

When the Water was quite emptied, I fancied it had been all contained in a Duplicature of the *Peritonæum*, and had made a Dropsy in that Membrane, because none of the *Viscera* appeared; for in such a Case I have more than once observed, that the inner *Lamella* of that Membrane of the *Abdomen* being separated from the outer, is forced inward by the Weight of the Water upon the Bowels, to which it closely adheres, contracting the Guts and Mesentery into a very small Volume. But upon a narrower View, I perceived that the thick Membrane including the Water, could be easily separated from the *Viscera*, having freed it from it's Adhesions by Membranous Filaments to the *Peritonæum*, and by Blood-Vessels, to the *Omentum*. This Bag reached from the *Pubis* to the Midriff, and from the left Region of the Loins, to the Right; it filled up indeed the whole Cavity of the *Abdomen*, distending her Belly so far, that a Plate could easily lie upon it when she was alive. Having gradually freed it from all the neighbouring Parts, and rolled it up, I found it adher'd inseparably to the left *Tuba Fallopiana*, the Spermatick Vessels being ramified upon it; and observing no *Ovarium*, which in the other Side was naturally disposed, I concluded that the Bag was nothing but the Membrane of the *Ovarium* covering the *Ova* preternaturally thickened and distended by the Collection of the above-mention'd Humour, and that the Distemper was a true *Hydrops Ovarii*, inasmuch as all this vast Quantity of Water was included in one Bag, being all of the same Colour and Consistence.

All the other *Viscera* in the *Abdomen* were found, and in their natural State.

In both Cavities of the Breast there was contain'd a great Quantity of reddish Water.

The Liquor in the *Pericardium* was very abundant, and of a greenish Hue.

The right Lobe of the *Lungs* was tied to the Membrane of the *Thorax*, covering the upper Part of that Cavity, but the left was free from any Adhesion.

In the *left Ventricle* I found a large *Polypus*, or Serous Concretion, of a round Figure, a white Colour, and of a pretty hard Consistence, with several long Roots of a red Colour, which extended thro' the Auricle and Bulb of the *Pulmonary Vein* into it's nearest Divarications in the *Lungs*.

Having carried home this large Bag, with the *Uterus* appendant, cut off, below the Orifice of the *Meatus Urinarius*, and viewed it at Leisure, I observed,

That the right *Spermatic Vein*, which opens into the *Cava* a little below the *Emulgent*, was three times larger than the left; and from a little above the *Ovarium* it was continued, without any Division, to it's Termination.

The right *Ovarium* was in a very natural State. The *Cicatrix* or *Caruncula*, whence the fœcundated *Ovulum* had dropt, was yet remaining, and the Blood-Vessels were ramified upon this *Testis* in a very beautiful Manner.

The *Tuba Fallopiana*, with it's *Fimbriæ*, were all well disposed.

The Diameter of the left *Spermatic* Vein, which opens into the *Emulgent* of that Side, was much less than ordinary. And from the extraordinary Narrowness of the Bore of this Vessel, we may draw a not very improbable Reason of some Cause of this Watery Swelling; for the Blood being hereby hindered in it's Reflux to the Heart, a great deal of *Serum* or *Lympha*, thro' it's slow Return, must needs be thrown off upon the *Ovarium*, already indisposed, whence the gradual Increase of the Tumour did proceed.

The two *Spermatic* Arteries were contorted, and full of Turnings and Windings, from their meeting with the Veins to the *Ovaria* and *Tubæ*.

A little below the *Kidneys* each Artery sent out a Branch, which was lost on the *Peritonæum* and fatty Membrane of the Kidney: And from the same Places the Veins received two considerable Branches.

One of the Arteries went off by a narrow Orifice from the Side of the *Aorta*, the other rose up from it's Middle, a little below the first.

Between the *Bag* and the *Uterus*, all these Vessels were much dilated, making several Turnings and Circumvolutions upon the *Peritonæum*, called in this Place *Ligamentum Latum Uteri*.

The left *Tuba Fallopiana* was only remarkable in it's being much longer and larger than usual.

In the *Bag*, which was nothing but the Membrane called *Dartos*, which covers all the *Vesicular* Glands of which the *Ovarium* is compos'd, I observ'd several little Bladders of different Sizes, distinct from one another, which contained a limpid or clear slimy *Serum*, in Colour and Consistence like a Mucilage of the *Semen Cydoniorum*; these were either *Hydatidal* Tumours only, or the Eggs themselves distended. This Liquor hardened by a slow Heat into the Consistence and Colour of the White of an Egg.

All the *Fundus Uteri* was about an Inch and a half thick, but near the *Collum minus* it grew something thinner, which did proceed from the Distention of it's Spongy and *Vesicular* Substance, by the Blood in the Vessels running thro' it in Variety of Turnings and Windings; so that when it was cut, it very much resembled the Substance of the Lungs.

Upon the inner Membrane of the *Uterus* I observed, upon wiping it with a Sponge, several little Eminencies, which I took to be the Glands mentioned by *Malpighius*, which separate a Humour, to lubricate and moisten it's Cavity.

On the upper Part of the *Fundus Uteri*, I took Notice of a great Number of small Vessels, like slender Filaments or Threads, running

off from it's Membrane, and terminating into a reddish and soft spongy Sort of Substance, not unlike the *Uvula*, bating it's Colour, which hung down from that Side of the Womb in Form of a Nipple. These perhaps are the Vessels, which in the Opinion of some, do separate and excern the Matter of the *Lochia* and the *Menses*, they being only visible at those Times.

Near the Beginning of the *Tubes*, I perceived two *Tubercles*, or little Bunchings, about the Bigness of a Nut, to which perhaps the *Placenta* was fastened, and to these adhered several Glandules of a blackish Colour, of different Sizes.

The *Collum minus* was composed as it were, of two *Labia*; the uppermost was most protuberating, and upon it I observed several small Glands, out of which, upon Compression issued a viscid clear Liquor, which is said to seal and close up this Part, in time of Pregnancy. The lower *Labium* was longer and thinner, it's Edges being cut or indented in several Places.

Fig. 160.

The *Rugæ* in the lower Part of the *Vagina* run as they are represented in Books; but those in the upper Part had a quite different Course, as they are exactly delineated in the Figure.

Near the Orifice of the *Meatus Urinarius*, there were observable two very large Caruncles, in shape like a Mulberry.

As far as I was informed, the Symptoms that accompanied her big Belly, were, that,

About three Years ago, not long after she had lain-in of her first Child she had a violent Blow upon the left Side of her Belly, very painful for the present, but in two or three Days, upon keeping herself quiet in Bed, the Pain and Anguish went off. About two Months after this, she began to feel some small Pains in the left *Hypogastric* Region, where she had lately received the Blow; and she observed that Side of her Belly to grow abundantly bigger than the other: These Pains increased more and more, till they grew very violent, but upon Conception, which was three Months after she was first afflicted with them, they went off, and her Belly swelled gradually, as is usual in Pregnancy, having no other Symptoms but what are incident to that State, only she was much bigger than ordinary; and on that account she forbore the Use of Medicines, which possibly might have been effectual in her beginning Distemper.

After Delivery, the Swelling and Bulk of her Belly continued much the same as before the Birth; only, upon a plentiful Evacuation of the *Lochia*, it decreased a little. When her Month was up, she advised with several Physicians, Apothecaries, &c. who used *Emeticks*, strong *Catharticks*, *Diuretick* Diet-drinks, and all the Train of Medicines commonly used in a *Dropsy*, her supposed Case. All the Effect they had, was to prevent the farther Increase of the Swelling, while she used them; but, being weary, she left them wholly off, and then the Tumor increased very remarkably.

Thus

Thus she continued about one Year, and then she conceived again, which she suspected, by the Stoppage of her *Catamenia*, having always been very regular but at such a time. Her Stomach was always good; she never was very thirsty, so drank but little; made Water freely and in great Quantity, and was attended with none of the Symptoms of an *Ascites*, except the Swelling of her Belly; only when she was half-gone, her Legs began to swell and pit, growing very big all of a sudden: from these, and likewise from her Belly, there would often issue out a great deal of watery Humour, upon rubbing, especially if she scratched the little Pimples that would often arise in these Parts. About this time she began to be afflicted with a Difficulty in Breathing, with a violent Trembling and Palpitation of her Heart, and to be often subject to great and involuntary Sighings. She was not able to lie down, but was still obliged to sleep in a sitting Posture, for fear of being choaked. I think it probable, that all those Symptoms did proceed from the Deluge of Water contained in the Cavities of the *Thorax* and the *Pericardium*; which, no doubt, did more effectually hasten her End, than the Bigness of her Belly, with which she might have lived several Years.

After she was brought-to-bed of a live Child, she became exceeding weak, being unable to fetch her Breath, and complained much of a heavy Load and Oppression on her Breast; and the third Day she expired.

Fig. 159. represents the *Glandulæ Renales*, the Uterus, with the Fig. 159.
Parts belonging to it, and the large Bag or Membrane of the Ovarium preternaturally distended.

a, The *Glandula Renalis* on the right Side. B, An Eminence, or Rising in it's Middle. c, A Vein that runs from it to the Cava. d, The *Glandula Renalis* on the left Side. e, A Sulcus or Furrow in it's Middle. f, A Vein running from it to the Emulgent. g, A small Vein that comes from the Diaphragm, and opens into this Vein before it leaves the Gland. h, h, Two small Arteries from the Aorta. i, i, Two Nervous Twigs from one of the Intercostal Plexus's. A, A, The Kidneys. B, B, The Uterus cut off. C, The Cava cut off. D, It's Division into the *Rami Iliaci*. E, E, The Internal Branches into which the *Hypogastricks* open. F, F, The Emulgent Veins. G, The Aorta cut off. H, It's Division into the *Iliacs*. I, I, It's Internal Branches, which are spread upon the Uterus. K, K, The external *Iliacs* of both Vessels. L, L, The Emulgent Arteries. M, M, The Spermatick Veins. N, N, N, N, The Spermatick Arteries, very much contorted in their Progress, that on the right Side being cut off. O, The Union of the Branches of the Spermatick Vein on the right Side. P, The right Ovarium, with Blood-Vessels ramified on it's outer Membrane. Q, The right Tube. q, It's Fimbria. R, The Tube on the left Side, it's Fimbria adhering to the large Bag. S, S, S, The Membrane of the left Ovarium, distended to a vast Bigness, with the Blood-Vessels ramified upon it. T, Some of the Ovula grown big. W, Some Hydatidal Tumours on the Inside of the Great Bag.

V V V, *The Ligamenta lata.* U, *The Fundus Uteri.* X, X, *The Ligamenta Rotunda; the Membrane that covers them, being laid open, that the Vessels of which they are composed may be viewed.* Y, *The Vagina cut off.* Z, *The Vesica Urinaria.* ** *A small Artery and Vein on each Side, the first going off from the Spermatick, is spread upon the Membrana Adiposa and Peritonæum under the Kidney; the latter bringing back the Blood from these Parts, opens into the Spermatick Vein.*

Fig. 160.

Fig. 160. *Shews the Vagina and Uterus cut open.*

A, A, A, *The Fundus Uteri laid open, and it's Sides folded back.* 1, 1, 1, 1, *The inner Spongy Substance, with the Orifices of the Hysterick Vessels.* 2, 2, *The Glands appearing on the Inner Membrane of the Uterus.* 3, 3, *The small Vessels, by which the Lochia, &c. are separated.* 4, *A soft Substance, depending from the upper part of the Uterus, into which the foresaid Vessels terminate.* 5, *Two Tubercles, seated near the Beginnings of the Tubæ, to which the Placenta adhered.* B, B, *The Vagina laid open.* 6, 6, *The two Labia of the Collum minus.* 7, 7, *Several small Glands placed on the Upper Labium.* 8, *The Course of the Rugæ on the Upper-side of the Vagina.* 9, 9, *Their Direction on the Under-side of that Part.* 10, 10, *Two Orbicular Substances, near the Orifice of the Meatus Urinarius.*

Balls of Hair taken from the Uterus, and Ovaria of Women by Mr J. Yonge, n. 309. 2327.

XXXI. In November 1705, I was called to deliver a Woman 30 Years old, who had four Days laboured in vain to bring forth her first Child: The Head being too big for the Passage, stuck immoveable at the Os Pubis; so that I could neither fasten a Crotchet, nor draw it out by a Cupping-glass fixed to the Scalp with an Air-pump.

In this Extremity I directed my Son to open the Child's Head, and take out all the Brains, with so much of the Skull as he could; and then by a Cord fastened round the Neck with a Noose, to pull it out, which was soon and easily done.

The Child was corrupted and stunk much, so did the *Lochia*, which flowed three Weeks; soon after they ceased, the *Menstrua* appeared, and the Woman went abroad: About six Weeks after her Delivery, she was seized with violent Convulsions and Hysterick Fits, which lasted near three Days; when a painful Tumour arose in the left Side of her Belly, which ended in an Eruption of white thick Matter near a Pint, with small Knobs of a Substance like the Yolk of boiled Eggs: All Symptoms immediately vanished, only she complained of the great Hollowness where the Tumour had been.

Four Days after this, the like Swelling appeared on the right Side of her Belly, which continued with a small Flux of Matter about five or six Months, in spite of Remedies.

About that time there appeared in the *Pudenda* a Bunch of something like greasy Wool, which being drawn forth, proved a Ball or Wad of Hair, the Bigness of a Turkey's Egg, immersed in an unctuous Slime, adhering on one Side to a Membrane so large as the Palm of a Man's

Man's Hand; and in the midst of it a small pyramidal Bone resembling a split Tooth. The Tumour sank upon this, and the Fluor ceased immediately; and her Lunary Flux (which all this while had not appeared) flow'd as usual, and she continueth in perfect Health ever since, full nine Months.

