

geriem e plurimis quasi spiculis brevissimis, acutissimis, minimis: habebitur etiam explicatio illius hypothefis, qua vim purgantium & emeticorum præcipue ratione mechanica explicando, fingendo spicula talia, cuneolorum rationem habentia (forsan & aculeorum, quales in viva inermi etiam oculo apparent urtica, fatis sensibiler vivum, cui applicantur, humanum corpus irritantes), quæ motu ventriculi peristaltico iteratis vicibus musculosæ illius tunicæ, utut mediate applicita & impacta, tumque perpetuo hoc motu huc agitata illucque, motrices fibras pungant, stimulent, & ad insolitam fortio rem contractionem excitent, licet interim ego certe nolim adhuc hypothefin hanc pro veritate vendere demonstrata, utut appareat speciosa etiam his microscopis observationibus!

XI. Remarks on the Operation of Cutting for the Stone; by Claud. Nic. Le Cat, M. D. F. R. S. Surgeon to the Hotel Dieu at Rouën, and Royal Demonstrator in Anatomy and Surgery. Translated from the French by T. S. M. D. F. R. S.

ARTICLE I.

*Read at several Meetings;
finished May 16. 1745.*

ALL the Methods of Cutting for the Stone may be commodiously divided into the *high Apparatus* [or Operation] wherein the Incision is made above the *Os Pubis*; and into the *low Apparatus*, wherein the Incision is below the *Os Pubis* and *Scrotum*. In the first, the Stone is extracted through the upper Opening

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ing of the *Pelvis*: In the second, the Stone is taken out thro' the lower Opening of the same *Pelvis*.

The *low Apparatus* [or Way] may be likewise divided into *direct* and *lateral*. The *direct* is the *greater Apparatus* [or Cutting on the Staff]: The *lateral* is of four Sorts.

The *lateral Apparatus* of the first Sort is that which is done without the Staff [or *Catheter*], and wherein the Operator has no other Guide but the Stone itself, which is pushed forward, as much as possible, towards the *Perinaeum*. This is called the *lesser Apparatus* [or Cutting on the Gripe], which *Celsus* has described. It is the oldest of all the Ways of Cutting, and may be look'd on as the Source of all the other Sorts of the lateral Operation.

The second Sort of lateral *Apparatus* is that wherein the Operator makes use of a grooved Staff, on which he cuts the [inner] End of the *Urethra* lengthways, and makes laterally on the Inside of the Prostate, and on the Neck of the Bladder, an Incision about two Lines deep, or a Sort of laying open, which only makes way for the Dilatation or Laceration. This is the Method of Cutting which I use, after having had it from Mr. *Morand*, who learned it of Mr. *Chefelden*. And it is to this I have endeavoured to give the Improvements which are already known in the World, and which I intend speedily to publish. In my Opinion, one may rank in the same Class the Method whereby Monsieur *de la Peyronie* lays open laterally the Neck of the Bladder, with Instruments differing but little from those of the greater *Apparatus*. [For] this Method, as it has been communicated to me by that great Surgeon, scarcely differs from ours but in the Instruments.

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The third Sort of lateral Operation is that, wherein, under the Direction of the same grooved Staff, he cuts quite thro' the Neck of the Bladder, the Prostate, and the [inner] End of the *Urethra*. This is, properly speaking, Frier *Jaques's* Method rectified; that which Mr. *Chefelden* practised last, that of Mr. *Sharp* his Disciple, and, probably, that of Mr. *Rau*; if, after all, it is not of the second Sort.

In fine, the fourth Sort of lateral Operation is that, in which, without touching the *Urethra*, or Neck of the Bladder, the Incision is made into its Body, on one Side of the Neck. This is ascribed to Mr. *Rau*; but I am of Opinion, that the first Persons who tried it on the living Body were Mr. *Bamber* and Mr. *Chefelden*, who soon after abandon'd it; after them, Mr. *Foubert*, who endeavoured to improve it; and, in fine, myself, who am in hopes, that I have given it those Degrees of Perfection, which were essentially wanting in the Methods of those who went before me.

This fourth Sort of lateral Operation, and those Improvements which I think I have added to it, are to be the Subject of our first Remarks.

ARTICLE II.

Remarks on the fourth Sort of lateral Operation, commonly ascribed to Mr. Rau.

FRIER *Jaques's* Manner of Cutting, quite imperfect as it was, is the Source, or, at least, the occasional Cause, of all the new Methods of the lateral

ral Operation. Immediately after Frier *Jaques*, Mr. *Rau*, who was qualified to correct the Defects in the Method of the former, invented a particular one, of which he never shew'd more than the outward Part, which he could not conceal, and made a Mystery of the essential Part of the Operation. The only Particulars that have been known with Certainty, are;

1. That he made use of a grooved *Catheter* pass'd into the Bladder without being injected; and that he himself held this *Catheter* in his left Hand during the Operation.

2. That he made the outward Incision between the left *Erector* [*Penis*] and the *Accelerator* [*Urinæ*], and carried it down to near the Buttock on one Side of the *Anus*; which he did by several Strokes of the Knife.

3. That he made the inward Incision with the same Instrument, which was like the common Incision-Knife.

But, in Mr. *Rau's* Operation, we know not what Parts he cut in his inward Incision: However, from the foregoing Circumstances, I believe I can demonstrate, that this Surgeon never performed the fourth Sort of lateral Operation, of which he is said to be the Author; and that his Manner was, at most, to cut thro' the *Urethra*, the Prostate, and the Neck of the Bladder, as is done in the second and third Sorts of this Operation. [For]

First, Mr. *Rau* made use of a grooved Staff. Now, in order to cut into the Body of the Bladder, the grooved Staff is quite useless; and even the common Staff is generally of little or no Use, because the End of
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the Staff, that answers to the Body of the Bladder, is plunged very deep towards the *Pelvis*, and also very apt to slip; for which Reason Lithotomists, such as the celebrated Mr. *Chefelden*, who resolved to try this Manner of Cutting, have been obliged to inject [the Cavity of] the Bladder, that its Body might be the less subject to slip [from the Knife]; but made no Use of the Groove of the Staff, as deeming it useless. *Incisionem in sulco catheteris fieri non posse, sine necesse non esse, ut sectio in sulco fiat.* Douglas in *Meijster* on the lateral Operation. But Mr. *Rau* made use of the Groove; therefore he did not make his Opening into the Bladder thro' its Body.

