number of Tunes be encreas'd; the Calculation of which (tho much more intricate and operoſe) would be equally attainable by our Theorem.

III. *Of Oſſifications or Petrifactions in the Coats of Arteries, particularly in the Valves of the Great Artery, by* William Cowper, *Surgeon, and F. R. S.*

HOw far Anatomical Enquiries inform in the true cauſes of Diſeaſes, which have been aſcribed to the want of Spirits in ſome, and Radical Moiſture in Aged People, *&c.* may be in ſome meaſure ſeen by two Obſervations, among others, publiſht in the Tranſactions No 280: The firſt there mentioned, pag. 1195, is of a young Gentlewoman, in whom the *Parietes*, or Membranes, that compoſe the Trunks of the Arteries of the Arm near the *Axilla*, being very much thickened, ſo that the *Diameter* of its Bore was leſſened to more than a third part of its natural ſize; inſomuch that a part of the Trunk of the Artery cut Tranſverſel very much reſembled a bit of the ſtem of a Tobacco-pipe, its ſides were ſo thick, and its Bore conſequently ſo much leſſened: The other was of the Trunks of the Arteries of the Leg, pag. *ib.* that were Obſtructed by Petrifactions or Oſſifications, in a perſon about the 67th year of his Age. Since which I have met with ſeveral of the like Inſtances in people of years, particularly in the Leg of an old Gentleman, whoſe Toes and Foot were Sphacelated, the Arteries of whoſe Leg I have ſtill by me, and have ſent them herewith Injected, as much as they could be, with Red Wax; in which the Oſſifications diminiſhing their Channels in ſome places, and totally obſtructing them in others,

others, is made very evident. (See the Preparation in the *Repoſitory* of the *Royal Society.*)

The Diſſections of Morbid Bodies not only inſtruct us in the Seats and Cauſes of Diſeaſes, but very often inform us in the true Uſe of parts, as will appear by the following Inſtances.

The Oſſification or Petrification in the Great Artery, at its riſe from the Heart, has been ſo commonly found, that ſome think it is conſtant; how it may be in ſome Animals I cannot be certain, but in Humane Bodies I amwell aſſured whenever it happens it is a Diſeaſe, and does in ſome meaſure incommode thoſe parts in the due execution of their office, as the following Caſes will evidence: But that this Paper may be of ſome uſe, I ſhall ſet down the Symptoms before Death, which may help our Conjectures when the like offers again. A ſpare man about 30, who languiſht with an Ulcer in the Thigh, attended with a *Caries*, or Rottenneſs of that Bone at its Articulation with the *Tibia* and *Patella* call'd the Knee, where all thoſe Bones were affected, at length fell into a true *Phthiſis*, and coughed up no ſmall quantity of *Pus*; ſome months before his Death I frequently ſaw him, when he would often offer me his Wriſt, to feel his unequal Pulſe, which was wont to amuſe him; the Artery there miſſing ſometimes one, ſometimes two ſtrokes in 6 or 7: At firſt he told me he obſerved it miſt but one in ten, but at length thoſe ſtops became more frequent, eſpecially on any agitation of the Body or Mind: tho a *Polypus* in any of the Great Veſſels about the Heart may induce that Symptom, yet the continuance of it ſo long before Death, ſhews it owing to ſome other Cauſe, as appear'd on opening the Heart and Great Artery of this perſon. A A A D G. Fig. 1ſt.

You will not be ſurprized I ſend the Figures printed from Copper Plates, when I tell you they are deſigned, among others (I am now about) to explain the Muſcles,

in another Edition of my *Myotomia Reformata*, this Fig. the 1ſt being one of thoſe that repreſent the Muſcular Structure of the Heart; the reſt I have added to explain the Petrifaction of the Valves of the *Aorta* in the following inſtance.

Fig. 1.

A A. The Trunk of the Great Artery opened and diſplay'd.

a aa. The three Semilunary Valves of the *Aorta*, which hinder the Blood from returning to the Heart, after it is expell'd thence by its *Syſtole* or Contraction; theſe Valves in this caſe were ſomewhat thicker, and not ſo plyable as naturally, and did not ſo adequately apply to each other, as is expreſt Fig. 4. a a a. Whence it hapned ſometimes, that the Blood in the Great Artery (A A A. Fig. 1.) would recoil, and interrupt the Heart in its *Syſtole*. But this ſtubbornneſs of theſe Valves was owing to a Bony or ſtony body, markt b. Fig. 1ſt, which appear'd much plainer when the Valves were dry, as is repreſented in the Figure beneath, markt with an *: a a. the two Valves pinn'd out and dry'd, b the Petrifaction or ſtony Body at their junction. In this Inſtance I obſerv'd the Left Ventricle of the Heart, expreſt at G G. D D. e e. f f. Fig. 1ſt, to be a little dilated from its natural ſize, but was not by two parts in three ſo big as the Left Ventricle of the Heart of one I diſſected in the Preſence of Dr *Sloane*. The Symptoms, ſome years before the Death of this perſon, who was about 40 years of Age, were extraordinary Shortneſs of Breath, eſpecially on any fatigue, with an intermiſſion of one ſtroke in three of the Pulſe; his poſture of ſitting up was more Eligible than any other, he complain'd of great faintneſs, and now and then pain about the Heart; the extreme parts often cold, which towards his Death increaſed more and more on him; his Legs and Arms being Gangreen'd ſome hours before; inſomuch that the Corps was very offenſive in opening, tho 'twas done within 24 hours after he expired, in the month of *November*.