The Bone is perfectly such; so is the Hair, being fine, soft, and indifferently strong, of no great length, of a light-brown Colour, entangled like a Parcel of Combings.

This Case, tho' rare and extraordinary, hath sometimes happened to others. Dr *Tyson* tells us, That in *November* 1679 he dissected a young Gentlewoman, and found the right Testicle, or *Ovarium*, swoln into two Bags, almost as big as a Man's Head, full of a pale *Serum*, in which floated several Lumps of a soft fat Matter, which dissolved in part when put into hot Water. One of those Pieces was half as big as a Man's Fist, in which lay a great deal of Hair (as there did, tho' not so plentifully, in all the rest) of a Silver Colour, soft, fine, strong, and above two Foot along; it was not fastened to, nor seemed to grow from any Part, but lay entangled in this Matter, and in it a bony Substance exactly resembling that which is commonly called the Eye or Dog-Tooth.

Vid. *Supra*,
Vol. III. p. 15.

Another time, dissecting a Woman forty Years old, he found, near the *Uterus*, a Bag as big as a large Turkey-Egg, and in it a fatty Substance like that abovementioned, with a great Quantity of light soft Hair fastened to a fleshy Substance: Within this *Cystis* a Bone, in some sort resembling a Mandible, having several Sockets, in which were seated three *Dentes Molares*, or Grinder-Teeth, and a fourth not quite grown out.

Dr *Grew* tells us, That in your *Musæum* lieth such another Tooth, found by Dr *Tyson*, after the same manner. And the Doctor himself tells us, That Dr *Needham* found a Tooth and Hair in the *Ovarium* of a dead Woman. And Dr *R. Hook* says, That Dr *Samson* found the like in two great Globose Tumours depending on, or rather Parts of the extended *Ovarium*, wrapp'd up in dissolvable and inflammable Fat, of a yellow Colour.

Mus. R. S.
p. 15.

About ten Years since, Sir *Andrew Leak* gave me a small Bunch of Hair, being part of what had been found in the Belly of a young Woman at *Deal*, by Mr *Jos. Nichols* a Surgeon there. The Case was this:

A. D. 1696, a Virgin of Thirty fell into a Periodical Fever, and afterward a total Suppression of her *Menstrua*; which was soon followed with a Pain and Tumour in the right Side of her Belly, which grew and increased, maugre all the Remedies advised by the neighbouring Physicians, 'till it became bigger and harder than that of a Woman in her last Month. When it had grown a full Year, it began to soften; and then the People who suspected her Honesty, thought her in a Dropsy. At fifteen Months end the Belly was so distended, that it seemed

ready

ready to burst; which made the Patient desire the Physicians to advise Mr *Nichols* to make the *Paracentesis*: But all were surprized, when, instead of Water, there rushed out a Pint and a half of sweet, well-digested Matter. The next Day he let out as much more, and then perceived Hair four or five Inches long issue forth with the Matter, but so fastened in the Inside, that he could not pull them out, the Woman complaining he would draw out a Piece of her Belly.

She lived but four Days after the Operation; and on Dissection of her Belly there was found ten Quarts of the same Matter, which flow'd through the Tap-hole, and in it floating a Lump of Hair as big as an Halfpenny Loaf, wrapped up in a fatty Matter; from which being cleansed, it weighed full half an Ounce. On the right Side of the Womb he found a Protuberance bigger than a large Wall-nut, from which the Hair grew eight Inches long: That Tumour, or rather the *Ovary*, being separated from the *Matrix*, there was found in it a perfect Dog-Tooth socketed in a Bone of a triangular Figure, in which another Tooth was growing; the Bone had a *Periostium* on it, surrounded with Flesh, fastened at the *Calvaria* to the Skull.

My Patient's Case hath two Difficulties in it, which I cannot get over, *viz.* How these Substances got in where they lodged? And how they got out thence by the Way they did? Without doubt they were nested in or near the Testicle, the Place of Tumour and Pain; and the many Anatomical Discoveries made by those I have quoted, do even demonstrate it: They could not be conveyed into that Bowel, and must therefore be made in it; and of what Materials, is the Question. Such who call these extraordinary Appearances *Lusus Naturæ*, seem like those of old, who, wearied in their Natural Searches by some puzzling Difficulty, take Refuge in Words, ascribing the Cause of Things which they cannot discover or discern, to occult Qualities, &c.

If by it they mean, that Nature being on the Work of Generation, mistook, failed, or was disappointed, and instead of forming an *Embryo* or *Fœtus*, made a *Chaos*, turned into a confused Lump of Bone, Fat, Hair, and Membranes, the Materials or Elements of Animal Bodies; they greatly err: For in all such Acts of Nature, the Coition of both Sexes is required, according to the old, or either of the new *Hypotheses* of Generation, which in the Girl of *Deal* was wanting; she being found, upon a very nice and strict Scrutiny, to die a Virgin, and intact.

We are told by many Authors of Credit, That great Quantities of Hair have been found in all the Parts of Human Bodies, the Fluids not excepted. Dr *Tyson* has published a large Collection from them, and has given us some Thoughts, and Conjectures, concerning their Origin and Production.

This is the only Difficulty all those Stories I have told from others are incumbred with; but mine hath another no less hard to resolve. It is obvious how those Things were got out of the Women that died;

but

but my Patient who survived the Evacuation, puzzles me to find the *Ductus per Quem* for such Lump to pass from without the Womb into the *Vulva*. It was certainly lodg'd without the *Uterus*: But which way could such a Lump of greasy Hair, with a Bone, and a large Membrane adhering, pass into it? I know none but the *Tuba Fallopiana*; but the Orifice of that into the Womb is so small, that it some- won't admit an Egg no bigger than a Corn of Pepper to pass; whence those Conceptions, which are made in that Trunk, are occasioned. It will distend very largely, so as to hold a big *Fœtus*; but where it is inserted to the Matrix, the *Foramen* is too narrow for Substances of such Magnitude to pass, unless some very extraordinary Accident expanded it; and what that can be, I cannot apprehend.

XXXII. Mrs *Duchefne* about forty Years of Age, plethorick, and frequently subject to the *Menstrua*, even during the Time of Preg- nancy, but otherwise very healthy and pretty fat, and now with Child for the twentieth Time; after she had gone the full Time, she was seized with a violent flooding from the Womb, about four o'Clock in the Afternoon, Nov. 12, 1697. *Jacob Arnaudin*, being called to her about nine in the Evening, and told of the violent flooding she laboured under, he imagined the only Remedy was to deliver her as quickly as possible: But the By-standers, as commonly happens, called out to him not to be rash, but to leave the whole to Nature. At last her Strength being thereby quite exhausted, *Monf. Arnaudin* was again called about the Middle of the Night, and, falling immediately to work, delivered her in half an Hour of a dead Girl, the *Secundines* coming after entire without any Labour. The flooding however still continued, and was attended with great Restlessness, a weak Pulse, frequent Faintings, cold Sweats, and Convulsions. At last, about six o'Clock in the Morning, she died.

We opened her next Day, and having laid open the Abdomen, and removed the Omentum, which was very fat, together with the small Guts, the Uterus appeared like a large Cupping-glass, thick, and pretty much distended. In the broad Ligament of the right Side, there was a large Ecchymosis, which descended from the Side of the Uterus, at that Part where the *Spermatick* and *Hypogastrick* Vessels are joined by Anastomosis, and was most conspicuous in the lower Part of the Neck of the Womb, where it lies upon the Rectum. We cut out the Womb with the Parts belonging to it, and laid them upon a Table. The *Vagina* was very lax, and it's internal Orifice so open, as easily to admit half one's Fist. Having laid open the Womb according to it's Length, we observed the following: In the Bottom of it some Clots of grumous Blood, otherwise it was quite found and entire: In this Part however the Adhesion of the *Placenta* was very conspicuous; and there likewise it's internal Substance was unequal, more thick and fleshy than elsewhere. In the lower Part of the Neck of the Uterus,

An Account of a Woman dissected soon after Delivery; by Dr P. Silvestre. n. 269. p. 787.

A Dissection of a Puerpera.

Uterus, the Cause of her Death appeared, *viz.* a Laceration capable of admitting two Fingers, which could likewise be seen externally, where the Ecchymosis appeared. Whether the Womb was torn from some external Accident, or rather from the violent kicking of the Child, as the Writers of Medical Observations mention sometimes to have happened, I cannot determine. But it is certain, that thereby the large Vessels were opened, which poured out that enormous Quantity of Blood. The Coats being divided, and a Blow-pipe introduced between the Doublings of them, the Air blown in burst out every where by a great many small Orifices, both from that Part of the Fundus to which the *Placenta* was connected, but especially from the Part of the Neck that was lacerated.

In the right *Ovarium* I very plainly observed the Mark or small Cicatrix, through which I make no doubt the little *Egg* had dropped and was received into the Cavity of the *Tuba Eustachiana*, and by it's peristaltick Motion conveyed into the Uterus. The left *Ovarium* was flaccid, and as it were withered. The *Tube* on each Side was opened, the *round Ligaments* very strong, and all the other Parts appeared to be quite sound.

Although the Womb is very soon straightened and contracted after Child-bearing, so that in this Woman, who died in about six Hours after she was delivered, it scarce exceeded the Size of a large Cupping-Glass; yet I could easily distend it with my Finger like a Purse or Bag. And every Body must see, that the fleshy Fibres which are so gradually stretched in Time of Pregnancy, and separated at such a Distance from one another, must require some Time to recover their former Tone and Strength.

I shall here observe by the bye, that that Question is very trifling which is here commonly proposed, *viz.* *Whether the Coats of the Womb are a great deal thicker in pregnant Women, than in those that are not impregnated?* I own indeed that the Substance of the Womb in those that are not impregnated, is firmer, more compact, and likewise more thick, because it's fleshy Fibres at that time are short and very much contracted: But in Women with Child, which was visible here to the naked Eye, the Womb is much more lax, upon account of it's Fibres being distended, and separated at a greater Distance from one another. Besides as the Blood-Vessels, whose winding and as it were serpentine Ramifications, resembling the Tendrels of Vines, in a natural State, creep upon the Bottom and Sides of the Womb, in pregnant Women are extended with the Uterus, and separated from one another; hence it is that these Coats appear slenderer and less thick. But what happens to the Stomach, the Bladder, and other membranous Parts of the Body, which become a great deal thinner by being distended; why the same Thing does not happen likewise to the Uterus, the Cause is very evident; for in the same Proportion as the Coats are distended, the Vessels of every Kind which run very thick upon them
are

are dilated for the Nourishment and Growth of the *Foetus*. Besides, the internal Surface of the Womb being perforated with a great many proper Ducts, becomes thicker at that Time, especially at it's Fundus where the *Placenta* adheres to it; which is likewise very plain in Animals which have the *Cotyledons*. But the Occasion of this Mistake, I imagine to be owing to some Anatomists having opened Bodies soon after Delivery, at which Time the Womb is immediately contracted, and it's Vessels being still varicous and distended with Blood, this might easily impose upon them, so as to make them believe that the Coats of the Womb in the Time of Pregnancy, are twice as thick as they are naturally in an unimpregnated State.

It is worth while to observe that singular Distribution of the Blood-Vessels, which I hinted at above, upon the Coats of the Uterus, *viz.* the Spermatick and Hypogastrick Arteries and Veins, which are elegantly twisted, like the Tendrils of Vines, both in the Bottom, and upon the Sides of the Womb. And hence they not only allow themselves to be extended in proportion as the Bulk of the Womb increases, but in the last Months of Gestation, being stretched nearer to streight Lines, they allow the Blood to pass more readily through them, and consequently to be distributed in greater Plenty to the Womb. But how much that must contribute towards supplying a greater Quantity of Nourishment to the *Foetus*, which is now considerably increased in it's Bulk, it would be altogether superfluous to explain in this Place.

XXXIII. The Wife of one *Raper* at *Coxwold*, 12 Miles from *York*, falling in Labour, the Midwife using her Endeavour, extracted the *Secundine*, it offering itself first, and could not by her best Skill perceive any thing else remaining. The Woman's Body falling, and for some Days she being pretty easy, and the Womb being contracted, the Midwife took this *Secundine* for a *Mola* or false Conception; but in about a Week more she began to discharge plenty of *Foetid* Matter by the *Vagina*, which continued, and in Process of Time she felt a troublesome Hardness on the *Hypogastrium*, which increased daily for above six Weeks, by which the Woman was brought so low, that they despaired of her Life. This Lump, Hardness, and Soreness, wrought upwards to the *Regio Umbilicalis*; and I supposed continued there fixed for about a Month; at length being exceeding painful, the neighbouring Gentlewomen took it for a great Boil or *Apostume*, and applied what they usually do in such Cases, to assist it's Suppuration and Breaking, which had it's Effect, and it broke upon (or rather under) the Navel, discharged then (and afterwards) a great Quantity of a thin, foetid, and discoloured Liquor. The Part about it mortified, and the Ulcer enlarged to that Bigness, that a Man's Hand might be introduced therein; it continued exceeding painful, and emitted such an exceeding Stench, that no one could endure to look on it, a small time

An Account of the greatest Part of a Foetus voided by the Navel; by Mr C. Birbeck. n. 275. p. 1000.

after they found some little Bones wrought out of it, at which they were amazed, and shewed them to me; I found them to be the Bones of a Child's Finger, upon which I went to see her. When I examined it, I perceived the Fœtus in a confused Heap, or mortified Lump, for with my Probe I felt several Bones, and at that time extracted (after I had separated and dilated the Mortification about it) above half the Ribs, some *Vertebra's* of the Back and other Bones, and cut out above a Pound of the Child's mortified Substance, as black as Ink, with an extream nauseous Smell; and every 2d or 3d Day for a Month, I extracted what I could, being forced to do it very deliberately, by reason of the exceeding Weakness of the Woman, who had certainly died in the Operation, had I forcibly extracted it, and not given her time; for we were obliged every Moment to support her with Cordials, and after every Operation she found herself lightsomer, and by Degrees sweeter, which gave me Hopes of her Recovery. For not only the *Linea Alba* and Muscles of the *Abdomen*, but the *Peritoneum* and *Omentum* were mortified to a great Breadth, and the Intestines lay fairly in View, and exposed to the Air a long time. When I had extracted Part, and had a plentiful Discharge of thin fœtid Matter, the other Discharge downwards began to lessen and abate, so that I endeavoured to assist it by Bandage and Compresses, with detarging and drying Injections up the *Vagina*, by which means in a little time I had no discharge that way, and those Parts became shortly perfectly well, and in some time after the Ulcer separated (with the Assistance of Fomentations, good Digestives and Mundificatives) from it's Putrification, contracted and united wonderfully, and hath now been quite cicatrized near three Months, all the whole *Abdomen* being soft, easy and well conditioned: The Woman laboured all this Season at Hay and Harvest.