Secondly, This Lithotomist did not inject the Bladder; and yet his Operation was quick and safe: Wherefore, it cannot be that he cut into the Body of the Bladder. For, even with the new Staff of my Invention, which I shall by-and-by describe, and which makes a considerable Elbow forward, the Incision into the Body of the Bladder is tedious and difficult. And I can assure you, from Experience, that this same Incision with the common Staff is so difficult, that it comes near to an Impossibility; and that it is absolutely impossible to be always sure of making this Incision in one certain Place, and without fatal Mistakes, in this Method, even supposing the Bladder injected. Therefore Mr. *Rau*, who did not inject it, would have, *a fortiori*, performed an impossible Operation, and with Success too: Therefore this Surgeon did not cut into the Body of the Bladder.

Thirdly,

Thirdly, Mr. *Rau* held the Staff with his left Hand, and did the Operation with his right. Those who do the lateral Operation of the first three Sorts do not certainly find both their Hands too much for cutting into the *Urethra* and the Prostate, without injuring the neighbouring Parts: And yet it is pretended, that Mr. *Rau* could open the Body of the Bladder very exactly (an Operation which I have proved above to be impossible in his Manner); it is pretended, I say, that he did this Operation with one Hand, a Thing which is more than possible; since, in order to do it with the new Staff, which projects forward, besides the two Hands of the Operator, which are absolutely necessary, we are obliged to make an Assistant put his Finger, or an Instrument instead of it, into the *Rectum*, to keep the Gut clear of the Place of the Incision.

Fourthly, Mr. *Cheselden*, in the first Trials he made of this pretended Method of Mr. *Rau*, opened the Body of the Bladder, and found himself under a Necessity of relinquishing this Method, because putrid Ulcers were formed, in the Course of the Cure, in the cellular Membrane that surrounds the Bladder and *Rectum*. Now Dr. *Heister*, a Disciple of Mr. *Rau*, says, This Accident never happened to Mr. *Rau*; therefore he did not open the Bladder in its Body: For there is no Reason why he should avoid this Accident rather than Mr. *Cheselden*.

Fifthly, Mr. *Rau* made all his Incisions, the inward as well as the outward, with the same Instrument, whose Make was much like the common Cutting Knife, according to Dr. *Heister*. This last Circumstance makes me think, not only that Mr.

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Rau did not cut into the Body of the Bladder; because, with so broad an Instrument, and the little Precaution he used, as we have already seen, he would never have succeeded; but likewise this broad Instrument gives me a violent Suspicion, that this Lithotomist did not so much as cut into the Neck of the Bladder; and that he only laid it open, as is the Practice in that masterly Operation with the greater *Apparatus* executed in Mr. *de la Peyronie's* Manner: For it is well known what Precaution must be used in the several lateral Operations, to remove the *Rectum* from the Prostate and the End of the *Urethra*, in order to cut these Parts without touching the Gut. Wherefore, in all the several Ways of the lateral Operation, not only the Fore-finger of the left Hand of the Operator is necessary, but also, as I have just now said, it is requisite that the Finger of an Assistant, or an Instrument introduced into the *Anus*, should contribute to keep off this same Gut.

Whether Mr. *Rau* open'd the Body of the Bladder or not, his Disciples believed he did: And as they were Witnesses to the great Success of their Master, they have not failed to conceive and give the Public an high Opinion of a Method of Cutting which opened the Body of the Bladder with all the Safety that could be expected from a true Method. The Trials made in *England* having failed of Success, it was pretty natural in *France* to think, that the Persons, who made these first Trials, had not light on the true Manner of making this Opening, so greatly cried up, and so much desired. Monsieur *Foubert*, Surgeon of *Paris*, flatter'd with these Hopes, added to the common Instruments for Cutting, the grooved

Trochart of the *Paracentesis*, which he proposed to thrust in between the Tuberosity of the *Os Ischium* and the *Anus*, directly into the Body of the Bladder; and on which he was afterwards to introduce a sharp Instrument of his Invention, to make a proper Wound for extracting the Stone. He made Trial of these Instruments on a dead Body; and, in fine, he cut a certain Number of Patients for several Years successively in that manner. People are divided on the Success which attended these Trials: Much has been written against it; and I have heard a great deal said in its Favour by good Judges. One Advantage, which flatter'd me in this Method, was that of its not being liable to occasion Incontinencies of Urine, nor even *Fistula's*, as I was assured; Inconveniences from which the lateral Operation is not exempt in the Case of large Stones, because this Operation attacks the Bladder in its Neck. But one Defect of Mr. *Foubert's* Method, which his very Partizans cannot help taking for an essential Inconvenience, is, that the Operator thrusts the Trochart in toward the Bladder without any thing to guide him, and, as it were, by Guess. 'Tis needless to enlarge on the fatal Consequences of this Defect; they appear at first Sight; and are sufficient to make one refuse giving even the Name of a Method to so uncertain a Way of Cutting. Nevertheless, if this Way of Cutting had otherwise great Advantages, and that one could clear it of that Blemish which overcasts it, by giving it this Guide which it wanted, and rendering its Process steady and certain, it must be allowed, that it would prove an excellent Method, a lateral Operation of the fourth Sort, worthy of being put
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upon a *Par* with, or perhaps of having the Preference of, the other three.