Upon

Upon opening the Cheſt, the Heart, particularly its Left Ventricle, was found larger than that of an ordinary Ox, and filld with Coagulated Blood. The Valves of the Great Artery A A. Fig. 1. were Petrify'd, inſomuch that they could not approach each other, as expreſt Fig. 2. and 4. But an Orifice, repreſented at Fig. 5, remain'd always open by the Petrifactions b b, Fig. 3. and a a, Fig. 5, which had clogg'd theſe Valves, and hindered their application to each other, as in a Natural ſtate is repreſented in Fig. 2 and 4, a a a.

The explication of the Symptoms in both theſe Caſes is obvious enough; for tho the Perſon firſt inſtanced did not dye of the ſame diſeaſe with the laſt mentioned, yet the Symptoms in his Illneſs plainly ſhewed what muſt follow, from the diſorders of theſe *Valves*, as they are rendred more or leſs uſeleſs: For as their Office is to prevent the return of the Blood into the Heart, in its *Diaſtole*, by exactly ſhutting up the paſſage of the *Aorta* (as the Flaps in Water Engines) ſo if by any accident they are hinder'd from doing their duty, as they were by the Petrifactions mentioned, the conſequences muſt be, not only a regurgitation of Blood into the Heart, but they baulk its impulſive force, when the Muſcular Fibres (which are in theſe Valves) cannot contract to prepare the paſſage for the Blood of the Left Ventricle, when to be expelled into the *Aorta*. Hence the Intermiſſions of the Pulſe in the firſt inſtance may be accounted for. In the latter inſtance, theſe Valves were wholly uſeleſs, the Circulation became more difficult, as appear'd by the refrigeration of the extreme parts, Gangreens, *&c.* In both theſe caſes the Left Venticle of the Heart was dilated proportionably to the ill conſtitution of theſe Valves, which clearly ſhews theſe Valves give that aſſiſtance to the Heart in its Office that it cannot be without, and that it gradually ſuffers according to their indiſpoſition.

Be-

Before theſe Papers were ſent to the Preſs, I had an opportunity of obſerving a like Inſtance of that firſt mention'd in this latter part of them. It was an Elderly Gentleman, about 72, who had ſometimes Intermiſſions in his Pulſe ſeveral years before his death, in whom I found divers Petrifications in the Mitral and Semilunary Valves of the Left Ventricle of the Heart.

If my time would give leave, I might here add ſome Anatomical remarks on the Structure and Mechaniſm of this noble Organ, particularly of the Uſe of that Tranſverſe Tendon expreſt at f f. Fig. 1. and the Progreſs and Inſertions of the Tendons f. Fig. 3, ariſing from the *Carneæ Columnæ* e e, which do not all terminate in the lower Margin of the Mitral Valve d, Fig. 2 and 3, but paſs to the upper and middle part of that Valve, whilſt others terminate in the Baſis of the Heart, with the Muſcular ſtructure of the Semilunary Valves; but theſe I muſt reſerve for another place.

The Explanation of the Figures.

Fig. 1.

The Left Ventricle of the Heart open'd, *&c.*

AAA. The inſide of the *Aorta* ſlit open to the Left Ventricle.

BB. The Bulbous Trunk of the *Vena Pulmonalis* divided through, and pinn'd aſide to ſhew

a a a. The three Semilunary Valves of the *Aorta*, which hinder the Blood from returning to the Heart.

b. A ſmall Stony Body at the conjunction of two of the Semilunary Valves, expreſt at the * below this Figure.

a a. Parts of the two Valves dryed.

b. The Petrifaction, as it appears in the dryed Valves.

C. Part of the lower Trunk of the *Vena Cava*, cut off immediately above the Liver.

c c c. The Left Auricle open'd and pinn'd out.

D D The ſides of the Left Ventricle divided and drawn aſide, to ſhew its inſide d d e e f f G G.

d d. The Mitral Valves of the Left Ventricle of the Heart or *Arteria Pulmonica* divided and turn'd aſide.

e e. The *Carneæ Columnæ*, whence ſpring the Tendons faſten'd to the Valves, d d, expreſt Fig. 3 d f.

f f. A Tranſverſe Cord or Tendon, by which the *Columnæ Carneæ* are drawn nearer each other in the *Syſtole*, or contraction of the Heart, when the Blood is expell'd into the *Aorta*; whereby the Tendons (expreſs'd f f Fig: 3 and 5) draw the Mitral Valve laterally; by which means its Orifice g c. Fig. *ibid*, is not only cloſed to prevent the return of the Blood by the *Vena Pulmonalis*, but at the ſame time it opens a paſſage for the Blood of the *Arteria Magna*, by withdrawing the Mitral Valve, d Fig. 2. from the Orifice of the *Aorta*, a a a g. Tho this Artifice in Nature may be indifferently explain'd by theſe Figures; yet I have deſign'd ſome others, that I think will make it more intellegible in another place.