I presume by the forcible Extraction of the Secundine, the *Uterus* had been lacerated and so ulcerated; the Woman being extremely weak, and constantly lying in Bed, gave the more Liberty for it's working upwards.

Of the Bones
of a Fœtus
voided through
an Imposthume
in the Groin;
by Sir P. Skip-
pon, n. 302.
p. 2077.

XXXIV. I lately visited a Woman 66 Years old, in *Drury-Lane*, who had a Child consumed in her *Uterus* about 28 Years ago; she bore two Children after this, one whereof liv'd 11 Years, and the other 6. About 8 Years ago, an *Imposthume* broke out in the right *Inguen*, and then several Bones of a dead Child were expelled (some of them I have by me). She has a great Swelling now in that *Groin*, where she feels something very hard, which she suspects are Bones.

An Account of
some Extra-
Uterine Fœ-
tus's, by Mr
J. Yonge, n.
323. p. 426.

XXXV. The following Account was communicated to me in these Words—— “I send this to acquaint you with a strange Occurrence observed last Week: A Gentleman's Servant having killed an Ewe, which was thought fat, and taken out the Bowels, found a very un-
“fual

“ usual and monstrous Lump of Fat, proceeding like a Wen from the
 “ middle of the *Omentum*. I was called to see it, and having cut it
 “ open, found inclosed a Lamb of the same Parts, Features and Dimen-
 “ sions with others of that kind. How it came there, and how nou-
 “ rished, are Questions I would have resolved.”

Having thirty Years since been shewn the like, found in a Bitch, by a Chirurgeon in *Oxford*, I told that Gentlewoman, that that Lamb was not conceived in the Womb, but in one of the *Fallopian Tubes*; wherein growing too big to be contained, it either broke out into the Place where it was found, or slipped back toward the upper Orifice, and thorough it into the Belly: That afterward, assisted by the prone and inclining Posture of the Sheep's Body, it slipped forward to the *Omentum*, and was there nourished the usual way, *viz.* by the *Placenta*, which was doubtless fixed in the *Tube*, and the *Pedunculus* being kept whole, will easily extend from thence to the *Fœtus*, where it lay.

Had this Sheep been nicely dissected, I verily believe we should have found my Opinion true in Fact. *Riolan. Jun. Anthropog. Nov. lib. 2. c. 34.* was the first that observed these strange Conceptions; and he tells us they have the Coats, Secundine, &c. of such *Fœtus's* as are engendered within the Womb. And considering the late Anatomical Discoveries, and new Hypothesis of the Genital Parts in Women, and their Uses in Generation, made by *Theod. Kerkringius, de Graaf*, and others; it seems more than probable, that such Conceptions as we are speaking of, happen when in Coition one of the Eggs descends into the Tube; and being unable to pass into the *Uterus* through the lower Orifice (which is sometimes, and in aged People always, contracted); and being however impregnated by the *Aura Seminalis*, or * *Animalcula*, wherewith the Testicles and seminal Parts of some Males do so prodigiously and incredibly abound; it there grows, till too big to be contained, and then breaks forth into the Belly: Though sometimes, as I shall shew, they continue in the Tube itself. There the *Placenta* fixes, and sucks Nourishment as from the *Fundus Uteri*; and if the *Pedunculus* holds together, conveys it to the *Fœtus*, as it doth to those in the natural Place of breeding.

Such *Extra-uterine Embryo's* have been sometimes found in Women; but not publickly taken Notice of till the Beginning of the last Century; the younger *Riolan* speaking of the *Fallopian Tubes*, says, They appear of the same Nature and Substance as the Womb, *Quia carnosa est, in quâ, quod est mirabile, fœtum humanum concipi fuit observatum.* Then gives an Account of four such strange Conceptions which occurred to his Knowledge.

* *Mr Leeuwenhoek saith, The Milt of a Codfish hath more Animalcula, than there are People on the Earth. Dr Hook Phil. Collect. No. 1.*

Since which Time, more strange ones have happened in that Country. One was found at *Paris*, *January* 1669, by Mr *B. Vesal*, in the right Tube of a Woman. It was four Months old, and so grown, and the Tube so distended, as made him mistake it for another Womb, and accordingly to call the Account he published thereof, *Demonstration d'une double Matrice*. Mr *Oldenburgh* put an Extract of it into the *Philosophical Transactions*, No. 48. and the *German Academy*, Vol. I. Obs. 110. did the like: But neither seemed to understand the Mystery, 'till *de Graaf* took it right, and made use of this very Observation to illustrate and confirm the Hypothesis of *Kerkringius*. And soon after *Elsholtius* did the same, in a little but curious Tract, *De conceptione Tubaria, qua Humani Fœtus extra Uteri cavitatem in tubis quandoque concipiuntur*. He recites the Story as from Mr *Vesal*, and gives the Figure of the supposed two Wombs, and the Fœtus in the distended Tube; and among other such Conceptions, mentions two large *Mola's* found without the *Matrix* of one Woman.

About ten Years afterward, a much more wonderful and incredible one happened there. It comes very well attested by Mr *Bayle*, who first published an History of it in the *Journal des Sçavans*, A. D. 1678.

Soon after Mr *Nic. Blegny* did the same with Figures. And afterward Mr *Oldenburgh* put an Extract of it into the *Philosophical Transactions*, No. 139.

' A Woman, A. D. 1652. came to her full Time of Bearing, but
' altho' she had all the Symptoms usual at that Season, no Child came.
' She continued in that Condition twenty Years, still feeling the Child
' within her. From that Time she felt not any Motion it had. In
' *June* 1708, she died, and the next Day was opened. In her Belly
' without the Womb, a dead Child was found lapped up in the *Omentum*:
' it weighed eight Pounds; and although it was kept in that hot
' Season three Days out of the Mother's Belly, it did not stink.' Mr
Blegny was curious to inspect, and give a particular Account of this
wonderful Thing to the World, not only in the Tract abovementioned,
but also in the first Volume of his *Zodiacus Medicus*, Obs. 9. with very
remarkable and learned Animadversions.

Before either of these appeared in *France*, there happened one in
Holland to *H. Rboonbuys*. ' A Woman with Child, at her full Time,
' was four Days in Labour, and although she had so many Midwives,
' could not be delivered. Our author was called, *December* 1658,
' found the *Internum Uteri Osculum* close shut: Without Flowings,
' or other Fore-runners of the Delivery. He finding the common
' Passage so closely shut up, and a very painful Tumour above the
' Navel, proposed the *Cæsarean Section*. The Woman having seen
' that Operation made at *Paris*, earnestly desired him to perform it on
' her. But he, to observe some unnecessary Forms, delayed it till the Wo-
' man was past Life: Who he believes might with the Child have been
' preserved, if the Operation had been done when he first saw her.

Opening

Opening the Belly after Death, he found a Child amidst the Entrails; and, as he saith, the *Placenta* fastened to the *Colon*, and part to the *Fundus Uteri*; and that there was a Breach in the Womb capacious enough for the Infant to pass through it into the Belly; and that Wound, he thinks, was made by a Blow, although it hurt not the external Parts, nor made Impressions on the tender *Embryo*. I cannot approve, nor will I censure the many Things in his Report liable to Exception: I presume, he mistook the extended Tube for a *Matrix*, as *Vesal* did.

T. Bartholinus, the Year after *Rhoonbuysse's* Exploration, met with such an extraneous *Fætus* wrapped up in a *Mola*, which he found in the Belly of a Woman; and thus conjectures: — *Non possum aliud divinare, quam quod fætus hic primo fuerit in Tubis uteri conceptus*. He imparted this Story first to *G. Horstius*, *Ep. 58. Vol. 4.* Afterward in the 92d Observation of his *Sixth Century*.

A. D. 1662, in the City of *Aurange*, *D. Baldwin* and *Monf. De la Fort* found — *Puellum Egregium, optime formatum extra uterum*. The Report of this Discovery is made publick by *Sachs*, with Remarks. *Miscel. Cur. Vol. 1. Obs. 100.* which he concludes with one more stupendous than all I have cited, which he had from the *Silesia Chronicle*, written long since by *N. Polinus*, and thus relates it: “ *A. D. 1581*, a Woman that had borne Ten Children in Fifteen Years “ *Matrimony*, conceived again, and at the full Time was delivered “ *through an Abscess of the left Hypochondria. — Ex qua infans boni* “ *habitus extractus qui baptizatus fuit, & annum unum cum dimidio su-* “ *pervixit; Mater vero, summis in doloribus tertio die obiit.*

I am told by a Gentleman Hunter, that he lately found in the Paunch of an *Hare*, two full-grown Young Ones among the Bowels; but almost rotten: And three *Immature Embryo's* in the *Uterus*. The former were certainly *Fætus* broke out of the Womb, &c. *Ibid. p. 432*

XXXVI. 1.] A certain Woman lately being in strong Labour, the Midwife finding the Birth coming very awkwardly, and more Legs than usual, after a tedious Time delivered the Woman of Twins (designed so by Nature, but) joined together; there being but one Trunk of a Body with two Necks, on each a Head, with four Arms, two forwards and two backwards, those backwards crossing each other's Shoulders Side to Side; there is but one Navel, two *Matrix's*, two Fundaments, two Pair of Hips, four Legs. They have gone their full Time, having Hair on their Heads, and Nails on their Fingers and Toes. The Midwife tells me they were alive within less than half an Hour before they were delivered; they look very clear and well: The Children are near ——— Inches long; and, by reason of their being joined, are about seven Inches over. *An Account of a Monstrous Birth; by Mr R. Taylor, n. 308. p. 2245.*

2.] I have been informed of a Monstrous Human Birth, seen at *London-Derry*, with two Heads, four Arms, and but one Body at the Navel: *—Another in Ireland; by Mr Neve, n. 320. p. 310.*

Of a Child's crying in the Womb.

Navel: It was of both Sexes, Female on the right Side, and Male on the left: The right Hand of the Male was behind the Female's Back, and the left Hand of the Female behind the Male's Back. This Birth was born alive, but lived but a little while.

An Alderman of the same City told me, that a Cow, in the Year 1706, had calved six Calves.

An Account of a Child's Crying in the Womb; by Mr W. Derham, n. 324. p. 485.

XXXVII. 1.] I lately visited a Woman brought-to-bed this Day sevensnight of a Boy, that had cried in her Womb, at times, for five Weeks. The Child appears to be lusty and strong; and is, since it's Birth, a very quiet Child. The Woman's Name is *Clark*, living in the Parish of *Hornchurch* in *Essex*.

She told me, The first time the Child cried was in the Night, as she lay in Bed, after a great Pain, which forced her out of Bed, and gave her Apprehensions of her Labour being nearer than her Reckoning: And every time after, whenever the Child cried, she had violent Pains like those of Labour.

Scarce a Day in all the five Weeks happened without Crying little or much: But the Woman observed, that every other Day it cried the most, and most certainly. The Midwife told me, She heard it cry seventeen times in half an Hour. It's Crying might be heard into the next Room; and sometimes it seemed to be so hearty, that the Child would sob again.

Both the Mother, and Midwife (a sensible Woman) amongst other Things, told me, They found no great Difference between her in her Case, and other Women in the same Condition. I asked the Woman whether she had received any Falls, or Hurts, or was troubled with Longings more than with her Child before? (for she hath had one Child before) She told me she had received no Hurt, but was more inclining to Longing, but had not what she longed for.

—On the same, by the same, *ibid.* p. 487.

2.] As to the Case of the *Child's crying in the Womb*, many are, I find, of Opinion, that such a thing is absolutely impossible.

Among the Authors that question the Fact, two of the most considerable are *Etmuller* and *Diemerbroek*. *Etmuller* declares *Diemerbroek's* Opinion, as well as his own, in his Dissertation *de Abstruso Respirationis Humanæ negotio*, chap. 9. where he treats of *Dr Harvey's* Problem, *Why the Fœtus, after Delivery, and before it had breathed, can live for some Hours in it's Afterburden, &c. but having breathed but once, cannot live scarce a Moment in that manner?* *Etmuller's* Words are, *Vagium Uterinum invincibile nonnulli existimant argumentum pro Respiratione Fœtus in Utero demonstrandâ. Sed cum muliercularum, quæ plerumque in hisce casibus invocantur testes, non satis circumspecta sit observatio, ut pro basi Problematis hujus resolvendi inservire queat; merito suspicamur cum Cl. Diemerbroeckio Vagium, siquis certo observatus fuerit, è sibilo intestinorum flatulentorum à fœtu compressorum ortum duxisse, qui sæpe mirus auditur, suspira gemitusque*
in

in quibusdam mentiens. Similia quoque ad pipientium Pullorum, intra ovi testam adhuc existentium, sonum, quem editum ferunt aliquando, reponimus: Præprimis cum extenuatus aquæ vapor ad corpora tenuiora allisus non minus sibilum excitare observetur: uti id experimento probat Illustr. Boyleus.