Such are the Reflections which I was led to make on Mr. *Foubert's* Operation, by the good Things I have heard of it, and the ill Consequences which I knew attended it. I endeavoured to find an Instrument that could fix the Incision into the Body of the Bladder to the Place intended: And here is [the Description of] that which I invented for this Purpose:

This Instrument is a Staff represented in TAB. IV. *Fig. 1.* such as it is when I pass it into the Bladder.

A, Is its crooked End, which is split lengthways into two Pieces; the concave Piece of which, *A*, is fixed, and of the same Piece with the rest of the Staff; and the convex Piece, *C*, is moveable, having its fixed Point joined by a Hinge to the End *a* of the Piece *A*, and its moveable Part jointed at *b*, with a Piece which makes the End of a strong Stilet [or Wire] that runs thro' the Centre of the Piece *B*, where it is riveted at *e*. This Piece *B*, the Wire, and the Piece *C*, are held in the Situation which the Operator puts them in, by the Screw *E*, the End of which bears against the Piece *B*. This is made of two solid Plates of Silver solder'd together; in the Middle of which a Groove has been made to lodge the Wire.

The Handle, *D*, of the Staff, is square, especially on the Inside, in order to serve as a Sheath for the Piece *B*, and give it a Firmness, which it communicates to the Wire, and to the moveable Piece *C*.

The Body, *G*, of the *Catheter* is almost intirely solid, leaving in its Centre but just Room enough

for the Passage of the Wire. Without this Solidity and this Narrowness of the Passage of the Wire, the *Catheter* would not be firm; and the Wire itself, liable to waver, would not run true, but would impart its Weakness, or Want of Justness, to the moveable Piece *C*, which is the Guide of this Operation.

This Body, *G*, is solder'd to the Piece *D* at *H*, making it enter square into the said Piece *D*, till it meets the Slider *B*, which I suppose intirely within the Piece *D*. The Rings are very large and strong, for the Conveniency of using it.

This *Catheter* is made of Silver, from the Rings inclusive to *F*: All the rest, together with the Wire, ought to be of the hardest Gold; because it is on this End of the *Catheter* that the greatest Stress is laid; and Silver has not Firmness enough to resist the Efforts that these Pieces must sustain. And particular Care must be taken, that all the Angles and Prominences be render'd very smooth.

I enter into these Details of the Make of the Instrument, because I have learn'd, to my Cost, that the Workmen do not think of them.

Fig. 2. shews the whole Mechanism of this *Catheter*, by representing it open, and such as it is in the Bladder while the Incision is making.

The Piece *B*, of *Fig. 1.* is here sunk in its Sheath *D*; whereby the small Style or Wire is thrust towards the crooked End of the *Catheter*, and, at the same time, pushes the End *b* of the small moveable Piece *C* towards this same Part. The *Catheter* being thus open in the Bladder, when the Operator draws the Instrument towards him, it is stopp'd by the Neck of this Organ, at the Place mark'd *dd*; and then the
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Angle *b* projects about a Finger's Breadth from the Orifice of the Bladder. Yet there are some Subjects, in whom this Orifice, being very wide or relaxed, gives greater Way to the Effort made by the Widening, *dd*, of the anterior Angle of the *Catheter*; whereby it happens, that, instead of stopping this Angle at *dd*, it lets it pass thro' to *ff*, which brings the Incision so much nearer the Neck of the Bladder: Nay, I have seen in some dead Bodies, in which the Relaxation is still greater, that the Prostate was somewhat concerned in the Incision; which is no great Misfortune. But even this may be easily avoided, by taking care, in the first Incisions, to disengage the Part that answers to the projecting Angle from every thing that may hide from us the Prostate and Bladder; and then the foregoing Case becoming visible, it is easy to guard against it, by causing the projecting Angle of the *Catheter* to be push'd, or by pushing it one's Self farther into the Bladder.

This projecting Part of the *Catheter* is not seen; but it is very perceivable to the Touch, thro' the Integuments; and still more so, after they are cut through.

I must not omit observing here, that, notwithstanding all the Care I have taken to instruct the Instrument-maker in the Construction of this *Catheter*, and especially of the moveable Piece *bC*, in order to make it solid: Yet it has often proved too weak to bear the Effort of thrusting the Part forward, which we are obliged to do on one Side; so that it bent, and remain'd in the Middle, while the rest of the *Catheter* was to the left Side.

In case of this Accident, it came into my Thought to turn the *Catheter* upside-down ; so that the Angle of the moveable Piece might answer to the upper Part of the Neck of the Bladder, and stop there, while the concave and immoveable Part of the *Catheter* answer'd to the Incision, and that the very End of the *Catheter* projected at the Place where I was to open the Body of the Bladder. And, upon several Trials, I found that this Place was the very same which had before been pointed out by the Angle of the moveable Piece ; therefore, when I have one of these *Catheters*, on which I cannot depend, I make use of it in this last Manner ; and it intirely answers my Expectation ; because the fix'd Piece of these *Catheters* is always very solid, and that the Angle of the moveable Piece does its Duty as well on the upper as on the under Side of the Neck of the Bladder. It has even seem'd to me, that the End of the Instrument makes the greater Protrusion forward. In fine, this *Catheter*, being almost strait, easily assumes in the Bladder every Situation which one finds necessary to give it.

Fig. 3. represents the Incision-Knife, which I use. It is the same that I call *Urethotome* in my common lateral Operation ; excepting that here I give a greater Length to the Back.

