so deplorable is the state of the sufferer, that it must be rather from that principle of duty, which forbids

* See § 11.

a surgeon to "abandon his patient 'till there be an evident impossibility of his recovery, than from any expectation of success, that we should exert our endeavours in his service.

Let me hope, I do not propose an absurd question in asking, If in such a case we should be justified in making the incision of the lateral mode of lithotomy into the bladder; and by causing the patient to lie on an inclined plane to render the artificial opening, a depending one, and thus endeavour, by giving a ready exit to the urine, to prevent the insinuation of it into the cellular substance?

S E C T.

S E C T. XX.

WHEN an inflammation of the urethra, by whatever cause induced, occasions the Retention, it will sometimes happen, that the whole penis shall become so tense and swollen, as to appear nearly in a state of erection. In this case the application of leeches to the penis and perineum may be added to the other remedies.

S E C T. XXI.

THE management of Retentions of Urine from strictures of the urethra is attended
with

with greater difficulties; for beside those in common with the other species, it has also those peculiar to the introduction of the catheter. For the urethra may not only have its size diminished, but its figure also may be altered, and its course rendered winding, and tortuous.

The doctrines already laid down seem to be sufficient for the relief of this species of the complaint, except in what relates to

1st. The circumstances of passing the catheter.

2dly, To the urine being retained, after

we have succeeded in the introduction of the instrument, and

3dly, To the methods to be adopted, when we are foiled in our attempts to introduce it.

Let us suppose, that the Surgeon, after having unsuccessfully employed such remedies as the preceding pages, and his own reason, and experience, shall have suggested to him, becomes satisfied in his mind, that it is time to evacuate the urine by art. He will then endeavour to pass the common catheter; and if he finds an impediment to its progress, he will not use force to break through the obstruction for fear of making an unnatural passage, but withdraws his instrument

ment and tries a smaller, but without effect. Let us then suppose him equally unsuccessful in his attempts with bougees even of the smallest size.

This question naturally arises; What farther means can the *hand* of the practitioner employ for the relief of his patient?

I will venture to mention an expedient, which experiment justifies me in recommending.

We are unsuccessful in our attempts to relieve our patient, because neither the catheter nor bougee possess a sufficient degree of flexibility, joined with a sufficient degree of strength, so as to enable us to use force

without injury to the patient. For if we can once pass a bougee into the bladder, we shall rarely, if ever, fail of accomplishing in the end the evacuation of the urine.

I am convinced from repeated trials, that a great deal may be done under the circumstances we have been just speaking of, by a column of olive oil.

I will be particular in describing the manner of using it.

Take the penis in one hand, and with a small syringe throw into the urethra some recent olive oil, 'till a considerable resistance be given to the piston of the syringe, and
the

the urethra shall feel tense; close the urethra by compressing the penis near its glans between a finger and thumb, and then with the other hand stroke the penis upwards, that is towards the scrotum, so as to force onwards the column of oil already thrown in. As soon as the lower part of the urethra is become less tense, inject the oil again, and stroke the penis in the manner already described; repeat this once or twice more, and then try a small bougee, which will now probably pass; afterwards a larger, and then a larger; and so on, 'till the urethra be sufficiently dilated to allow of the introduction of a catheter.

Here let me observe, that a large bougee will sometimes pass, when we can make no pro-

grefs with a small one probably from its point being entangled in some fold of the urethra.

We should allow every bougee to remain some time in the urethra before we withdraw it, and attempt to pass a larger or to introduce a catheter.

In cases of spasm where the immediate introduction of the catheter has been impracticable, a bougee remaining for fifteen or twenty minutes in the urethra, has induced such a change in the state of that canal, that the patient has been enabled to make water without farther assistance.

If the urethra be rendered tortuous by the strictures, it is probable, notwithstanding

we

we may have procured a considerable dilatation by the means already described, that a silver catheter cannot be introduced. In this case great advantages may accrue from the elastic flexible catheters made of the Caoutchac, or elastic vegetable substance, which were lately invented in Paris, and are now to be purchased of the instrument makers in London. They are flexible and compressible every way, and may be passed whenever a moderate sized bougee can be used. After the use of the oil and bougees, the Surgeon will have recourse to a catheter of this kind*, if the urethra will not admit a silver one.

* I pass over the flexible metal catheters, because their use is entirely superseded by those made of Caoutchac.