The Matter of Fact being thus called in Question, may receive an Answer, in some measure, from the Case I have spoken of, and into which I have made some farther Enquiries. And notwithstanding I should be as much inclined as any one to doubt of the Fact (being clearly of Opinion that the Fœtus doth not live in the Womb by Breathing) yet the Evidence is so clear to me in the present Case, that I am fully satisfied it was really *Crying of the Fœtus*, and not Croaking of the Guts, or Womb, or the Effect of any Feminine Imagination.

For here we have a Thing happening not once, or twice only, but a great many times; almost every Day, and divers times in the Day; and that for near five Weeks together. Enough to have discovered any Mistake, or to have undeceived even a fanciful Person.

The Child has been heard to cry aloud, so as to be distinctly heard by Persons in another Room; and consequently the Hearers could more easily, and certainly distinguish whether the Noise was *Crying* or *Croaking*. The Description the Mother and others gave me thereof was, "That the Noise the Child made, was as if a Born-Infant had cried eagerly, shut up close in a Tub."

The Crying seemed to be so eager and hearty, as to end in Sobbing, like what is observable oftentimes in Born-Infants.

It was heard not alone by the Father and Mother, or one or two besides, but by many of the Neighbourhood, and many of them Persons long used to Children; who do all with the greatest Assurance affirm it to have been as manifest Crying, as ever they heard from a Born-Infant, and nothing like any Noise of Wind, or the Guts: As on Enquiry they all particularly told me.

The Midwife moreover told me, that laying her Hand on the left-Side of the Woman's Belly, where the Child lay when it cried, she could plainly feel a Motion under her Hand, like that of Respiration, every Blast of the Child's crying sensibly touching upon her Hand.

These Particulars being considered, do not only prove the Reality of the Thing, but shew the Case to be very considerable. I have met with many Instances of this Nature in Authors, but not one that was of so long Continuance, and in which there were such frequent Reiterations of the Crying. The learned *Verzascha* of *Basil*, hath given us a Catalogue of many of them in the third Observation of his *Observ. Med.* Passing by the Cases he mentions attested only by illiterate Persons, I shall name only a few that seem to have more sensible Persons for their Evidence, *Ant. Deusingius* in his *Dissert. de Generat. Fœtus*, tells us, 'how that he had it from his Colleague *Monæus*, that the Child cried in his Wife's Womb, and the same befel the Wives of *Mr Salmuth*, and *Mr Grænwolt*.' His next
Relation

Of a Child crying in the Womb.

Relation is that of Dr *Needham*, of the Fœtus crying in the Womb of an *English* Lady of Quality; as she, her Husband, and Chaplain, were together at Supper; it is in the Doctor's Book, *De Formato Fœtu*. The last Instance is of *Christian II.* King of *Denmark*, who was heard to cry before he was born. Now these being Cases attested by Persons that may be supposed of better Understanding, seem to claim somewhat more of Credit: The latter being the Case of a King, and in all Probability heard by some of the best Quality about the Court; the next heard by the Chaplain as well as Persons of Quality themselves, and that three times one after another; and the former coming within the Cognisance of Gentlemen, and they probably Men of Learning too.

From these Cases so well attested, I conclude, That the Fœtus doth really cry sometimes in the Womb; altho' how this is performed is hard to account for; Surely not without Respiration. And therefore I am apt to think, that altho' the Fœtus doth not ordinarily breathe in the Womb, yet it is possible for it to have an occasional, temporary Respiration there. But whether in such Respiration, any of the Blood passeth into the Lungs, or whether it doth not continue it's Circulation thro' the *Foramen Ovale* only; Or if any more than ordinary Blood should by such Respiration get into the Lungs, whether it may not easily and without Inconvenience be discharged thence, during that State of Life the Fœtus leads in the Womb; All these Doubts I am unable to determine. But however thus much favouring my Opinion, may be observed in the *Sea-Calf*, and such other Animals as have the *Foramen Ovale*; That the Circulation of their Blood is continued, notwithstanding the Discontinuance of their Respiration for a long time.

As to the *Peeping of Chickens in the Egg*, about which *Etmuller* hath the same Doubt, as of the *Vagitus Uterinus*, I have myself divers times heard that, both from Chickens and Ducks. And a Person conversant in such Matters, assures me, That a little before the Hatching, she hath often, and can at any time cause some Chickens, and Ducklings to peep in the Egg. She says, that sometimes whole Nests of Eggs will yield a Cry, sometimes only some particular Eggs: But that such Eggs as have once afforded a Peeping, may be made to peep and cry at any time by shaking the Egg, and putting the Youngling into a Disorder. And sometimes where there hath not been any Noise before heard, the Bird hath been made to cry, by shaking the Egg in which it was enclosed.

The Cause of this peeping in the Shell, I take to be from some Uneasiness the young Bird may find there. It being arrived to it's perfect State in the Egg, is either weary of it's Confinement therein, and desireth more Liberty: or it lies uneasily, or else is offended with shaking, and therefore peepeth and crieth, as when uneasy out of the Shell.

And

And after such manner I take it to be with an Human *Fœtus*; that it is in some Disorder, and uneasy in the Womb, and therefore cries as well in as out of it. Thus I am apt to think it befel the *Fœtus* I have spoken of, *viz.* That it lay very uneasily in the Womb all the while it cried there, the Mother being in great Pain before, and during the time of the Child's crying; and the Child itself being closely confined, and pent up on the left Side the Mother's Belly *all the time of the Crying only, and not all the 5 Weeks.* Perhaps also the Child might find some Uneasiness from a Bone the Midwife told me she found to stick out somewhat farther than ordinary: Which, upon Examination, I take to be one of the *Vertebræ* of the Back-bone. And if this Bone caused Uneasiness to the Child, it might also by that means occasion, perhaps, the Woman's Pains I spake of: But these are only GuesSES and Imaginations of my own.

XXXVIII. There was in *Essex* a Great-bellied Woman who had the *Small-Pox*, and was pretty well recovered, so that she was able to take something to purge her after it: And on *August 30, 1712,* she took a Purge which did not work; and on *September the 1st,* another Purge, which gave her only a Stool or two. Upon which, *September the 3d,* she took another stronger Purge, that worked so violently upwards and downwards, that she fell into Faintings and Convulsions; about which time I conceive her Child within her died, but of which she was not delivered till *September the 8th.* The Child was a Female, and in Appearance well made, lusty and strong. At it's Delivery, the Midwife judged it had been dead five or six Days; so that the Belly was burst, and the Bowels came out, and the whole Body was inclining to be rotten.

Of a Woman big with Child, and having the Small-Pox, deliver'd of a Child having the same Distemper; by Mr W. Derham. n. 337. p. 165.

The Child was very full of the *Small-Pox*, so full that the Midwife said hardly a Pin's Head could be put between the Blisters, which were very plump, and full of Matter like the Pustules of an Adult, when the *Small-Pox* is at the Height, only a little depressed in the middle. But as full as the Child was, the Mother had as few, and very favourably; her Child, I suppose, undergoing that which would have been more severe upon her.

I leave it to others to determine whether when a Woman hath the *Small-Pox* in Pregnancy, it be likely that the Child should be in Danger of catching and having that Distemper after it's Birth? And whether this Child had the *Small-Pox* at the very same time the Mother had it, and not rather afterwards, by reason the Child was full of it some time after the Mother was well recovered?

I am inclined to think, that the great Flux and Tendency of the Blood to the Child in the Womb, might draw in the Humour, and prevent the greater Eruption of the *Small-Pox* in the Mother; and that for want of a due Expence thereof, the Remainder afterwards broke

out in the Child, and that the Child really had it after the Mother; Nature making the Discharges upon the Child, which were not completed on the Mother.

The Human Allantois discovered; by Dr R. Hale. n. 271. p. 835.

XXXIX. Most of the Antients allow a *Human Allantois*, not from their Experience of it, but because they took it for granted, that Men and other Animals were alike, in the *Viscera, Membranes, Vessels, &c.* And the Accounts they have left of many Parts, particularly of the *Urachus* and *Allantois*, (as to it's Name, Figure, Scite, &c.) agree only to their Appearance in Brutes. I shall say nothing of the *Allantois* in Brutes, since it is granted by most Anatomists, to be in these Animals, and sufficiently described by Dr *Needham*.

This Anatomist also first discovered part of the *Allantois* in *Human Subjects*; but neither he, nor any other, has taken the right Method of finding it entire. (b) Dr *Needham* says, that after the *Amnios* is cleared, and left fixed to the *Umbilical Rope*, you may divide by the Fingers, or Knife, the remaining Part of the *Involucra* into two Membranes: The exterior he truly calls the *Chorion*, the interior he takes to be the *Allantois*. But by these ways of Separation, you will presently tear the *Allantois*, and be able to discern only some small Pieces of it. Besides the *Allantois* is at first Sight so like the *Amnios*, that (c) many who suppose the *Amnios* double, and that it's Coats are easily separable, have taken these Pieces of the *Allantois*, for broken Parts of one of the Coats of the *Amnios*. Whereas having first found the *Hole* whence the *Urine* came forth, (if the *Allantois* is not too much torn) you may blow up the *Allantois* with a Pipe to it's full Dimensions, and then see it's true Shape, the *Fundus*, the *Cervix*, the Infertion there of the *Urachus*, it's Relation there to the other Membranes, &c. Be the *Allantois* never so much torn, yet this way you may easily separate many Inches of it from the *Chorion* and *Amnios*. Which easy Separation demonstrates a Distinction of Membranes, since no double Membrane can be divided by the Breath alone.

Indeed *Hoboken* and (d) *Diemberbroeck* make it a very easy thing to separate the *Allantois* from the other Membranes, only by the Fingers; but 'tis plain from their Descriptions that they never saw one entire. Amongst other Mistakes *Diemberbroeck* says, That the *Urine* of a *Fætus* lies between the *Urinary Membrane* and the *Chorion*; as tho' not contained in a distinct Bladder, but in a Cavity made partly from the *Chorion*, partly from the *Urinary Membrane*.

I confess *De Graaf* (e) tells us, that by blowing with a Pipe into a Hole made thro' the *Chorion*, all the Membranes of the *Secundines*

(b) Cap. 3, & 7. (c) Diemer. lib. 1. cap. 31. Horn. parag. 69. (d) Lib. 1. cap. 31. (e) De Mul. Org. cap. 15.

will appear distinct. He has also delineated an *Allantois*, with the other Membranes, &c. as he says he found them. Yet this (f) Figure must have been drawn from his own Fancy, and not from any Preparation, for these Reasons. 1st, Because by this way of Separation, you can only part the *Allantois* from the *Chorion*, but never see it's true Dimensions, nor any Appearance of a Bladder; for a Bladder, as the *Allantois* is, can be shewed only by blowing into it's Cavity, or by finding it full. Yet in this Figure no Sign can be observed, where 'twas blown up, and tied, *De Graaf* also speaking of making a Hole only in the *Chorion*. Nor can this *Allantois* be supposed full of Urine, because 'tis not of the Shape of a full *Allantois*; and our Author himself calls it only the inflated Part of the *Allantois*. However I cannot conceive how the *Allantois* could remain partly filled with Air (any moré than it might with Urine) so long as till this *Fig.* was drawn, unless some *Hole* was tied up, whence the Urine came forth, and the Air was blown in. 2dly, Because in this *Fig.* the *Umbilical Rope* seems to run through both *Amnios*, and the *Allantois*, to it's Insertion on the *Placenta*. Whereas the *Allantois* is no where perforated by the *Umbilical Rope*, nor does it any where pass thro' the *Amnios*, but only runs under it, at the Place of it's Insertion on the *Placenta*. If the *Navel-string* could be allowed to enter the *Amnios* at I (g), and to pass under it to the *Placenta*, why should it not appear (which it does not) under the *Amnios*, as well as the thin Substance of the *Allantois*? Again, according to *De Graaf's* Position of the *Secundines*, (which is the Reverse of *Fig.* 161. where the *Navel-string* lies under the *Allantois*) nothing could hinder a plain View of the Place where the *Navel-string* is set on to the *Placenta*. This will be easily apprehended, by supposing the Part H in my Figure, *Fig.* 161. to lie uppermost, the *Fundus G* and *Navel-strings* being turned over; for then the *Strings* will run over the *Allantois*, as in *De Graaf's* Gut, and it's Insertion appear plain on the *Placenta*, which yet cannot be discovered in his (g) *Fig.* I am sure the whole is irregular, and I take it to be fictitious. As for the *Urinary* (g) Membrane G, it seems to be the *Allantois* of a *Colt* (where (b) *Needham* says, the *Umbilical Rope* runs through the *Urinary* Membrane) not less absurdly added to the *Secundines* of a *Human Fœtus*, than the *Secundines* of a *Whelp* are to a like *Fœtus* by *Vesalius*.

'Tis most evident that *De Graaf* knew nothing of the true Shape of this Membrane, and that he had never seen one entire, because (i) he consents to (*) *Needham's* Description of it is as true, which yet is false in several Particulars. For 1st, The *Urinary* Membrane does

(f) De Mul. Org. Cap. 15. Tab. 22.
B. Tab. 2.
de format. Fœt.