A is the Handle ; *BC* the Blade ; of which *B* is the great Edge, *C* the Back, *FE* is the little Edge. In the middle of this Blade is a Chanel, that ends with the Point of the Instrument at *E*. The little Edge *FE* must not go beyond the Point *F*, if the Operator would spare the Neck of the Bladder, when he plunges the Instrument into this Organ ; for, if it

it be made longer, it must carry the Incision as far as into the Prostate.

The Manner of performing the Operation.

HAVING placed the Patient as usual, I pass an hollow *Catheter* into the Bladder, thro' which I half-inject the Bladder; because I have found, that, as a moderate Injection renders the Operation more speedy and safe, so a complete Injection forces back toward the *Rectum* the Place appointed for the Incision, and makes the Operation laborious and dangerous.

When I have made the Injection, I draw out the hollow *Catheter*, and pass in my new Staff by half a Turn; which I make very short, upon account of its little Convexity. I push it to the Bottom of the Bladder; and when I am quite sure it is there, I give to the moveable Piece *b C*, the Situation requisite to make the Protrusion answer the Places where I intend to open the Body of the Bladder.

The Places which I have chosen in the Trials I have made of this Method are two; the first is between the two *Vesiculae seminales*, close to the left, under the Orifice of the left *Ureter*; the second is above the Orifice of the *Ureter*, and over the left *Vesicula seminalis*.

For doing the Operation pursuant to the first Intention, when my Staff is in the Bladder, I keep its Rings exactly in a horizontal Position, so that the moveable Piece *b C* may bear directly on the Line, which may be imagined to pass between the Orifices of the *Ureters*. In this Situation, I loosen the Screw which

which stoppt the sliding Piece *B* of *Fig. 1.* I thrust in this Piece, which opens the Staff, and makes the Elbow or Angle *b*, *Fig. 2.* I then fasten the Screw to fix the Staff thus open: I afterwards draw the Rings towards me, as if to draw back the Staff, always in a horizontal Position, till the Angle *b d a* stops me. Then, being sure that the Elbow *b* of my Staff has pass'd directly between the Orifices of the *Ureters*, and that it is a good Finger's Breadth from the Neck of the Bladder, I raise up the Handle of my Staff a little, carrying it softly toward the right Thigh, and I give to the Rings an oblique Direction approaching to a diagonal, in order to push the Elbow *b* toward the Space between the *Anus* and left *Os Ischium*. An Assistant holds the Staff in this Attitude; another passes the Fore-finger of his right Hand, or an Instrument made for this Purpose, *Fig. 4.** into the *Anus*, and pushes down the *Rectum* on the right Side. With my left Thumb I secure the Integuments, resting it on the Middle of the *Perineum*; and with the right Hand I make, with the Incision-Knife, *Fig. 3.* a long and deep Incision between the *Os Ischium* and the *Anus*, beginning on one Side of the Place, where ends the Incision with the greater *Apparatus*. This first Incision generally

* Tho' this Instrument serves me here for removing the *Rectum* from the Parts destin'd for the Incision, it was not for this Use that I invented it, but to make a *Speculum Ani & Matricis*, being joined to another intirely like it, with its Angle and Groove placed on the Angle and Groove, *AB*, of this. We shall have Occasion, in another Place, to give a more ample Description of this Instrument, and its Advantages over the other Sorts of *Speculum*.

rally lays open no more than the common Integuments: Then, with the Fore-finger of my left Hand, I feel for the Elbow of my Staff; and on this Elbow I cut upward and downward; first, the *Septum*, formed by the *Elevatores Ani*; secondly, the ligamentous *Lamina* that supports these muscular Expansions, and which, without an accurate Knowledge of those Parts, may be easily mistaken for the Bladder. These Obstacles being well removed, the Elbow of my Staff becomes more and more disengaged, and the End of the Prostate and Beginning of the Bladder are laid bare. Then, being certain of the Place I am at, I feel again for the Elbow of my Staff: I set it right, if the Assistant has let it slip from its due Position, and on it I plunge the Knife into the Bladder, so as that its Point runs on the Outside, and the whole Length of this Elbow, and the great Edge *B*, *Fig. 3.* faces the posterior Part of this Organ. By this Incision I cut into the Bladder an Inch long or more, if I think proper, a Finger's Breadth from its Orifice, under and close to the left *Vesicula seminalis*, and the Orifice of the left *Ureter*.

I had caused a Groove to be made on the projecting Piece *C*, *Fig. 2.* to direct my Knife, but I found it of no Use. On the Groove of my Knife, now in the Bladder, I slide the Gorget; and then the Assistant, who held the Staff, loosens the Screw, draws the Ring of the Piece *B*, whereby the Staff is brought back to its former Shape, as in *Fig. 1.* and then he draws it out of the Bladder. The rest of the Operation is perform'd in the usual Manner.

In order to open the Bladder above the left *Vesicula seminalis* with the same Staff, as soon as it is

in the Bladder, one must turn the moveable Piece *b C* *Fig. 2.* towards the left Side of the Bladder, by giving to the Rings of the Staff such an oblique Direction, that they make an Angle of about Forty five Degrees with the horizontal Line. In this State I open the moveable Piece, and oblige it to make an Elbow exactly in the Place desired. Then I do my Operation, as above described.

The above described Operation is the Result of a great Number of Experiments made on dead Bodies; in some of which I had injected the hypogastric Artery.

These numerous Trials have constantly convinced me, that my Staff is an Instrument with which one is as sure as possible, always to open the Body of the Bladder in the Place resolved on by the Operator. For if it happens, that a Bladder either too large or too small, or some other Motive, obliges the Surgeon to make his Incision farther from, or nearer to, the Neck of this Organ, he will fulfil that Intention, by more or less pushing the Piece with the Slider *B*, and thereby causing the moveable Piece *b C* to make a greater or lesser Angle.