The oil answers two purposes; first that of an extremely flexible bougee which will adapt itself to a canal of any size, and to which we can also give the property of strength, by the force we apply a tergo: and secondly, that of an emollient and relaxant of the urethra, lubricating all its internal surface, and thus facilitating the passage of the instruments afterwards to be employed.

Indeed, whenever the introduction of a catheter or a bougee is found in the least difficult, it is better that it should be withdrawn, and the oil injected, before we repeat our attempt.

When we have pushed the catheter into the bladder, and drawn off the urine, it is a question

question whether we should suffer the catheter to remain in the bladder, or withdraw it immediately.

If a silver catheter has been used, it should be changed for a bougee; but in retentions from stricture, I see no objection that can be made to the continuance of a caoutchac catheter in the bladder, because with all the advantages of a bougee, it hath the additional one of there being no necessity to withdraw it and repass another instrument two, three, or four times a day. This catheter, as we have before said, is flexible and compressible in every direction, while the silver one on the contrary is incompressible and inflexible; the latter will therefore tend to irritate and inflame the urethra,

urethra and bladder if continued in, and will not allow the patient to move his body without inconvenience ; but with the elastic vegetable catheter in the same situation, he may even walk about.

Before we suffer any foreign body to remain for a length of time in the bladder, we should first inquire whether the patient be subject to calculous complaints ; for if this should be the case, a stoney incrustation may in a day or two be formed round the part of the catheter or bougee that remains within the bladder, and prove an obstacle to our endeavours to remove it.

If, however, we resolve to let the caoutchac catheter remain, we should place a cork in
the

the mouth of the instrument; withdrawing it at proper intervals of time, so as just to anticipate a sense of pain from distention of the bladder, and thus imitating as much as we can the actions of nature.

S E C T. XXI.

IT sometimes happens, after the catheter has been introduced into the bladder, that there is a difficulty in making the urine flow, although the bladder be then in a distention; at other times the urine will still be totally retained*.

* The present Professor Gregory of Edinburgh, takes notice of this circumstance,

——— “ *Ita ut ne quidem immisso tubulo ad educendam urinam, hæc profluat.*

Conspect. Medicin. Theoret. Sect. 733.

The cause of this disappointment may be either, first a partial or total loss of power in the bladder to contract. Or,

2dly, Clots of blood, mucus, &c. obstructing the holes or eyes of the catheter. Or,

3dly, Both these causes may exist at the same time.

S E C T. XXII.

IN order to understand how these causes § 21. can operate in producing their effects, it is necessary that we previously consider the principles upon which the evacuation of the urine by the catheter depends.

These

These are, first, the power of the bladder to contract upon the urine, and thus force it through the unobstructed canal of the catheter; or, 2dly, the urine running off, independent of any action in the bladder, and merely upon hydraulic principles.

A paralytic bladder, or a bladder which has lost its power of contracting is nearly in the same condition with that of a dead person. It may be in a state of distention, we may have introduced our catheter; but, if the patient do not lye in a position favourable to the escape of the fluid, the urine will not flow.

We are then in a dilemma, from which we endeavour to extricate ourselves by shifting

the direction of the instrument, by changing the position of the patient, or by making pressure upon the abdomen.

The latter expedient increases the sufferings of the already too miserable patient; the second is often extremely distressing and fatiguing to him, and three or four assistants may be required if he should be too ill to rise, and move his body himself.---Even the shifting of the direction of the instrument, as by depressing the handle of the catheter, is frequently not to be done without giving pain. These inconveniences every Surgeon must have experienced.

By applying the principles of Pneumatics to the practice of Surgery, I have been
enabled

enabled to suggest a method of emptying the patient's bladder when so circumstanced; and that without pain, or fatigue to him, trouble to the Surgeon, or the necessity of assistants. This is to be done by means of that simple machine, a pump. I have given a drawing of the one which I have used for this purpose, with an explanation annexed.

When the catheter has been introduced and we find that the water does not readily run off, the first circumstance we must ascertain is whether the instrument is in the bladder; this is to be known by examining with the finger in the rectum, and by perceiving no resistance to the extremity of the instrument in gently turning it about as we do in searching for a stone.

The

The brass pipe of the machine is then to be inserted into the mouth of the catheter; the former being conical will readily adapt itself to the latter, even so as to be air tight; the penis is then to be gently compressed, but so as to make the urethra lie in close contact with the catheter, and to prevent the insinuation of the air between them. Having done this, by working with the piston of the pump a vacuum will soon be made in the catheter, which the urine will rush into and fill, and ultimately rise through it and the flexible tube into the glass receiver; as soon as that is full, we are to withdraw the machine; and admitting air into it by loosening the screw in the brass collar the receiver will readily be emptied. The instrument must then be replaced, and the operation repeated till the urine be entirely drawn off.