(g) Tab. 22. De Graaf.
(i) De Graaf, cap. 15.

(b) Vid.
(*) Cap. 3.

not cover the whole *Fœtus*, (as he affirms) but only that Part of it which respects the *Chorion*, and does not lie on the *Placenta*; for the *Allantois* can be extended at farthest but to the Edges of the *Placenta*, where the *Amnios* and *Chorion* are so closely joined by *Fibres*, that no Membrane can come between them. Wherefore, 2^{dly}, The *Allantois* is not every where fastened to the *Chorion*. And consequently, 3^{dly}, The *Allantois* cannot be of the same Shape that the other Membranes are of; nor be like the *Allantois* of a *Colt*, which contains the *Fœtus* in the *Amnios*; all which, nevertheless, *Needham* (k) asserts. In short, Dr *Needham* had seen only Pieces of the *Urinary* Membrane, but never an intire one, and so could only guess at the Shape, &c. of it, from what he had observed in *Mares* and *Glanduliferous* Animals. He might have made a better Guess at the Figure, Scite, &c. of a *Human Allantois* from that of a *Whelp*, which does not every where encompass the *Fœtus*, as he observes.

Bidloo, in most of the *Figures* of the *Secundines*, letters some *Vestigia* of the *Urinary* Membrane; but in any of these *Figures*, you only see broken Pieces of one, so confusedly placed, that no *Idea* of it's Bigness, Shape, or Situation can be formed from them. I must confess, that oftentimes the Membranes of the *Secundines* are so torn, that no Art can exhibit an entire *Allantois*. However, among the many *Secundines* that have come under the Hands of Anatomists, several, no doubt, must have been entire enough for a fuller Discovery than they have made, had it not been by their ways of proceeding, (*viz.* by Knife, Fingers, or blowing under the *Chorion*) impossible to discover any thing plain or satisfactory, even in the fairest Subjects.

The Difficulty of finding this *Membrane*, is by no means an Argument against the Existence of it: But a Woman that dies big with Child, is so fair a Subject for the Discovery of *three Membranes*, that I wonder (l) *Parey*, having such an Opportunity, could find but two, if he was so careful as he says he was. The accurate Dr *Tyson* observed *three Membranes*, some Years ago in a like Subject. After the *Chorion* was divided and laid aside, he saw *two Bladders*, containing Liquors of different Colours; which he pressing one towards the other, did not mix, but remained distinct. This Observation fully satisfied that Anatomist, as to the Existence of an *Allantois*; and it's Figure, Texture, Scite, &c. might also have been discovered by him, had not the less-curious Spectators been impatient to pass on to the other Parts of the Dissection.

Some deny an *Urinary* Membrane to a *Human Fœtus*; because they suppose the *Urachus* to be impervious, and that therefore there would

(k) Cap. 7.

(l) Lib. 3. cap. 34.

be no Passage for the Urine, consequently no need of an *Allantois*. *Nedham* (m) indeed says, That he could never find any Sign of a Cavity in the *Urachus*; yet is of Opinion, that by blowing from the *Bladder*, the Air might be forced through a *Human Urachus*, as easily as he has often done it through that of a *Whelp*. I do not understand why *Dr Needham*, and (n) others, should insist so much upon an apparent Cavity in the *Urachus*, or expect that Air should necessarily pass through it, upon blowing, and think that otherwise it cannot be fit for the assigned Office; since many Bodies, as Membranes, &c. will not admit Air, &c. yet let Water pass freely through them. It will not seem strange, that Water should pass through the Substance of the *Urachus*, if we consider that the Cavity of the *Urachus* to the *Navel* is open, as appears by Inflation, or Injections, (to say nothing of those who are mentioned to have made Water by the (o) *Navel*); and that the rest of the *Urachus* is pervious, though not plainly hollow (the Urine rather soaking gently, than running through it's more straight Tubes) may be gathered from hence; 1st, That the Substance of the *Urachus*, (as well as the Cavity of the *Allantois*) is always found turgid with a Liquor, that in Colour, Taste, and Smell, seems Urinous. 2dly, That since the *Mucous Coat* of the Intestines is demonstrated to be Vascular, by *Mr Leeuwenboeck*, therefore the *Mucous Substance* of the *Urachus* may also be Vascular. 3dly, That Urine may as easily ouze through these *Mucous Vessels*, as other Fluids run through *Vascular Cartilages*, and *Bones*, &c. or the *Chyle* into *Lacteals*, whose Orifices, as (p) *Leeuwenboeck* observes, will scarce admit of Particles so big as the 1000000000 Part of a Grain of Sand) the great Cavity of the Intestines being open at the same time; or as easily as grosser Parts of the *Semen* pass the Tubes of the *Testicles*, whose Cavities are not more perceptible. I am sure the Urine is more assisted in it's Motion by the *Detrusor Urinae*, &c. than any of these Fluids can be by the Heart, or other *Muscles*.

(q) Others will not admit of an *Urinary Membrane*, they thinking it would be useless; because they imagine, that when the *Bladder* is full, the Urine must be discharged at it's *Cervix*, and not at it's *Fundus*, by the *Urachus*. But in answer to this, the Urine can never pass through the *Cervix* and *Urethra*, unless the *Abdominal Muscles* contract; because we never void Urine naturally, but by the Help of these *Muscles*, nothing less being able to force open the *Sphincter*

(m) Cap. 3. cap. 4. cap. 7.

riceau, lib. 2. cap. 4.

par. 8. sect. 2. cap. 10. Lauren. lib. 8. quest. 17.

68. p. 235.

Parey, lib. 3. cap. 34.

(n) Parey, lib. 3. cap. 34. Mau-

(o) Fern. lib. 6. cap. 13. Senn. lib. prac. 3.

(p) Vol II. epist.

(q) Barth. lib. cap. 36 & 37. Riolan. lib. 6. cap. 3, & 4.

Vesicæ. Now it being more than probable that these Muscles never act before *Respiration*, no Urine can pass through the *Sphincter* before the Child breathes. No Reason can be given why the *Abdominal Muscles* of a *Fœtus* should voluntarily contract; since neither the Quantity nor Quality of the (*r*) Urine can excite to such an Action. For when the Bladder is too full of Urine, it will ouze through the lax spongy Substance of the *Urachus*, being gently pressed by the *Detrusor* alone. There would arise many Inconveniencies from the voluntary Contraction of the *Abdominal Muscles* of a *Fœtus*, as voiding *Fæces* as well as Urine, into the *Amnios*, which would be more prejudicial than (*s*) Sweat, &c. Yet if we should suppose the *abdominal Muscles* of a *Fœtus* to act, the Urine will however pass where it can most easily, *i. e.* through the *Urachus*, which is partly open, and altogether of such a Texture, as in no wise can hinder the passing of the Urine, much less be able to resist a considerable Force, as the (*t*) *Sphincter Vesicæ* can. Besides, the *Urachus* is not only thus qualified for the Admission of Urine, but when the Mother lies down, 'tis almost upon a Level with the *Urethra*, and what has once passed the *Urachus*, cannot return by reason of the Length, Situation, and peculiar Structure of it: And the (*u*) *Pudendi Clausura* sometimes happening in both Sexes, demonstrates, that then, at least, the Urine cannot pass through the *Urethra*.

Dioni (*w*) not finding any *Allantois*, nor an *Urachus* plainly pervious, thinks there is no need of either, on another Account. For he supposes that the Blood, which serves for the Nutrition of the *Fœtus*, is depurated from all Excrement. But I cannot apprehend, what should make this Portion of the Blood and Chyle freer from Excrement, than the rest of the *Massa Sanguinea*. There is indeed no Portion of it, which does not contain Parts unfit for *Assimilation* and *Nutrition*. Our Author would have been convinced of this Error, had he ever opened *Abortions* of five Months old or upwards, their Bladders being always full of Urine, and some *Fæces* constantly in the Intestines. 'Tis difficult to determine when this Separation of Urine first begins, but I am apt to think it much sooner than is generally supposed. *Fig. 163*, is the *Allantois* of a very small *Abortion*, which I have still by me. Since all the Parts are perfectly formed before *Impregnation*, not very long after *Impregnation* they may begin to perform their Offices. No doubt they begin as soon as there is Occasion for any Separation, and

(*r*) Barth. lib. 1. cap. 37. Need. cap. 3. pag. 81.
Humor. pag. 547. (*t*) Gal. de usu part. lib. 15.
Prac. lib. 4. part. 1. sect. 1. cap. 3. Mauric. lib. 2. cap. 3.
145.

(*s*) Harv. de
(*u*) Senn.
(*w*) Pag.

a Separation of Urine is necessary when the *Fœtus* is first nourished by the *Umbilical Arteries*.

The Existence of an *Allantois* is denied by (x) some who grant an *Urachus*, but will have it convey the *Urine* to between the *Amnios* and *Chorion*. (y) *Diemerbroeck's* Opinion is somewhat like this, only he would have the *Urine* lodged between the *Urinary Membrane* and the *Chorion*. These Men do not consider that the *Urine* in this Case would get into the *Amnios*, as well as the *Succus Nutritius* of the *Chorion*, whether imbibed from the *Uterus* by the *Chorion*, or separated by it's *Glands*. Such a *Succus Nutritius* of the *Chorion* is granted by the (z) Maintainers of the fore-cited Opinions, as well as by those who deny an *Allantois* altogether, or (a) suppose it to have a different Figure, &c. from what *Diemerbroeck* assigns it. The Transudation (or Filtration through the Membranes) of this *Succus* seems most likely in *Mares* and *Sows*; for in a (b) *Mare* the *Chorion* is not joined to the *Uterus* till she is half gone, and in a (c) *Sow* it does not adhere to the *Uterus* till near the End of her going with young. But 'tis most evident that the *Urine* of a *Human Fœtus* is not contained between the *Chorion* and *Amnios*, nor between the *Chorion* and *Allantois*, from the close Connexion of these Coats to one another; also from the Observation of Midwives, who often find a Bladder of Water (they call it a *By-Water*) offering itself before the *Child*, whereas the Humour of the *Amnios* is little, and of the *Chorion* much less, and of another Colour, &c. at the Time of *Birth*. This *By-Water* is taken Notice of, as an Argument for an *Allantois*, by Mr *Cowper*.

Dr *Harvey* (d) will not allow an *Allantois* even to *Brutes*, and fancies the *Allantois* and the *Chorion* to be the same Membrane, that has two Names, the first from it's Shape, the other from it's Office, or Number of Vessels. Yet 'tis plain from *Galen* and all the Antients, that they meant two distinct Membranes by the *Allantois* and *Chorion*. Dr *Harvey* thinks, that a *Fœtus* does not void *Urine*, but that the *Bladder* contains it, till the Time of *Birth*. What was offered against *Dioni's* Opinion, may serve for an Answer to this also. Because 'twas impossible for this Anatomist not sometimes to observe an *Urinary Bladder*, he has thought of ways to explain such *Phænomena* without granting an *Allantois*. In (e) *Sheep* and *Does* he had seen as it were a certain *Process* between the *Umbilical Arteries* full of *Urine*. This *Process* is no doubt the *Allantois*, though (f) *Bartho-*

(x) *Aquapend. lib. 1. cap. 7. Fallop.* (y) *Lib. 1. cap. 31.*
 (z) *Harv. de Hum. & Membr. Needh. cap. 2, 3, & 7. Barth. lib. 1. cap. 36.*
Graaf. de Mul. Org. cap. 15. (a) *Needh. Graaf.* (b) *Harv.*
de Membran. (c) *Need. cap. 2, 3, & 7. Graaf. de Mul. Org.*
cap. 15. (d) *Harv. de Memb. & Humor.* (e) *Harv. de*
Memb. & Humor. (f) *Lib. 1. cap. 37.*

linus calls it the *Urachus*. Again, he thinks what is called by others an *Allantois* (if it is not the *Chorion*) is some Coat accidentally formed from a Reduplication of the Membranes; because (since every Membrane is double) Nature may upon a Streight, lodge the Urine between a *Duplicature*. Yet he does not tell us how *his Duplicature* is to be filled, he allowing no *Urachus*. But, in short, this *Urinary Bladder*, can be no *Duplicature* of the other Membranes, since in all Animals it differs from them, as to Figure, Texture, and in having an *Urachus*, which no other Membrane has. And since every Animal that has a Bladder, must have a like Necessity for a Receptacle of Urine, till born, since also the *Urachus* is ever alike inserted in the same *Species* of Animals, and the *Urinary Bladder* constantly the same, as to Shape, Texture, Situation, &c. the *Urachus* and *Allantois*, with it's (g) *By-Water*, can be no accidental or preternatural Things.

All the Objections and Difficulties about an *Human Allantois* being thus cleared, I shall now consider what may be offered against these *Figures*. It is not my Design to give an entire History of the *Secundines*, &c. or repeat what can be found in other Anatomists; but only to relate what I have discovered of an *Human Allantois*, *Amnios*, &c. which is altogether new, or different from the Observations of others.

The *Allantois*, Fig. 161, I discovered in *March* 1698-9, the other, Fig. 163, several Years ago.

Fig. 161.

Fig. 161. Represents the *Secundines* of *Twins*, to shew the *Allantois*, and it's Relation to the other Membranes, &c. after the Parts were prepared and dried.