From Trials on dead Bodies I passed to Operations on living Subjects; and, having had some Reasons to think, that the Incision into the Body of the Bladder between and beyond the *Ureters*, was preferable to that which is practised above the left *Vesicula* [*seminalis*]. In Autumn 1741, I cut three Patients in this Way; *viz.*

John Peter Desmarest, whose Stone could not be extracted whole. He lost much Blood during the Operation, and after it; and died the 17th Day.

Peter le Grand; who died in three Months after cutting, of a sinuous *Fistula* in the *Pelvis*.

Giles Laurence; who had likewise an *Hæmorrhage*. Of three or four soft Stones which he had, the greatest Part remained, and he died the fourth Day.

As I was accustomed to good Success in our lateral Operation, I was concerned for the Accidents that happen'd in these first Trials more sensibly than another would probably have been. I publicly open'd the three above-mentioned Subjects. The Incisions of the Bladder were found to be most exactly done in the Place above specified, without hurting any of the neighbouring Parts: And it plainly appeared, that the Death of these Subjects was occasioned by the following Inconvenienc^{es} attending this Method.

1. The *Hæmorrhage*, which is almost inevitable from the Depth of the Incision.

2. The Stripping of the Gut of the cellular Membrane that surrounds it; which, together with the Depth of this Denudation occasions putrid Ulcers by the Irruption of the Urine into the rest of the cellular Membrane, behind the *Septum Levator Ani*, and thence into the whole Circumference of the Bladder. Mr. *Chefelden* complained of this Accident, when he try'd this Method.

3. The Stones more difficult to be found, either with the Fingers, or the Instruments; especially when they are lodged in the right Side, and *anterior* Part, of the Bladder.

4. Even when the Operator has laid hold of the Stone, he finds more Difficulty in extracting it than in any other sort of the lateral Operation. I was formerly of the contrary Opinion; but Experience has since convinced me, and I have plainly seen the

Grounds of this fourth Inconvenience ; which are these :

It is not the exterior Integuments that ever hinder the Passage of the Stone ; for they yield too easily [to give any Obstacle]. The *Septum Levator Ani* is not more difficult to dilate from the Moment it has begun to be divided : Wherefore the real Obstacles to the Extraction of the Stone are, either the Bones of the *Pelvis*, the Bladder, or the Prostate.

The Bones of the *Pelvis* give an equal Obstacle to all the Sorts of lateral Operation : And even, generally speaking, in all the Methods of the *low Apparatus*, it is the same Road, the same Outlet, the same Obstacle.

The Bladder presents as great an Obstacle in the fourth Sort of the lateral Operation as in the second, or in ours. In the first, the Wound of the Bladder is made an Inch long ; in the second, the Bladder is laid bare for some Lines, and then dilated the rest of the Way. In both these the Opening is the same, when the *Forceps* is introduced. In extracting the Stone, you must in both still dilate or tear as much as the Size of the Stone requires ; and, consequently, in this respect, the Difficulty is the same.

The Prostate and Neck of the Bladder are the remaining Obstacles to the Extraction of the Stone. These Parts are divided in our Method, and they are left whole in the lateral Operation of the fourth Sort. Now it is plain, and I have experienced it in the three Operations I did, that the Neck of the Bladder and the Prostate advance, while the Stone is extracting, under the *Pubis*, and against the interosseous Ligament of the *Os Pubis*, and there form a considerable

siderable Obstacle; and indeed so considerable, that, in the Case of *John Peter Desmarest* it could not be forced by the greatest Efforts: A Circumstance which has never happened to me in the lateral Operation these ten Years past that I have used it.

5. Tho' I have had the good Fortune, in the foregoing Operations, not to hurt the *Vesicula seminales*, nor the *Ureter*, much less the *Rectum*; and that, with the Precautions which I have laid down in the Account of my Manner of doing the Operation, one always avoids these Accidents; yet it must be allowed, that the above-mentioned Organs are extremely near the Incision; and that in so terrible and bloody an Operation as that of Cutting for the Stone, one is not always in a Condition to make so strict an Examination as is requisite for shunning these Dangers. For which reason I reckon them as one of the Inconveniences of this Method, especially of that which opens between the two *Vesiculae* [*seminales*]: And I have found it so on some dead Bodies, which I cut by an affected Negligence, without making use of that scrupulous Exactitude of which I have just now made mention. In my Opinion, the second Method I have spoken of, *to wit*, that wherein the Bladder is opened above the left *Vesicula seminalis*, is less exposed to the Hazards above mentioned, especially with our Staff. But it is subject to the other Inconveniences, and also to this additional one of Opening the Bladder in a Place thick set with [Blood] Vessels, and in particular with a very considerable *Plexus*; as is well known to those who have dissected these Parts.

In fine, I do not pretend in this Place to examine the Advantages and Inconveniences of all the different Methods.

Methods: This Detail I have reserved for a more complete Work than this Paper: At present, I only seek to lessen the Inconveniences of the general Way of Cutting by opening the Body of the Bladder; or, rather, I endeavour to improve it; and I am humbly of Opinion, that the Instrument which I have the Honour to lay before the *Society*, may contribute to this End.

REMARKS *on the Operation of Cutting for the Stone.*

ARTICLE III.

On the Method of Cutting by the high Operation.

WHATEVER Improvements have been made in the different Methods of Cutting for the Stone by the *low Apparatus*, there still remains in them several Inconveniences, to which the high Operation is not subject. These Advantages of the high Operation above all the other Ways, have been learnedly treated of by celebrated Authors *French and English*, and have not been contradicted by any one; so that it would seem as if this Operation had been abandoned, in order to run after the *lateral* Operation, pretty much as People quit an old Fashion for a new one. This being a shameful Circumstance in an Art of such Importance as Surgery is, and with respect to so serious an Operation as that of Cutting, it was at length said, in Justification of this Change, That the *high* Operation is not so general a Method as the *low*;
That

That it is not practicable on Subjects of too full a Habit of Body, on indurated Bladders, which are said to be very common in Persons afflicted with the Stone.