G G. The Internal Surface of the Left Ventricle where it is ſomewhat ſmoother as it leads to the *Aorta*.

g g. The Trunk of the Coronary Vein divided when filled with Wax.

h h. The Coronary Artery in like manner divided.

i. One of the Trunks of the *Vena Pulmonalis*.

k k k. The three Orifices of the Trunks of the *Vena Pulmonalis*, as they open into the Bulbous Trunk, expreſs'd at B B.

H. The Cone of the Heart.

Fig. 2

A. Part of the *Aorta* next the Heart.

a a a. The three Semiluminary Valves, as they appear next the Heart in a Natural State, when the Heart is in *Diaſtole*, and the Blood hinder'd by theſe Valves from returning to its Left Ventricle.

b b. Part of the Baſis of the Heart cut off.

e e. The two *Calumnæ Cornea* of the Left Ventricle.

d. The Mitral Valve.

f f. The Tendons Springing from the *Carneæ Columnæ*, and inſerted into the upper and middle parts of the Valve, as well as to its lower Margin; which is better expreſt in the following Figure.

g. The Orifice of the *Aorta* compleatly clos'd by the application of theſe three Valves to each other.

Fig. 3.

Shews the ſame parts expreſt in the preceding Figure, as they appear'd when the Valves of the *Aorta* were Petrified: The ſame Letters alſo directing to the parts already explain'd, except a.

a. Part of one of the Valves which was not cover'd with the Petrifaction.

b b b. The Petrifactions on the reſt of the Valves.

† A ſmall Petrifaction on the Mitral Valve.

h h h. Some of the Tranſverſe Tendons which draw the *Carneæ Columnæ* to each other, when the Heart is in *Syſtole*, for the more effectual cloſing the Orifice of the Mitral Valve, expreſt here at g.

Fig. 4 *and* 5,

Shews the ſame parts repreſented in the two preceding Figures, as they appear view'd towards the Heart, when dry'd and diſplay'd.

A A. The Trunk of the *Aorta.*

a a a. Fig. 4. The Semilunary Valves in a Natural State, when the Blood in the Arteries preſſes them cloſe to each other.

b b b b. The Trunks of the two Coronary Arteries cut off.

a a. Fig. 5 The Semilunary Valves Petrify'd.

c. The Orifice of the Mitral Valve next the *Vena Pulmonalis.*

d d d.

d d d. The Internal Surface of the Mitral Valve leading into the Left Ventricle.

e e e. The *Columnæ Carneæ:*

f f. Their Tendons.

g g. The Tranſverſe Tendons which draw the Fleſhy Columns to each other when the Heart is in *Syſtole.*

IV. *An Account of a Dropſical Body diſſected by Mr* John Lafage.

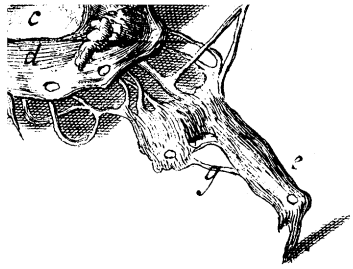
SIR,

I Was called, ſome time ago, to open a Maiden Lady 52 years of age, who complain'd, about ſix weeks before, of a Circonſcript hard Swelling on the *Hypograſtica regio*, on the Right ſide; from that time her Belly grew by degrees to an exorbitant bigneſs, the great weight whereof was the moſt conſiderable Symptom, and at laſt ſuffocated the Lady. The Body was mightily emaciated, and the Legs ſwelled few days before her death.

I expected Water, but there was only a viſcuous darkiſh Humour, to the quantity of 18 Gallons; after the evacuation of that matter, I was no leſs ſurprized to perceive a large heap of Veſcicles ariſing from a thick Membrane covering the Guts, it being the *Peritoneum* ſeparated from the Muſcles: I took it out, to examine the better thoſe Veſcicular Bodies diſpoſed on the outward ſurface of that Membrane, as alſo them that were on its inſide, towards the Guts. The Veſcicles were of different magnitude; ſome of the largeſt had been broken and ſunk, others were broken and almoſt empty, and the others very much diſtended and full; the matter of all of them was of the


Fig: 2.
Fig: 4.
Fig: 1.
Fig: 3.

Fig: 5.



M:V:d^r Gucht Sculp:


Fig: 2.
Fig: 4.
Philos: Transact: N: 299.
Fig: 1.
Fig: 3.
Fig: 5.
M. V. 3r Gucht Sculpt.