Thus

Thus the bladder is emptied by a very simple process, with neatness and ease.

Secondly, though the bladder retain its power of contracting, coagula of blood or collections of mucus may plug up the holes, or eyes of the catheter, (whether it be the common one with small holes on each side and with a bulbous end, or that formerly in use with long eyes) and thus obstruct the efflux of the urine.

Filling the catheter with oil previous to the introduction of it, is a method which I have successfully used, and which was taught me by a gentleman of deserved reputation in his profession, Mr. JEFFERIES, of Worcester.

Fill the catheter with pure olive oil, by suction either with the mouth or a syringe, and placing a finger on the extremity of the instrument to prevent the escape of the oil, pass it into the bladder; then withdraw your finger, and the oil will flow, generally followed by a stream of urine. I say generally, for sometimes the clots of blood or mucus may be too large or of too firm a consistence, to be forced through the catheter by the action of the bladder alone.

Thirdly, both the first and the second cause may exist at the same time, and then also the expedient of filling the catheter with oil will be inefficacious.

But in these circumstances and in all others, when the introduction of the catheter has been accomplished,

accomplished, it is scarce possible to fail with the machine which I have been already recommending.

This conclusion is drawn from various experiments made upon dead bodies, as well as from successful trials upon the living subject.

One patient was in the extremity of danger; I had repeatedly introduced, with the greatest facility, catheters of different sizes both with holes, and with long eyes; I repeatedly tried the expedient of filling the catheter with oil, pressure on the abdomen, change of the position of the patient's body, &c. but without effect. I had the good fortune however, to pump up from his bladder more than three pints of urine, and at different times, in the

course of the operation, large coagula of blood formed into long ropes, which nothing but the amazing power which the pressure of the atmosphere gave to the urine, could have forced through the catheter.

A second was relieved by the same method.---It succeeded also in a third instance so far at least as to empty the bladder; but a gangrenous state of that viscus and the general irritation of the system, the patient having been ill of the retention four or five days without assistance, had made his recovery impossible.

Besides those cases which have fallen under my own notice, four others, in which the urine would not flow upon passing the catheter,
have

have been communicated to me by practitioners of distinction.

In one the retention proved fatal, the urine never being evacuated.

Another case fell under the care of a worthy friend of mine in London lately deceased, who called in the aid of a then most celebrated anatomist. The catheter was repeatedly introduced by both gentlemen, but without success. Fortunately the next day nature removed whatever was the obstructing cause, and the urine ran off without the assistance of art.

The third was that of an elderly gentleman, who was preserved afterwards by filling the catheter with oil as directed in this section.

The fourth was relieved by pumping up the urine.

Happily, cases of this kind are but rare ; but it behoves us to be prepared against them ; for when they do occur, the patients must either be abandoned to their fate or submit to the paracentesis of the bladder, unless some expedient can be devised for the removal of the obstacles to their relief.

Such an expedient is suggested in the method here proposed, which seems to be countenanced by the soundest reasoning. It may render a precarious and disagreeable operation unnecessary, and may preserve life : at least it will certainly be found upon many occasions to lessen trouble, to remove difficulty,

culty, and to shorten and alleviate the sufferings of the patient *.

S E C T. XXIII.

NEVERTHELESS, there may be Retentions of Urine in which the size of some part of the urethra may be so greatly di-

* The doctrines recommended in this and the preceding section must be regarded as applicable to every species of retention, in which the difficulties, of which we have just been speaking, arise. For different species of retention may be complicated with each other. Thus the bladder may want the power to contract, and at the same time there may be a stricture in the urethra; &c.

minished,

minished, and the direction of the canal so much altered by old and confirmed strictures, that no catheter of whatever size or fashion can be introduced into the bladder.

Supposing the instrument in these instances, could be carried high up in the urethra, I should not absolutely despair of evacuating the urine by the use of the pump.

This I was once in hopes of being able to effect in every instance; but a failure in the only case of the kind in which I have had an opportunity of trying my machine, have rendered my expectations less sanguine.

I had

I had flattered myself, if the urethra were not rendered totally impervious to a fluid, that I should be able to draw out that fluid, as the urethra would in fact be made a continuation of the canal of the catheter. But in this I was disappointed.

I imagine the reason of my failure to have been, that, when a vacuum was made in the catheter, the sides of the urethra were compressed together; the pressure of the atmosphere operating upon them, and not upon the bladder.

