geriem e plurimis quaſi ſpiculis breviſſimis, acutiſſimis, minimis: habebitur etiam explicatio illius hypotheſis, qua vim purgantium & emeticorum præcipue ratione mechanica explicando, fingendo ſpicula talia, cuneolorum rationem habentia (forſan & aculeorum, quales in viva inermi etiam oculo apparent urtica, ſatis ſenſibiliter 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 fortiorem contractionem excitent, licet interim ego certe nolim adhuc hypotheſin hanc pro veritate vendere demonſtrata, utut appareat ſpecioſa etiam his microſcopicis 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* Roüen, *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 Open-

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 *Perinæum*. 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. *Cheſelden*. 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.

The

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. *Cheſelden* 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. *Cheſelden*, 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 the

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. *Cheſelden*, 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, ſive neceſſe non eſſe, ut ſectio in ſulco fiat.* *Douglas* in *Heiſter* 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. *Rau*

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 *Paracentheſis*, 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 inlarge 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 upon

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 *d d*; and then the Angle

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, *d d*, of the anterior Angle of the *Catheter*; whereby it happens, that, inſtead of ſtopping this Angle at *d d*, it lets it paſs thro' to *f f*, 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 *b C*, 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

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; *B C* the Blade; of which *B* is the great Edge, *C* the Back, *F E* 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 *F E* 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 *Veſiculæ 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 ſtopt 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 *Perinæum*; 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, *A B*, 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 Knowlege 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 publickly 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 Inconveniences 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. *Cheſelden* 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 *Veſiculæ 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 *Veſiculæ* [*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 this

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*, *Cheſelden*, 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 the

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 Superiorty 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.

The

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

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 adviſed; and being rendered as electrical as poſſible by the Application of a dry woolen 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 the Iron, that, upon touching the other End of it with one's Finger, not only Sparks of Fire, in the uſual

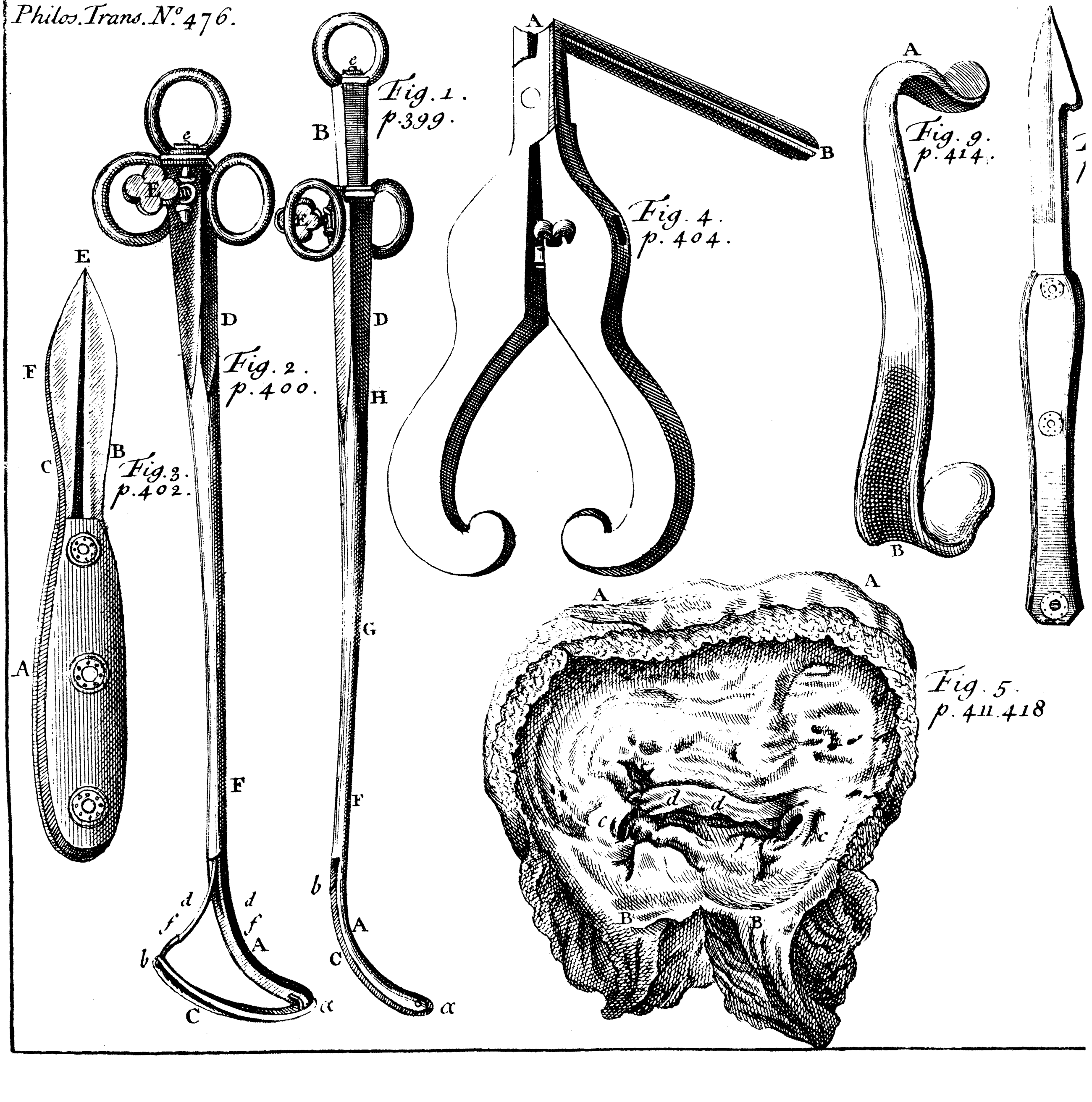
Fig. 1. p. 399.
Fig. 2. p. 400.
Fig. 3. p. 402.
Fig. 4. p. 404.
Fig. 5. p. 411. 418
Fig. 9. p. 414.