One might say, in Answer to these Objections against the *high* Operation, that Persons troubled with the Stone are very seldom plethoric; for I do not remember to have met with one Instance of it in above fifteen Years that I am conversant with this Distemper: That most Part of the indurated Bladders become so, by the Stones being lodged many Years therein, and that such Stones are of extraordinary Size and Weight; and that, in this Case, the Bulk of the Stone alone pushes the Bladder forward enough to be able to cut by the *high* Operation; and the rather, because these Subjects are so much emaciated, that, generally speaking, one may feel the Stone above the *Pubis*, thro' the very Integuments.

This I have experienced on one *Anthony Germain*, of forty-four Years of Age, a Native of *Calais*, but residing at *Diepe*; who coming to our Hospital in order to be cut, and being dead of an accidental Fever, even before the [usual] Preparation, I cut him, by the *high* Operation, on the very Stone, and without injecting the Bladder. This Stone however was not excessively large: It is represented of half its natural Dimensions, together with the Bladder, in TAB. IV. *Fig.* 5. and 6. and it weigh'd but eight Ounces.

But, granting that the *high* Operation is not a general Method, is there any one Method universally proper in all Cases? And even the *lateral* Operation, which I look upon as the most perfect of all the Sorts of the *low Apparatus*, does it lay Claim to
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this Universality? It must be allow'd, that it does not, whatever Attachment one has to it. True it is, that very large Stones are extracted by this Method; but it is equally true, that the Lacerations attending the Extraction of these large Stones are generally mortal, and always followed by *Fistulas*. It is a decided Point in Practice, That large Openings, whether made by Incision or Laceration, in the lower Part of the Body of the Bladder, are almost all mortal: Wherefore our Posterity may spare the Public from such murdering Experiments. Thus the Case of large Stones is one of those, wherein the *lateral* Operation becomes too fatal to venture putting it in Practice; and besides, we are not destitute of Examples to prove, that some Stones are too large to be extracted by this Method, even with all these Risques it is exposed to.

On the other hand, Experience has long since determined, that the largest Stones, even those on which the *low Apparatus* has failed, are extracted by the *high* Operation with Ease, and constant Success. This then is one Case, wherein the *high* Operation, if it be not an universal Method, is at least the only one. I think this Circumstance might have deserved more of the Attention of Lithotomists; and that, while they cultivate new Ways of Cutting by the *low Apparatus* (which are indeed useful in a great Number of Cases), they should not absolutely neglect the *high Apparatus*, which [in its Turn] is necessary in several Cases, wherein the former are either insufficient, or very dangerous. For, even supposing the Number of these Cases to be but small, the *high* Operation is not the less a necessary Supplement

plement to the other Methods for all Cases that offer.

Thus much I have learned by Experience, that is, by the ill Success of the different Methods of Cutting by the *low Apparatus* in the Case of large Stones: And therefore I am resolved to follow the *high Operation* in the said Case.

In adopting this Way of Cutting, as practised by Mr. *Douglas*, *Chefelden*, and *Morand*, I thought I might, under the Patronage of these great Men, be able to make some Improvements on it.

An Inconvenience, which always happened in doing this Operation, is, that as soon as the Knife has open'd the Bladder, the Urine or Liquor injected, which kept up its Side close to the Integuments, comes off; the Bladder sinks, and often slips from the Instrument before the Incision is made large enough; and then it is very difficult to find the Bladder, and finish the Operation, which by this means becomes tedious and painful. This Accident has happened several times.

In order to guard against it, I have thought of two Things:

First, Instead of cutting the Bladder downward, which contributes to the sinking-in of its Coats, I plunge the Knife into the Bladder behind the *Os Pubis*, and I cut it upward toward the Belly; by which means the Edge raises and supports the Coats of the Bottom of the Bladder. When I see that my Incision is large enough, I turn my Instrument quick, so that the Back may be where the Edge was: And this Back has a very smooth Shoulder, as appears in TAB. IV. *Fig. 7.* This Shoulder continues to keep

the upper Side of the Bladder close up to the Integuments. Then along the Blade of the Knife I introduce into the Bladder the Part *a* of the Instrument represented in *Fig. 8.* and placing this very easy smooth Crotchet in the room of the Back of the Knife, I give it to an Assistant to hold and keep up the Bladder close to the Integuments. This done, I put the Fingers of my left Hand very securely into the Bladder, and examine, if it be sufficiently open'd. I lengthen the Incision, if requisite; and, if the Stone presents itself to my Fingers, I draw it out, if it can be done without Difficulty; if not, I use the Instruments represented in *Fig. 9. 10. and 11.* in this manner:

By means of the first *Suspensor*, placed at the upper Angle of the Wound, I slide into the Bladder the End *B* of one of the Instruments of *Fig. 9. and 10.* I apply this second Instrument, which I call *Dilatato-Suspensor*, under one of the Lips of the Wound: I raise it up, carry it close to the Integuments, and give it to an Assistant to hold. I do the same Thing to the other Lip of the Wound with the other Instrument exactly like the foregoing. Thus the Wound of the Bladder is kept close to that of the Integuments in all its Parts; whereby the Urine cannot ouze out towards the cellular Membranes (a very common Accident in the old Way;) and it must all come thro' the exterior Opening. In the Case of little Bladders, and small Stones, the two last Instruments are sufficient for this Purpose; and then I draw out the first.