But several experiments since made upon the dead body have taught me to believe, that it is possible to remedy this inconvenience by keeping the portion of the urethra above
the

the stricture dilated by means of oil. This is effected by throwing oil up the catheter into the urethra with some little force, and keeping that force applied for some time previous to the joining of the brass pipe to the mouth of the catheter. For this purpose the catheter must be made open at both ends, and very little curved *. For if we can keep the urethra dilated from the bladder to the part where the catheter stops during the time we make a vacuum, then let that

* The mucous membrane of the urethra will be applied to, and fill up the holes or eyes in the sides of the catheter, for which reason there should be an opening in its point. And the catheter should be very little curved; that the point of the instrument may not be applied to either side of the canal of the urethra, but take such a direction, that the axis of the hole in the former may exactly correspond with the axis of the latter.

part

part of the canal be ever so straitened, still a small stream of fluid will come off, which, by continuing the action of the piston, we may keep up 'till the bladder be emptied.

But I can contend for the probability only of success from this process, not for the certainty. Could the latter be depended upon, the invention would assuredly be an improvement of the most extensive utility; because retentions from old and confirmed strictures, in which the catheter cannot be introduced without difficulty to the surgeon, and torture to the patient, occur every day.

S E C T. XXIV.

IF the reader should agree with me in opinion, he will apply these doctrines, and

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this

this practice, as far as it will go, to Retentions from pressure upon the urethra.

The enlargement of the prostate gland is by no means unfrequent in old men; hence another reason why they are particularly subject to the complaint under consideration.

Whatever may be done by way of evacuating the urine, and giving them present relief, I do not know of any plan of treatment, that can promise a cure.

Possibly the frequent use of the Hemlock bath, mercurial frictions on the perineum, and frequent endeavours to dilate that portion of
the

the urethra, which passes through the prostate, by injecting oil, and by the use of bougees, may prove beneficial. It is a melancholy case, but happily does not often occur, 'till that advanced period of life, which naturally leads to the grave.

S E C T. XXV.

NOTWITHSTANDING all the exertions of skill and care to prevent the necessity of a paracentesis of the bladder, yet it is to be feared, cases will happen, in which it must be our last resort, as giving the patient the only chance for life.

I will not take up the reader's time in describing the different methods of performing

the operation, as that has been done by the labours of others*, in a manner which I cannot improve; nor shall I presume to give an opinion, which of those methods is most eligible.

I will venture however to advise the Surgeon, who may be disposed to prefer making his wound above the os pubis, not to use a very short trochar; because, as the urine runs off, the bladder will collapse, and

* See SHARP'S Operations, SHARP'S Critical Enquiry, REID'S Elements of Surgery; also a pamphlet published by Mr. REID, in consequence of a dispute on the subject of the puncture of the bladder through the rectum, carried on between himself and an anonymous writer in the Gentleman's Magazine for May, July, and August, 1777, entitled, "An enquiry into the merits of the different methods of puncturing the bladder."

withdraw itself from the cannula of such a trochar; and then the urine will insinuate itself into the cellular substance of the hypogastrium, and produce many of the inconveniencies complained of as the consequences of the high operation for the stone, such as extensive inflammations, suppurations, &c.

I mention this from having seen the paracentesis of the bladder performed above the os pubis with a very short hydrocele trochar; the consequences were those I have described; and had nearly proved fatal to the patient.

S E C T. XXVI.

THE preceding Remarks, excepting what relates to the peculiarities of the male urethra,
may

may be considered as applicable to the treatment of Retentions in women. The female urethra being wide, short, and straight, commonly admits of the introduction of the catheter with the greatest facility. But it may be otherwise, when a retention during pregnancy is accompanied with a retroversion of the uterus. In this case, as the bladder in being distended is obliged, by the peculiar situation of the uterus, to rise higher and higher in the abdomen, the urethra is drawn upwards; its external orifice is scarce to be discovered; its canal is so much elongated, and its diameter diminished, that a female catheter cannot be used. Under these circumstances, as the course of the urethra is also somewhat altered, a male catheter made of caoutchac may be advantageously employed.

Tumours

Tumours of the ovaria may occasion a difficulty in voiding the urine, and even a total retention.

In a woman, whom I dissected last year, I found an hydropic ovary occupying the natural situation of, and resembling in appearance, the bladder when moderately distended. The real bladder was thrust to one side of the tumour.