A, A, A, A, Part of the *Chorion* expanded. B, B, B, a *Line*, expressing the Edges of the *Placenta*. C, C, C, the *Amnios* which is united to D, the *Allantois*, at E, E, E, the *Line of Union*. F, the *Cervix* of the *Allantois*. G, a *Hole* at the *Fundus* of the *Allantois*, whence the Urine came forth, and where the *Allantois* was blown up. H, Part of that half of the *Allantois*, which lies under the *Line of Union*, and immediately covered the *Fætus's*, unless it is supposed that the *Amnios* is continued under the *Allantois*. I, I, two *Stiles* or *Probes* thrust under the *Amnios*. They support the *Allantois*, and keep open the *Aperture* * * * * of the *Amnios*, whence the *Twins* came forth. K, Part of the *Placenta*, with some *Blood-Vessels* injected. L, L, L, L, the *Arteries* of the *Navel-string* filled with red Wax. M, M, the *Umbilical Veins*, filled with green Wax. N, a *communicant Artery*, by means of which all the *Arteries* of both *Navel-strings* were filled at once, and the *Veins* were filled by one *Injection* in like manner. O, a

Pin that keeps out the *Amnios*, where from the Edge of the *Placenta* it runs partly to the *Line of Union*, or *Adhesion*, and partly over the *Placenta*. P, Part of the *Chorion* at the Edge of the *Placenta*, where it runs under the *Amnios* on the *Placenta*. Q, a Pin that by a Thread helps to pull open the *Aperture* of the *Amnios*. R, R, R, the *Urachus*, lying between the *Arteries*. a, a, a, a, *Fibres* or *Vessels*, which fasten the *Allantois* to the *Chorion*.

Fig. 162. Exhibits a *Side-view* of the same Preparation, that the Fig. 162. Infertion of the *Urachus*, &c. may be better seen.

N. B. That A and all the same Letters in these three *Figures*, denote the same Parts in every one.

S, shews the Course of the *Urachus* R, at F, in pricked Lines. T, Part of the *Amnios* raised from the Edge of the *Placenta*, to discover the *Placenta* K, and V. V. That Part of the *Allantois* which is below the *Line of Union*, near it's Neck F.

Fig. 163. Shews an entire *Allantois* of a very small *Abortion*. Fig. 163.

N. B. This *Allantois* was easily separated from the other Membranes between which it lay; and the *Amnios* remained an entire *Bladder* or Membrane under the *Allantois*.

Now some to whom I have communicated these *Figures* object, that what is called the *Line of Union* can be no real thing.

As to this, I do not know whether the *Allantois* of *Twins* may not require such a *Conjunction* to sustain, and keep steady a greater Quantity of *Urine*: nor can I resolve whether the *Allantois* of *Twins* (like that of a single *Fœtus* in Fig. 163.) may not be distinct, and separable from the *Amnios*, but was not discovered by me to be so, through want of Skill or Care. However, the Reasons why such a *Line* was figured, are these: 1. Altho' I used more Force, with equal Care, to separate the *Allantois* from the *Amnios* in this Place than in any other (where nevertheless the Separation was very easy) yet I could not divide these Membranes farther than that *Line*. 2. This *Line* seeming so regular as to divide the *Allantois* into two equal Parts, I could not take it to be the Effect of Chance, or my Separation. 3. The Part H below the *Line* EE was alike in *Transparency* to that Part of the *Allantois* D above it. Whereas had the *Amnios* been still joined to the *Allantois* (as these Objectors suppose) the *Allantois* below this *Line* must have appeared thicker than that Part above it, since the *Amnios* alone is much thicker than the *Allantois*. 'Tis easy indeed to conceive the *Amnios* running an entire *Bladder*, or Membrane, under the *Allantois*, and perhaps it may be so; but I shall not conceal what I did observe, or make out by Fancy, what I could not discover in Fact.

Others have thought this *Allantois* to be an *Amnios* of one of the *Twins* belonging to these *Secundines*. This Objection, tho' it may seem

plausible, yet is of no Force. For 1st, This *Allantois* is much finer to the Touch, and also much more transparent, than the other *Amnios*; which still remains stiff, whilst the much thinner *Allantois* sinks upon the least Blast of Air, notwithstanding the Stiles I, I, which assist it. 2dly, This *Allantois* had two visible *Urachus*'s, and it is of an oviform Figure, somewhat like the common Cuts of a Man's Bladder (for a true Cut of a *Human Bladder* I never yet saw, for it ought to be made much bigger, as it really is, at it's *Cervix*, &c.) Also this *Allantois* no where touches the *Placenta*, unless at the *Neck F*: But on the contrary, the *Amnios* is of the same irregular Figure, as the Position, Motion, &c. of the *Fætus* require. Likewise, it covers the whole internal Surface of the *Placenta*. 3dly, They who make this Objection must suppose some *Hole* in this Bladder, and in the *Amnios*, thro' which one *Umbilical Rope* may pass from the *Placenta* to the *Fætus*. But such a *Foramen* would be preternatural, because the *Navel-string* only runs from the *Placenta* to the *Fætus* under a *Coat* taken from the *Amnios*, and lies with the *Fætus* in the Cavity of the *Amnios*, that is no where perforated. 4thly, The *Hole* at the *Fundus G* was scarcely wide enough to receive the End of a Man's Finger, whereas the *Twins* did not want six Weeks of their full Time. Since therefore a *Fætus* of near eight Months could not possibly pass this *Orifice*, this Bladder could not be an *Amnios*.

Nothing in these *Secundines* is preternatural, only some things were not before observed. Hitherto Anatomists have not allowed *Twins* to lie in a common *Amnios*, but supposed each *Fætus* to have a distinct *Amnios*. The Reason of this Opinion might be, that some denying any *Urinary Membrane*, called every Membrane they found (except the *Chorion*) an *Amnios*, and these finding two Membranes in the *Secundines* of *Twins*, supposed them to be two *Amnios*'s. That others granting an *Allantois*, but not distinctly discovering it, but only two Membranes, also imagined them to be two *Amnios*'s. Both of these taking that for an *Amnios*, which might really be an *Allantois*. But since one *Chorion*, and one (*b*) *Placenta*, (the (*i*) *Placenta* and (*i*) *Chorion* being ever of the same Number) generally serve *Twins*, (nay, sometimes three *Fætus*'s) why should it seem strange, that one *Amnios* (at least sometimes) and one *Allantois* should serve the like Number?

I am not ignorant that (*k*) *Mauriceau*, and (*l*) *Diemberbroeck* think there is an absolute Necessity for every *Fætus* to lie in a distinct *Amnios*, and that otherwise *Twins* in the same Membrane would grow together, and make a *Monster*. *Aquapendens* (*m*) further says, that all *Ova Gemellifica* produce some other Sort of *Monster*. Yet 'tis most certain, that *Ova*

(*b*) Mauriceau, lib. 2. cap. 4. Need. cap. 2. Barth. lib. 1. cap. 36. Diemberb. lib. 1. cap. 30. (i) Diemer. lib. 1. cap. 31. Graaf. cap. 15.
 (*k*) Maur. lib. 2. cap. 3, & 4. (l) Diem. lib. 1. cap. 31. (m) Pag. 19.
 Gemellifica

Gemellifica do exclude two perfect *Chickens*, however not both alive. Dr *Harvey* (n) indeed thinks it possible, that such an *Ovum* may produce a monstrous *Chick*, if it's *Vitelli* are contained in the same Membrane, &c. yet does not positively say it must be so. For my Part I can't see any more Reason why *Twins* in one *Amnios* should grow together, than that the *Hands* or *Heels* of the same *Fætus* should grow to it's own Body. How can the Humours that lubricate a single *Fætus* and help it to move, join two together? Since the Humours are the same, and the Parts of the same *Fætus* as tender as those of *Twins* are, and lie as close to one another as *Twins* do. 'Tis very observable, that amongst all the *Monsters* we read of, there are very few, which seem to be made of two entire Bodies joined together, and that most of these upon (o) Dissection were found to have but one Heart, one Liver, &c. whence 'tis most plain, that these *Monsters* (and no doubt all others) were originally *Monsters* in the *Ova*, before Impregnation, and not so from want of an *Amnios*. Yet *Diemerbroeck* (p) does not a little boast of having first (as he thinks) found the Reason why *Twins* must lie in distinct *Amnios*'s. But since the Matter of Fact (sometimes at least as in these *Secundines*, where there was only one *Amnios*, and two regular *Fætus*'s) is not true, his Argument for a Necessity of two *Amnios*'s for two *Fætus*'s, will never prove valid, even where *Twins* and two *Amnios*'s are found. Indeed any Part may be made to grow to any Part, as we see in the Cure of *Hair-lips*, &c. but then the Fibres must be first broke, before there can be any *Union*. Now I can't conceive what should naturally break the Fibres of the *Twins* in the *Uterus*. But although 'tis evident from what has been said, that *Twins* may lie distinct in the same *Amnios*, yet there must be as many *Urachus*'s, as *Fætus*'s. In these *Secundines* I saw two running over the *Placenta*, to the Neck of the *Allantois*, which I communicated to some Physicians, before the Parts began to grow dry. The *Urachus* passes under the *Amnios* as the other *Umbilical Vessels* do, and runs from that part where the *Umbilical Rope* is set on to the *Placenta*, straight to the *Cervix F.* S, describes the Course of that *Urachus* marked R at F, in *Fig. 162*. The other *Urachus* lay about a quarter of an Inch laterally beyond that marked R in the same *Figure*. I mean by two *Urachus*'s, two long roundish Bodies, of a depressed Figure, they seemed as big as a common knitting Needle, and were of a darker Substance than the *Placenta* on which they lay. They appeared in every respect like that Part of the *Navel-string*, which is allowed by all Anatomists to be the *Urachus*, and in like manner shrunk in two or three Days, from a mucous Substance to a meer Membrane.

(n) Exercit. 24. de Gener. lib. 1. cap. 30, & 31.

(o) Parey, lib. 25. cap. 2.

(p) Diem.

These two are the only entire *Urinary* Membranes that I have prepared. Yet in the many *Secundines* that have come to my Hands, I have ever found three distinct Membranes easily separable.

From hence then we can better explain some *Phenomena*, as voiding *Urine* by the *Navel*, and the *Breaking of Waters* from Women half gone with Child, and tell the Consequences of such Accidents; as also better account for those *Waters* and *Bladders* Midwives meet with, and direct them in their doubtful Operations, &c.

XL. *An Account of a Book Omitted.*

n. 270. p. 829. *Profluvia Ventris*, or the *Nature* and *Causes* of *Loosenesses* plainly discovered, their *Symptoms* and *Sorts* evidently settled, the *Maxims* for curing them fully demonstrated, and all illustrated with the most remarkable *Methods* and *Medicines* of all Ages; and with some *practical Observations* concluding every Sort. By *William Cockburn*, M. D. late *Physician* of his Majesty's Fleet, F. R. S. and of the *College of Physicians*. London, 1701, 8vo.

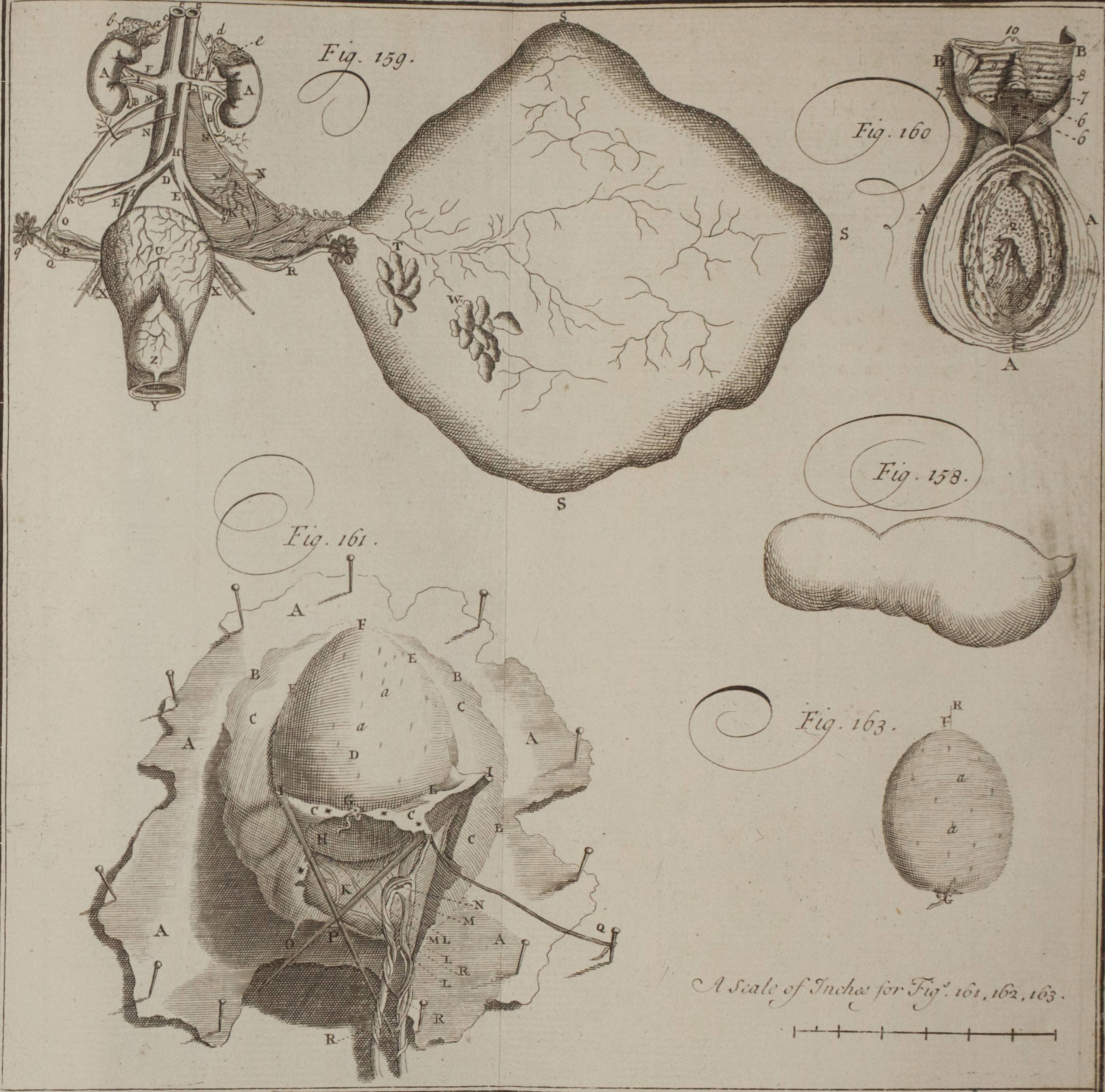


Fig. 159.