The Bladder being in this Condition, in order to extract the Stone I introduce either my Fingers, or
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the *Forceps*, or the Scoop, *Fig. 11.* which I have found, by Experience, to be much more commodious and sure than the *Forceps*. To be able to use this Instrument with the utmost Advantage, one must practise with it a little on dead Bodies: And I am bold to say, it will be found much superior to the *Forceps*; and that with it one will extract Stones with Ease and Safety, which the *Forceps* would either miss, or not draw without great Pain. The essential Reason of this Superiority is, that the Scoop takes up less Room, and that it pushes the Stone from behind, so that it can never slip back.

This Instrument, as well as the *Forceps*, is passed into the Bladder between the two Instruments that support and line the Lips of the Wound. The Passage for the *Forceps* is, as it were, mark'd out on the Back *B* of these Instruments, *Fig. 9.* and *10.* which I have designedly made lightly concave, in order to direct the *Forceps* or Scoop, and prevent their going wrong. They are in the same manner drawn out, with the Stone, between these two Concavities; and it is easy to conceive what Advantages must attend this Contrivance. The whole Stress of the Operation falls on these Concavities: All the Contusions, all the Rubbing, which these Efforts might have caused to the Lips of the Wound, and to the Bladder, bear upon these Instruments: The Shrinking of the Lips of the Bladder behind the Integuments, which is another common Consequence of these Efforts; the Tearing of the cellular Membranes, which follows this Shrinking, and makes Way for lodging the Urine, and forming purulent and mortal *Sinus's*: All these Accidents, I say, which are common in the usual *high* Operation,

and which have contributed toward disgusting some Operators, are avoided by this aforesaid Contrivance. The Instruments that extract the Stone touch the Bladder no otherwise than to lay hold of the extraneous Body : And, as soon as they have laid hold of it, they have nothing to do but with the *Dilatato-Suspensors*, which are so broad, smooth, and well polished, that they preserve the Bladder from any Hurt, dilate the Lips of the Wound as gently as the Operator thinks proper, and prepare a slippery Issue for the Stone, which must render the Operation equally expeditious and safe.

All that I have here said, has been practised upon one *John Goubert*, a Lad of seventeen Years old, of the Parish of *Plane* in *Normandy*. In searching this Lad, I judged the Stone was considerable ; and, from all the Reasons above-recited, I concluded, that he ought to be cut by the *high* Operation ; which I performed on the 23d of *May* 1742.

Instead of the Table that commonly serves to cut on, I had prepared one of those little Beds which are made by Turners. I placed my Patient so as to have his Head turn'd towards the Window, and his Feet at the opposite Part ; the Hips rais'd, the Breast low, the Head raised on a Pillow. Two Assistants, standing at his Shoulders, took hold of his Hands, and, unknown to him, threw a Ligature on each Wrist, which they fasten'd to the Bedstead : Two others did the same to his Knees ; for his Legs left hanging beyond the Bed, and held by Assistants.

Having placed myself on the Right-hand of the Patient, I did the Operation in the Manner above described, having begun by injecting the Bladder.

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The Subject was not such as one would chuse ; he had a strong Fever, and was blooded twice the Day of the Operation.

The second Day he complain'd of great Pain about the Hips ; which, as he would not lie on his Belly, I attributed to the Urine got into the cellular Membranes, and beginning to hurt the Parts adjacent to the Bladder. As the Fever, and the other Accidents which the Patient complained of, were attended with a Cold over all his Body, and a Paleness of his Face, I bled him no more ; but put him into a warm Bath at Eleven in the Morning. He had a Clyster given him at Four in the Afternoon, and at Night he was bathed again. He was put in on his Back with the Wound bare, that the Water of the Bath might enter in ; and, when he was put to Bed, he was desired to lie on his Belly.

The third Day in the Morning, as the Symptoms were not ceased, he took a Clyster, and was bathed at Eleven o' Clock, and again at Night.

The fourth Day he was bath'd once more. He slept therein half an Hour, and the Symptoms abated.

This Method of bathing might seem strange to Practitioners ; but I have used it for many Years with Success in Cases like this. The first Year that I tried it, I gave an Account of this Practice to the *Royal Academy of Sciences*.

The fifth Day my Patient was upon the mending Hand ; and he lay regularly on his Belly.

The seventh Day the Accidents quite disappeared.

The fifteenth Day he was purged. The Wound was almost closed ; he made Water pretty easily thro' the *Urethra* : But, what was singular, in order

to make Water thro' the Yard, he was obliged to put himself on his Belly; and when he lay on his Back, the Urine came out thro' the Wound. To prevent which, I put a common *Catheter* into the *Urethra*, which he could not bear: I changed it for one made like an S; but that also he could not bear. A Fever seized him, which made a greater Quantity of Urine pass thro' the Wound; so that I was compell'd to let him lie on his Belly, to suppress this Efflux, which, one would be apt to think, ought to be facilitated by this Situation. The Reason of this uncommon Appearance seems to be, that the Opening of the Bladder, and that of the Integuments, no longer answering to one another, the Posture on the Belly applied the Wound of the Bladder, now shrunk, and become lower, against the *Pubis*; and thereby stopp'd up the Passage of the Urine [that Way]. I allow'd him to put himself in whatever Posture agreed best with him: And, notwithstanding several Indigestions, which his Greediness of Eating was the Occasion of, he was perfectly cured.

Explanation of Fig. 5. and 6. in TAB. IV.

Fig. 5.

The Bladder of *Antony Germain* open'd throughout, and its Neck slit by two Incisions.

AA, The *Fundus* of the Bladder.

BB, The Neck of the Bladder.

cc, The Orifices of the Ureters dilated to the Breadth of an Inch.

dd, A transverse Fold, which imprinted on the Stone the circular Furrow which appears thereon.

Fig.

Fig. 6.

The Stone of *Antony Germain*, of half its natural Size, view'd by its posterior Surface, which lay on that of the Bladder represented by *Fig. 5.*

E, The posterior End of the Stone.