But as tumours of the ovaria generally contain a fluid, and consequently will make the less resistance, it does not seem probable that they will often occasion a difficulty in drawing off the urine by the female catheter.

I will now take my leave of the reader, with intreating him, if I appear to have handled my subject too briefly, or superficially, to accept what is offered in my preface, as a just apology; and, what other faults soever his criticism may have detected and condemned in the foregoing pages, at least to give me credit for a desire to lessen the sufferings of humanity; and to throw one mite into the treasury of chirurgical knowledge, which has received so many rich gifts from the several distinguished writers of the present age.

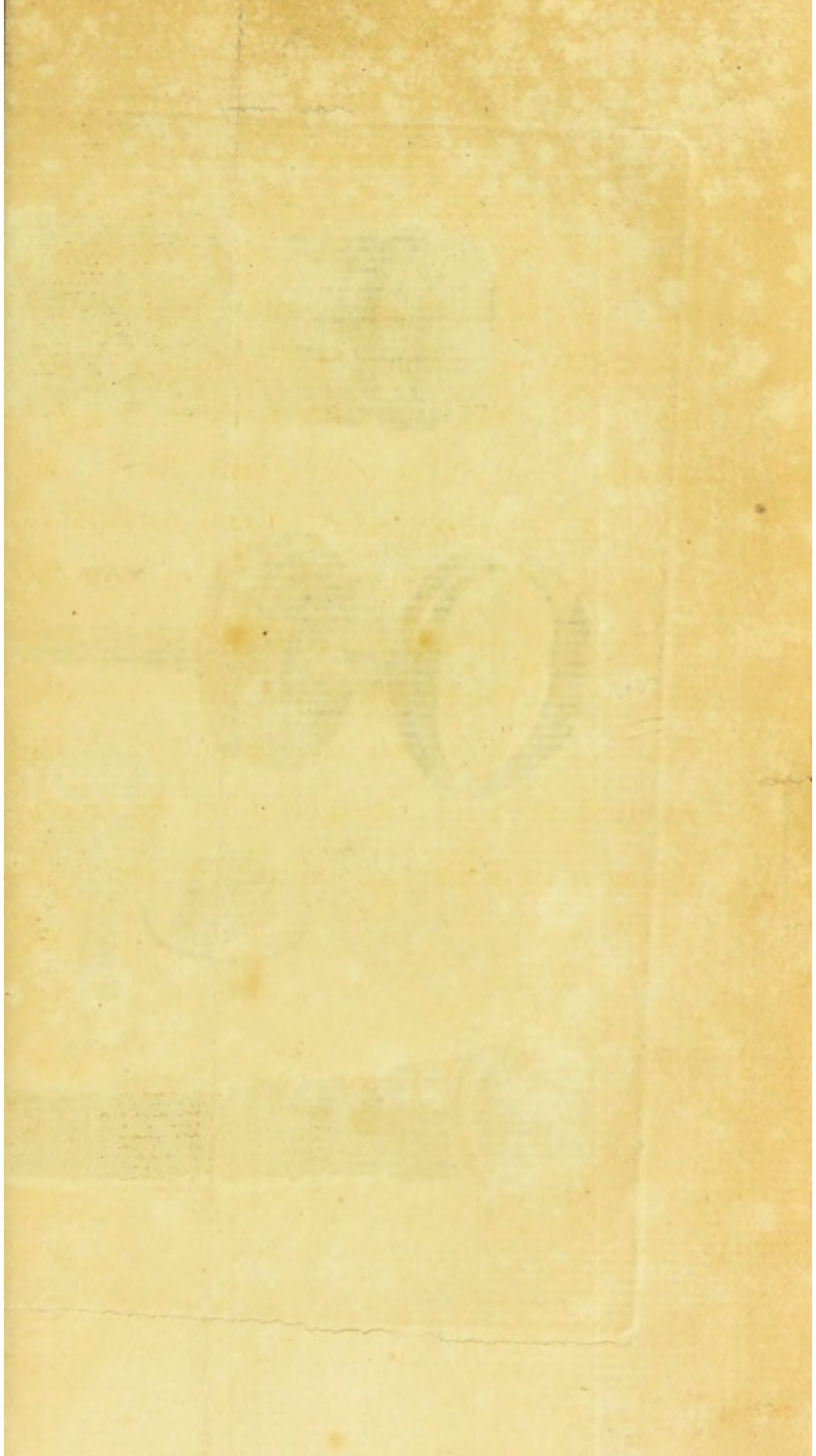


Fig. 2.