Fig. 160

Fig. 158.

Fig. 161.

Fig. 163.

A Scale of Inches for Fig. 161, 162, 163.



C H A P. VI.

The Humours, and General Affections of the Body.

I. **T**HE Body of Mr *Dove* in divers Parts appeared of a black, blue, livid, and various Colours, before I made any Incision into it; particularly the Back (where the Blood was settled) had a cadaverous Blackness; where the *Cuticula* was here and there vesicated or distended with *Serum*; of this there was no appearance before Death.

An Account of
the Dissection
of Mr—Dove.
By Mr W.
Cowper.

n. 335. p. 512.

The Muscles of the *Abdomen* had a mortified Appearance, being of a blackish green Colour. The Liver was intirely sphacelated. The Spleen had large mortified Spots on it's Surface: Both these Parts were specifically lighter than in the natural State; insomuch, that Portions of each of them swam on the Surface of Water, and seemed to have more Air in them than we commonly find in the Lungs in their natural State. The rest of the *Viscera* in this lower Cavity were not in so ill a State; though the Guts had here and there blackish Spots on them.

The Pectoral Muscles were in a little better State than those of the *Abdomen*; nor were the intercostal Muscles like those of the Limbs. I am apt to think all the Muscles imployed in Respiration, had more or less of this blackish Appearance. The right Lobes of the Lungs were diseased; and the same Side of the *Thorax* had a small Quantity of *Serum* in it. The Lungs on the other Side were in no ill Condition. The *Heart* was very flaccid and large: The right *Ventricle* and *Vena Cava* had no small *Polypus* in them. The *Vena Pulmonalis* was exceedingly dilated next the *Basis* of the Heart. The left *Ventricle* of the Heart was furnished with a small *Polypus*, and a great Quantity of grumous Blood. The great *Artery* was very thin, and appeared not a little extended, and had some cartilaginous Bodies interspersed in it's Membranes.

In the Head; the *Dura Mater* was found inseparable from the *Cranium* in it's upper Part. A *Polypus* was drawn out of the upper great Vein of the Brain, called *Sinus Falcis superior*.

The *carotid* Arteries, were very thin, and much larger than they ought to be, before they entered the Substance of the Brain. In short, all the Blood Vessels which I examined were very much dilated, and seemed to be charged with as much Wind as Blood.

Experiments
relating to the
Specific Gra-
vity of Human
Blood; by Dr
J. Jurin.
n. 361 p. 1000.

II. It is well known from the Observations of Mr *Lewenboeck* and others, that Human Blood consists of red globular Particles swimming in a pellucid *Lympha* or *Serum*. Which two different Substances, tho' of unequal Specific Gravities, yet so long as they continued to circulate in the Veins and Arteries, are prevented from separating by their Motion and Warmth. But when the Blood comes to stagnate and cool in the Porringer, the globular Particles uniting together by their attractive Power, and sinking by their Weight, which is greater than that of the *Serum*, form the *Coagulum* or *Crassamentum* at the Bottom of the Porringer, the *Serum* swimming above it.

Things always happen in this Manner when the *Crassamentum* is at Liberty to subside; but it often falls out, that neither by it's Adhesion to the Sides of the Vessel, or by the Bubbles of Air which the Blood gathers upon falling into the Porringer, and which stick to it's Surface, the *Crassamentum* is kept from sinking, and seems to float upon the Top of the *Serum*.

These Accidents seem to have given the first Occasion to that Opinion, which has been generally entertained by those who have writ upon this Subject, namely, that the globular Part of the Blood is specifically lighter than the *Serum*, in which it swims.

But that which has so fully established this Persuasion, is the Authority of the late Mr *Boyle*, who, among the many Experiments he has given us in his Natural History of Human Blood, has left the following ones upon this Subject.

The Specific Gravity of *Serum* of Human Blood was found by weighing a Piece of Sealing-Wax first in *Serum*, and afterwards in Water, to be to the Specific Gravity of Water, as 1024 to 1000.

In a second Experiment, which for greater Accuracy was made with an Instrument contrived on Purpose, the specific Gravity of *Serum* was found to be to that of Water, as 1194 to 1000.

In a third Experiment made by the same Instrument, and with *Serum* from the Blood of another Person, it's Specific Gravity appeared to be 1186.

The *Medium* between these two last Experiments is 1190, which has since been universally received for the Specific Gravity of *Serum* of Human Blood, the first Experiment being declared by Mr *Boyle* himself to be less exactly made than the other.

The Specific Gravity of Human Blood was found by Mr *Boyle*, to be to that of Water, as 1040 to 1000; tho' on Account of Difficulties by him mentioned, he was far from being satisfied with this Experiment, and recommended the Thing to farther Trials.

These Experiments however having hitherto past uncontroverted, and it appearing from them, that the Specific Gravity of *Serum* was greater than that of Blood in the Proportion 1190 to 1040, or of 8 to 7 nearly; it was a necessary Consequence of this, that the Blood

Globules

Globules were specifically lighter than the *Serum*, and that in a very great Degree, considering the small Proportion that the Bulk of the *Crassamentum* was found to bear to that of the *Serum*, from other Experiments.

From this it was not improbably conjectured, that these Globules were thin Vesicles fill'd with an Aëreal Substance: And this Opinion seem'd to receive a great Confirmation, upon it's being observed, in viewing the Circulation by a Microscope, that a Blood Globule, in passing thro' a very narrow Vessel, would change it's Shape from a globular to an oval Form, and would recover it's former Figure, as soon as it was got thro' the narrow Passage; which Appearance seem'd to be naturally accounted for, from the Elasticity of the included *Aura*.

Upon this Conjecture have been built a great many Solutions of the *Phænomena*, observable in the Animal Oeconomy, and the Disorders of it, by eminent Authors, who were led into this Mistake by the natural Consequence of a Matter of Fact, for the Truth of which they had so great an Authority: But, that the *Red Globular Part* of the Blood is specifically *heavier* than the *Serum*, will appear from the following Experiments.

Exp. I. I have several times cut off a small Part of the *Crassamentum*, when by it's Adhesion to the Sides of the Porringer, it has seem'd to swim upon the Surface of the *Serum*, and have put it into another Vessel fill'd with *Serum*; upon which it has immediately sunk to the Bottom.

Exp. II. When the *Coagulum* has been buoyed in the *Serum*, by the Bubbles of Air adhering to it's Surface, I have separated a small Part of it, where those Bubbles have been thickest, and put it into a Glass of *Serum*, in which it has swam as before. Then setting the Glass upon the Air-Pump, those Bubbles burst after one another, as the Receiver was exhausting; and the Air being again let into the Receiver, the Lump of *Crassamentum* sunk to the Bottom of the Glass.

Exp. III. I have often plac'd a Drop of *Serum* upon a clean Glass, before a Microscope, in which I had dissolv'd a very small Quantity of Blood, and observ'd, that when the Glass was held in a perpendicular Posture, the Blood-Globules subsided to the Bottom of the Drop; and inverting the Glass, the Globules again descended thro' the *Serum*, to the Bottom. I had the same Success with a small Quantity of *Serum* and Blood, in a Capillary Tube: And the same Thing has been long since observ'd by Mr *Lewenboeck*.

These Experiments undeniably demonstrate, that the *Crassamentum*, or Globular Part of the Blood, is specifically heavier than the *Serum*; and consequently it is by no means probable, that the Blood-Globules are Vesicles fill'd with Air, or any other Fluid, lighter than *Serum*. And that they are not fill'd with any Sort of Elastic Fluid, will appear from the following Experiment.

Exp. IV.

Exp. IV. In a small Quantity of *Serum* of Human Blood, I dissolv'd so much Blood, as that the Globules might not lie too thick together, to hinder their being seen distinctly. Then having lodged a small Drop of this Liquor on the Inside of a thin Glass Tube, I fitted the Tube on to the Air-Pump, and placed a Microscope by it, so that I could see the Blood-Globules thro' the Tube. This being done, I caus'd the Tube to be exhausted, keeping my Eye upon the Globules all the time, in order to observe whether they dilated themselves, as the Air was withdrawn; but could not perceive the least Alteration, they appearing exactly of the same Bigness in the *Vacuum*, as they had done before. Whereas if they had been fill'd with an Elastic Fluid, they would either have burst, or have been dilated to at least 70 or 80 times their former Magnitude. The Stop-Cock being afterwards turn'd, and the Air suffer'd to re-enter the Tube, the Blood-Globules still retain'd the same Bigness, as in *Vacuo*.

Mr *Machin*, Professor of *Astronomy* in *Gresham-College*, was present at a Repetition of this Experiment, and was fully satisfied upon repeated Trials, that there was no perceivable Difference between the Magnitude of the Blood-Globules in the Air, and in *Vacuo*. Upon this Occasion the two first Experiments were likewise repeated in his Presence, with the same Success, as above related.

Tho' what has been already said, is a sufficient Proof of the Falsity of the Opinion above-mention'd, yet however to prevent the Objections which may arise for want of Experiments made in the same manner with Mr *Boyle's*, as well as for the Satisfaction of the Curious, who may be desirous to know the true Specific Gravities of *Serum* and Blood, I shall proceed to demonstrate the same thing by Hydrostatical Experiments.

Exp. V. Novemb. 13, 1713. Having suffer'd a Quantity of my own Blood to stand about 24 Hours in the Porringer, and then drawing off the *Serum* carefully with a small *Siphon*, into a convenient Glass, I found by the Hydrostatical Balance, it's Specific Gravity to be to that of Water, as 1029,8 to 1000.

Exp. VI. Feb. 21, 1716-7. I examin'd the *Serum* from the Blood of another Person in the same manner, and found it's Specific Gravity to be 1028,6.

Exp. VII, VIII, and IX. April 8th, 1717. I obtain'd three several Quantities of *Serum* from the Blood of different Persons. The first of these was of a deep Colour, inclining something to red, and a little turbid. It's Specific Gravity was 1029,7.

The second was likewise a little turbid, and of a pale whitish Colour. The Specific Gravity of this was 1030,2.

The third Quantity of *Serum* was perfectly clear, and of the Colour of *Canary*. It's Specific Gravity was found to be 1030.

Tho' these five several Experiments were all carefully made, and with a Balance whose Accuracy I was well assur'd of; yet for farther Evidence,

Evidence, I thought it proper to make that which follows after another manner.

Exp. X. Jan. 15th, 1718-9, I drew off all the *Serum* from five or six several Porringers, containing the Blood of different Persons. This I found to be a little tinged with Blood, which was occasion'd by my being oblig'd to draw it off pretty near to the Bottom of the Porringers, in order to obtain a Quantity sufficient for my Purpose. For this Reason, I suffer'd it to stand about two Days, in which Time the Globular Part of the Blood was entirely precipitated to the Bottom, and the *Serum* was become perfectly fine and transparent. I then drew it off with a *Siphon* into a Glass Vial with a narrow Neck, which I fill'd to a certain Mark made in the Neck for that Purpose. This done, I plac'd my Vial in a nice Pair of Scales, in which I had a Counterpoise for the Weight of the Vial, and found that Quantity of *Serum* to weigh 2284 $\frac{1}{4}$ Grains.

Then pouring out the *Serum*, I fill'd the Vial with common Water to the same Mark, and found the Weight of the Water to be 2219 Grains.

From which it follows, that the Specific Gravity of this *Serum* was 1029,4.

Exp. XI. July 14, 1719. I procur'd a Quantity of Blood taken from the temporal Artery, from which I drew off the *Serum* the next Day, and weighing it in the same manner, found it's Specific Gravity to be 1028,8.

These Experiments agree so nearly together, that the little Difference between them may very well be attributed to that which is between the *Serum* of different Persons; or to the Variations occasion'd by Heat and Cold in the several Seasons of the Year, in which they were made. So that from them we may safely determine the Specific Gravity of *Serum* of Human Blood, at a *Medium* to be 1029,5, or in a round Number 1030. From which the greatest Variation in any of these Experiments, is little more than 1 in 1000; whereas the Difference between Mr *Boyle's* Experiments and mine, amounts to 160 in 1000.

Exp. XII. April 6, 1717. In order to find the Specific Gravity of Human Blood, which, by Reason of it's Tenacity, and sudden Alterations upon standing, cannot be determin'd by the Hydrostatical Balance; I took a narrow-neck'd Vial, and fill'd it to a Mark with Blood pour'd immediately out of the Porringer, as soon as the Person was blooded. This I weigh'd, as I had done the *Serum* before, and found it's Specific Gravity to be 1051.

Exp. XIII. Aug. 5th, 1717. Having fill'd the same Vial with the Blood of another Person, running immediately out of the Vein through a Funnel, it's Specific Gravity was determin'd at 1053.