TAB. IV.

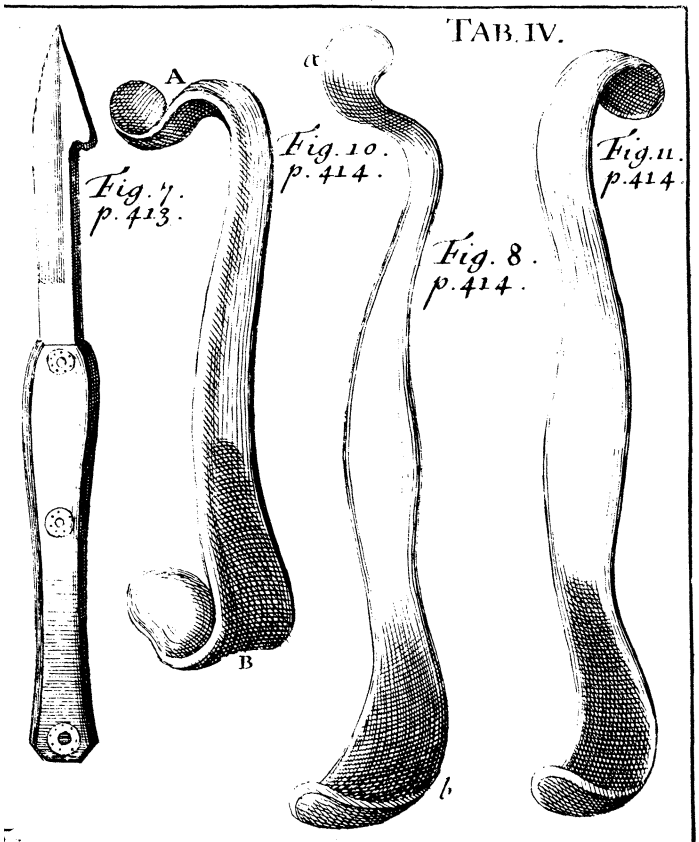

Fig. 7.
p. 413.

Fig. 10.
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Fig. 8.
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Fig. 11.
p. 414.

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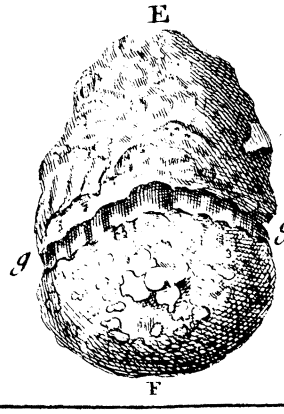

Fig. 6.
p. 411. 418.

J. Mynde sc.

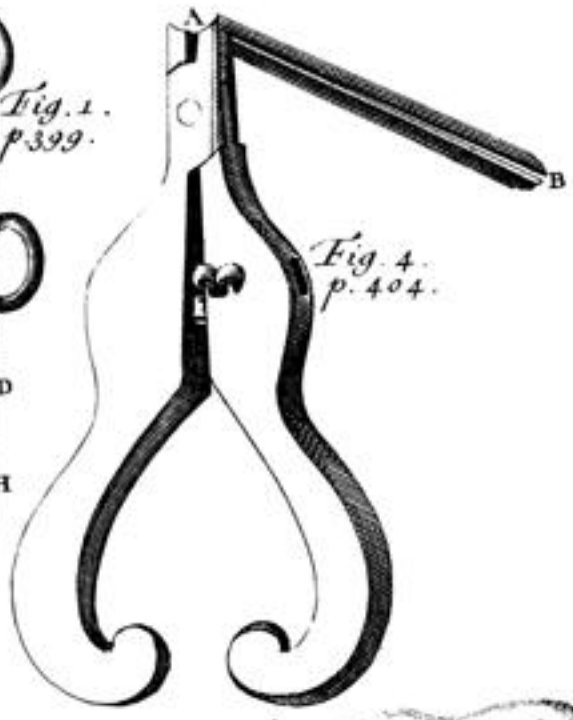

Fig. 4. p. 404.

Fig. 9. p. 414.

Fig. 7. p. 413.

Fig. 10. p. 414.

Fig. 8. p. 414.

Fig. 11. p. 414.

Fig. 5. p. 411. 418.

Fig. 6. p. 411. 418.

Fig. 3. p. 402.

Fig. 2. p. 400.

Fig. 1. p. 399.