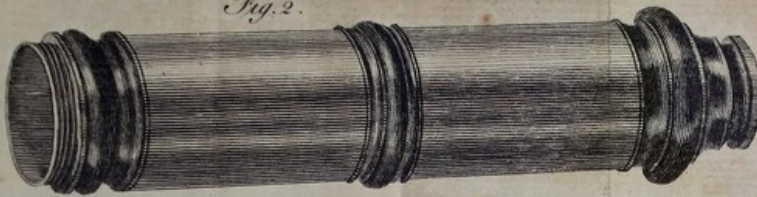


Fig. 1.



Fig. 5.



Fig. 6.

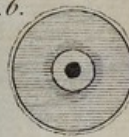


Fig. 7.



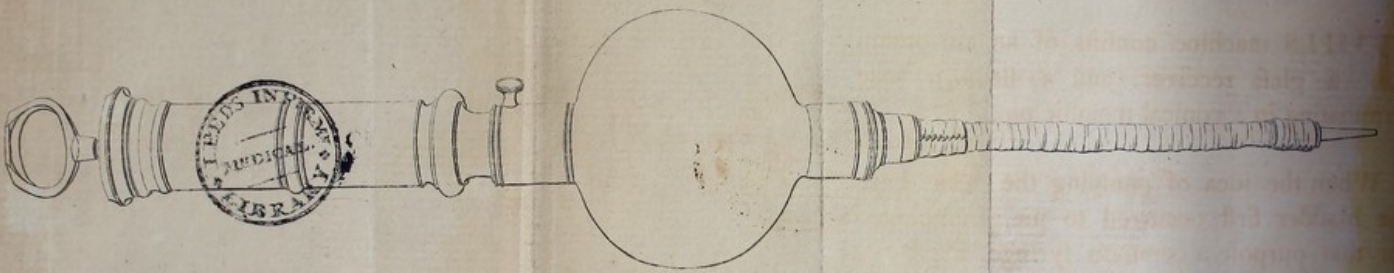
Fig. 4.



Fig. 3.







D E S C R I P T I O N

O F T H E M A C H I N E

RECOMMENDED IN SECT. XXII. P. 61, 62.

THIS machine consists of an air pump, a glass receiver, and a flexible tube terminating in a conical metallic pipe.

When the idea of pumping the urine from the bladder first occurred to me, I employed for that purpose a common syringe, fixed to a catheter, without any flexible tube being interposed; and then the jarring occasioned by working the piston gave very great pain to the patient. This inconvenience I found means to obviate in a subsequent trial, by the addition of a flexible tube.

The advantage of the glass-receiver is, that it entirely preserves the bed clothes, &c. from being soiled by the urine; an inconvenience

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which

which I have found extremely disagreeable, and not to be avoided in using a machine which had no receiver.

I have given two plates of the machine; the first representing all its parts separately, of their exact size; the second shewing the machine entire, but upon a contracted scale.

In plate I. Fig. 1. represents the piston of the pump, passing thro' the top of the cylinder.

Fig. 2. the cylinder, the small end of which is formed into a female screw, and receives the male screw of

The receiver, Fig. 3, which consists of a glass globe, to which are joined two perforated brass collars. In the side of the superior one *f* is a hole, which receives a screw *c*, by tightening, or loosening which, the air is excluded from, or admitted into the glass globe *d*.

g. A valve covering the hole in the axis of the superior collar.

c. The

e. The inferior collar terminating in a male screw *h*, which is received by a female screw in

Fig. 4. which represents the flexible tube made of dog's skin leather well coated with varnish so as to be air-tight; to one end of it is fitted a brass collar *a.* and to the other a conical brass pipe *b.*

Fig. 5. 6. and 7, represent the parts of which the lower end of the piston of the pump is composed; it does not seem necessary to give a farther description of them.

Plate 2. as before mentioned, gives a view of the machine entire, but represented as if reduced to about half its real dimensions.

The cylinder and piston are made of brass.

Mr. DAVIS, instrument-maker, Ruffel-Court, Drury-lane, has made several of these machines for myself and my friends.

I am inclined to believe that the use of this, or a similar instrument, may be extended to other purposes in Surgery, beside that of emptying the bladder under the circumstances already described; for instance, to the extrication of any fluid from a cavity, when no depending opening can be procured.---But of this I can as yet speak nothing from experience.

F I N I S.

E R R A T A.

Page 4. line 12. *for parts read part*

15. *for and which read, which*

19. line 9. *before cause read a*

44. line 4. *after be read in*