F, The anterior End answering to the Neck of the Bladder.

gg, The circular Furrow remark'd above.

N. B. The Catheter, *TAB. IV. Fig. 1.* and *2.* is figured, and a short Account given of it, in the *Med. Essays*, Vol. V. p. 466. *C. M.*

XII. *Abstract of a Letter from Monsieur De Bozes, Professor of Experimental Philosophy, at the Academy of Wirtemberg, to Monsieur De Maizau. Communicated by Mr. Baker from Mr. Ellis, and translated out of the Latin by Mr. Baker.*

Read May 23. 1745.

A Hollow Globe of Glass, of six or eight Inches Diameter, being swiftly turned round upon its *Axis*, by means of a large Wheel, in the Manner Mr. *Haukesby* formerly advis'd; and being rendered as electrical as possible by the Application of a dry woollen Cloth, or rather of a very dry Hand; if, whilst in this swift Rotation, it be brought near the End of an iron Bar, suspended by Strings of Silk that are exceedingly well dried, such an electric Power will be communicated to the Iron, that, upon touching the other End of it with one's Finger, not only Sparks of Fire, in the usual

Fig. 1.
p. 399.

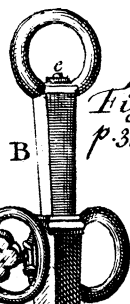


Fig. 2.
p. 400.

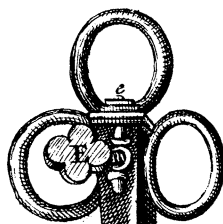


Fig. 3.
p. 402.



Fig. 4.
p. 404.

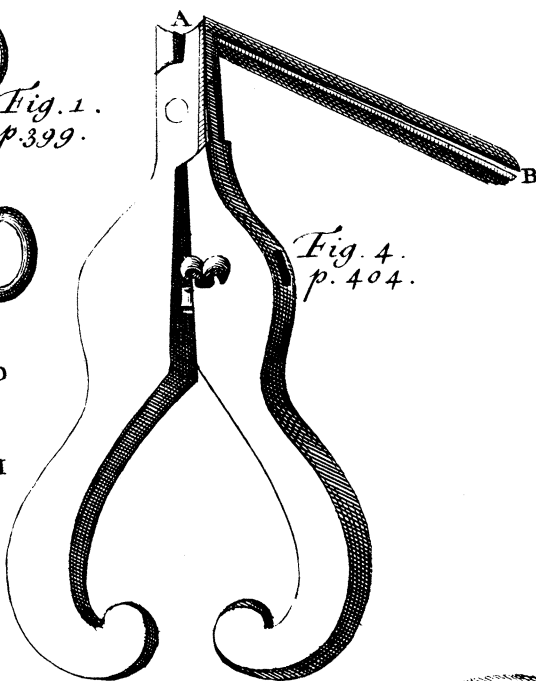


Fig. 9.
p. 414.

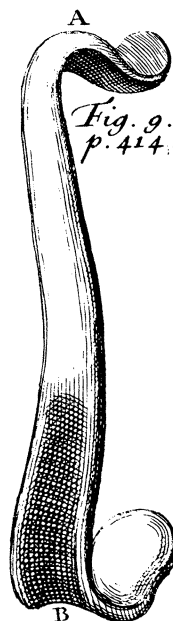
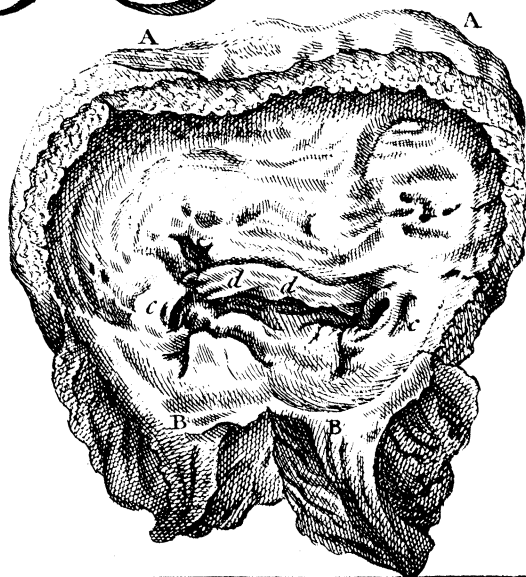


Fig. 5.
p. 411. 418



TAB. IV.



Fig. 7.
p. 413.

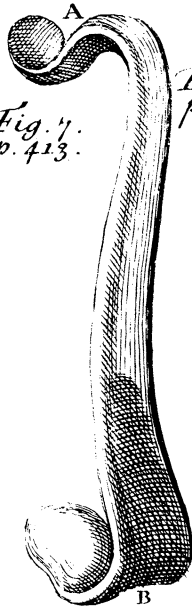


Fig. 10.
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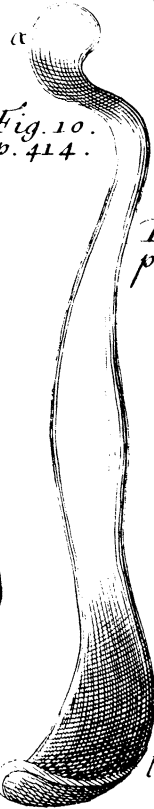


Fig. 8.
p. 414.



Fig. 11.
p. 414.

p.
418

E

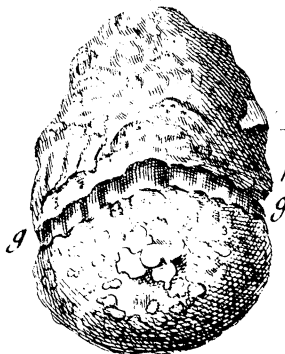


Fig. 6.
p. 418. 418.

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J. Moreau sc.