Suffering this to stand 'till it was cold, I found the Blood was sunk a small Matter below the Mark in the Neck of the Vial. This being fill'd up with the Water, which in so small a Quantity could make no

sensible Difference from Blood, I found the Specific Gravity of cold Blood, to be 1055.

Exp. XIV. Aug. 6, 1718. The last Experiment being repeated in the same manner as the Year before, the Specific Gravity of cold Blood was again found to be 1055.

Exp. XV. July 14, 1719. The Arterial Blood, from which the *Serum* was afterwards drawn off for the 11th Experiment, being weigh'd in the same manner, it's Specific Gravity was 1052,5.

As this Arterial Blood and it's *Serum*, differ no more in Specific Gravity from Venal Blood and it's *Serum*, than the several Portions of these do from one another, 'tis plain, that the Difference in this respect between Arterial and Venal Blood, is wholly inconsiderable. The Animal Oeconomy indeed teaches us, that the *Serous* Liquor is perpetually drawing off from the Arterial Blood by the several Secretions, but as the Quantity separated in one Circulation is very small, the Blood must arrive in the Veins nearly of the same Density, as when it runs thro' the Arteries.

In the 13th Experiment, we observ'd that the Blood alter'd it's Specific Gravity upon cooling, from 1053, to 1055; from which we may infer, that if the Blood made use of in the 12th Experiment, had been suffer'd to stand 'till it was cold, it's Specific Gravity would have been 1053; wherefore, taking a *Medium* between the four last Experiments, we may allow the Specific Gravity of cold Human Blood, to be 1054.

The Difference of 14 Parts in 1000, between this and the Specific Gravity determined by Mr *Boyle*, is easily accounted for, if we consider, that That Gentleman did not make use of a Vessel with a narrow Neck, as plainly appears from the Circumstances mentioned in his Experiment; and consequently a small Error in the Height of the Liquor, would make a considerable Alteration in the Specific Gravity.

Since therefore the Specific Gravity of Human Blood is 1054, and that of it's *Serum* 1030, it is plain, that Blood is heavier than *Serum* by about one Part in 43. From which it manifestly follows, that the globular Part of the Blood is specifically heavier than the *Serum*, since the globular Part being separated from the Blood, leaves the Remainder, or the *Serum*, specifically lighter than the intire Mass.

But in order to determine the exact Specific Gravity of the Blood-Globules, it is first necessary to know the Proportion which the whole Quantity of the *Crassamentum* contained in Blood, bears to the *Serum*. To this End, Mr *Boyle* has given us two several Observations of the Weights of the *Crassamentum* and *Serum*, after they have separated one from another in the Porringer. But besides the Difficulty of making this Experiment with any tolerable Exactness, it is to be consider'd, that there is a great deal of *Serum* contain'd in the Interstices of the Globules, that compose the *Crassamentum*.

This Difficulty, however, is in some measure answer'd by two other Experiments, which Mr *Boyle* made for this Purpose, after the following manner. He put a Quantity of the *Crassamentum*, already separated from the *Serum*, into an Alembic, and distill'd off the remaining *Serum* to Dryness, but without drawing off the Oil, or Volatile Salt; after which, he weigh'd the distill'd Liquor, and the dry Mass left behind.

By comparing these Experiments with the two former, it will be found, that the entire Weight of *Serum* contain'd in Blood, is nearly $\frac{13}{15}$ of the whole; and consequently the Weight of the dry'd *Crassamentum*, is only two Fifteenths of the Blood.

But for farther Satisfaction, an Analysis was made at my Desire, with a large Quantity of Blood, amounting to four Pounds fourteen Ounces, by a skilful Chymist, Mr *John Brown*.

From this was obtain'd, with a very gentle Heat, two Pounds fourteen Ounces, and six Drachms of a Phlegmatic Liquor, that had scarce any thing of the foetid Scent which is usual in the Distillation of Animal Substances; and it's Specific Gravity was nearly the same with that of common Water, being but 1000,8. This being mix'd with a strong Solution of Alum, scarce afforded any *Coagulum*; but exhibited a considerable one, upon Mixture with a Solution of *Roman Vitriol*.

The Distillation being continued with the same Heat, we had seven Ounces more of Phlegm considerably impregnated with Volatile Salt, as was manifest from the Smell. The Specific Gravity of this was 1007, and having mix'd it with *Tinctura Martis optima*, Solution of Alum, and of *Roman Vitriol*, a large *Coagulum* was precipitated. In distilling these, there was lost by Evaporation, two Ounces and two Drachms.

The third Portion of Liquor being rais'd with a stronger Fire, amounted to seven Ounces six Drachms. This was reddish, and turbid, and so strongly charg'd with Volatile Salts, that it might very well deserve the Name of Spirit. It's Specific Gravity was 1080,1.

Besides these, we had seven Drachms of Volatile Salt, an Ounce of Oil, and eight Ounces four Drachms of *Caput Mortuum*, which still retain'd some small Remainder of the Oil, as was manifest from it's taking Fire at the Flame of a Candle. In this latter Part of the Operation, was lost three Ounces, seven Drachms.

Upon making due Allowance for the Difference between the Specific Gravities of the three first Portions of Liquor, and that of *Serum*, as likewise for what was lost in the two several Parts of the Operation, which we may reasonable conclude to have been of a Specific Gravity nearly the same with that of the Liquor drawn off, it will be found, that the Quantity of *Serum* contain'd in this Mass of Blood, was about $\frac{15}{17}$ of the whole Weight; and consequently that the Quantity of *Crassamentum* was $\frac{2}{17}$ of the same Weight.

If we calculate therefore upon this Supposition, that the Weight of the globular Part of the Blood is $\frac{2}{7}$ of the whole, we shall find the Specific Gravity of a Blood-Globule, to be to that of Water, as 1277 to 1000.

If we follow the Proportion of $\frac{2}{3}$, which results from Mr *Boyle's* Experiments, the Specific Gravity of a Blood-Globule will be 1242.

But this Computation is in all Appearance a great deal too large; for we cannot be assur'd, that our whole Quantity of aqueous Liquor was rais'd from the *Serum* of the Blood. On the contrary, it is more than probable, that a considerable Part of it was afforded by the Blood-Globules themselves, especially in the latter Part of the Operation, when their Texture must of Necessity have been broken and dissolv'd by the strong Fire that was made use of. To prove this, we need only to consider the Condition of the dry'd *Crassamentum*, after the Phlegm is drawn off, that being now a hard and brittle Substance; whereas the Globules in their natural State, are soft and yielding. For which Reasons it may perhaps be more satisfactory, if we attempt to find the Quantity of the globular Part of the Blood after another manner.

It appears therefore from Mr *Boyle's* Observations, that the Quantity of *Serum*, which may be pour'd off from the *Crassamentum*, is about one Half of the whole Mass. The remaining *Crassamentum* consists of the Blood-Globules, and a Quantity of *Serum* filling up the Interstices between them; which if the Globules keep their Spherical Form, may easily be found by the Principles of common *Geometry*, to be nearly one Half of the Bulk of the *Crassamentum*; but if the Globules by their Pressure against one another change their Figure, the Quantity of *Serum* will be something less.

If this Quantity of *Serum* lying between the Blood-Globules be added to that pour'd off, it appears, that the *Serum* contain'd in Blood, is about $\frac{3}{4}$ of the whole Bulk, and consequently that the Blood Globules make about $\frac{1}{4}$ of the whole. From which we shall find the Specific Gravity of the Blood-Globules to be to that of Water, as 1126 to 1000.

If we suppose the Blood-Globules to make $\frac{1}{6}$, $\frac{1}{5}$, $\frac{1}{3}$, or $\frac{1}{2}$, of the whole Bulk, their Specific Gravity will be respectively 1174, 1150, 1102, or 1078. So that upon any of these Suppositions, the Specific Gravity of the Blood-Globules will be considerably greater than that of the *Serum*, and consequently they cannot be suppos'd to be Vesicles fill'd with an Aëreal Substance.

It will therefore perhaps be ask'd, What they do really consist of?

In order to come to a Solution of this Question, it may be proper to take Notice.

That Blood is compos'd of Phlegm, Oil, volatile and fix'd Salts, and Earth. For as to the Spirit, we look upon it with Mr *Boyle*, to consist of the Phlegm and Volatile Salt united together.

That

That the *Serum*, upon a Chymical Analysis, exhibits a great deal of the first of these, and the others in a very small Quantity.

That on the contrary, the *Crassamentum* yields much less Phlegm, but the other Principles much more copiously than the *Serum*.

From which *Data*, I think, we may safely conclude, that the *Crassamentum*, or Globular Part of the Blood, consists of some Phlegm united with the Oil and Salts, and a small Quantity of Earth.

But what is the exact Proportion of these several Principles to one another; what Alterations are produced in the Body by a Change of this Proportion; how, and in what Part these Globules are form'd; by what means they preserve their Figure, without dissolving in the *Serum*, or uniting with one another; what Variations are made in their Specific Gravities by Heat and Cold; and what are the Effects of those Variations, are Questions not very easy to be solv'd, and yet of so much Importance to the Animal Oeconomy, that it were greatly to be wish'd, we had a Number of *Data* sufficient to determine them.

I have since made the following Experiments, which serve to confirm the Method last made use of, for finding the Specific Gravity of the Blood-Globules.

August 6, 1719. I took a Lump of the *Crassamentum* and wash'd it gently in fair Water, to free it from the loose Globules, which precipitating out of the *Serum*, after the *Coagulum* is form'd, do not unite into one Body with it. This done, I laid it on a spongy brown Paper, in order to drain off the superfluous Moisture. After which, weighing it first in Air, and then in Water, I found it's Specific Gravity to be $1083\frac{1}{2}$.

Another Lump of the same *Crassamentum* being weigh'd in the same manner, it's Specific Gravity was 1082,9.

Sept. 18, 1719. I found the Specific Gravity of another Piece of *Crassamentum* to be 1082,1.

A second Piece from the Blood of a different Person, gave me 1086,1.

A third from the same Person, gave 1086,6.

From this it follows, that the Specific Gravity of the Blood-Globules is at least 1084, which is the *Medium* between these five Experiments.

But if we allow one Half of the Bulk of the *Crassamentum* to consist of *Serum*, filling up the Spaces between the Blood-Globules, we shall find their Specific Gravity to be 1138.

From this we must make a small Abatement, because some Part of the *Serum* must have been squeez'd out from between the Globules, by their yielding to one another's Pressure, when the Lump of *Crassamentum* lay upon the Paper: And this will reduce their Specific Gravity sufficiently, near to 1126, as we had before determin'd it.

The Figures
of the Arteries
and Veins ex-
plained. With
several Ana-
tomical and
Chirurgical
Observation,
by Mr W.
Cowper. n.
280. p. 1177.

An Account of
these Prepara-
tions; by Mr
J. Evelyn.

Fig. 164.

Fig. 165.

III. The Schemes of the Arteries and Veins (*Fig. 164, 165, 166,*) were drawn after the Vessels themselves, pasted and dry'd, which were dissected from *Adult Human Bodies*, and display'd on *Tables* in the *Repository* of the *Royal Society*, and are the Present of *John Evelyn, Esq;* from whom I receiv'd the following Account, concerning them, and another *Table* of the *Nerves*, &c.

Being some Years since in Italy, and curious of seeing the many repeated Dissections at the Anatomical Theatre at Padua, Cavalier Vestlingius being then Professor, and reading on divers Bodies several Days, during the Lent, Dr Johanno Athelsteinus Leoncenæ, who was then Operator, by extracting the Veins, and other Vessels, which contain the Blood, Spirits, &c. out of Human Bodies, began to apply, and distend them on Tables, according to their natural Proportion and Position. Some of these Tables being finish'd with the Direction and public Approbation of the Professor, and several other Learned Physicians and Anatomists, present at those Lectures, and Operations; and understanding that Leoncenæ was going shortly (I think) into Poland, and willing to dispose of his Tables before he took his Journey, I desir'd the late Dr Geo. Rogers, (Consul then at Padua, for the Students of our Nation in that University) to purchase, and procure them for me; which he did, for, as I remember, 150 Scudi; with Condition, that he should add a Table more, namely, that of the Liver, Gastrick Nerves, and other Vessels, to compleat the fourth.

I find the *Arteries* here, very agreeable to a Figure which I drew and published not long since, from the *Arteries* of a *Fœtus* injected with Wax. But this Figure of the *Veins* differs so much from any extant, as would incline one to suspect all of the Subject hitherto publish'd, are fictitious, not excepting even those of *Vesalius*. But first of the *Arteries*.

That the *Arteries* are the Vessels which convey Blood from the *Heart*, to all Parts of the Body, is well known; and we see by *Fig. 164*, that the common Practice of Nature, in distributing these Vessels, to supply the Parts with Blood, is from the next adjacent Trunk, 'till their ascending and descending Trunks become Conical, as well as their collateral Branches: Not that all the Trunks and Ramifications of *Arteries* are uniform; and become Conical in the same manner; nor do all of *Them* pass directly to the Parts to which *They* convey Blood; nor do all Parts receive *Arteries* from their neighbouring Trunks.

The Trunks of the *Carotid, Vertebral, and Splenic Arteries*, are not only *Contorted* in their Progress, in the *Adult*; but the Diameters of their Bores are variously dilated in divers Parts of *Them*, especially where *They* are *Contorted*; but as these Dilatations of their Trunks are caus'd by the Resistance the Blood meets with at those *Angles of Inflection*; so those *Enlargements* of them afterwards, contribute to retard the Protrusion of the Blood to the Extremities of those *Arteries*: Hence it is, That as the *Arteries* of the *Fœtus* are not *Contorted* in
such

such acute Angles as in full grown Bodies; so their Trunks are more Conical, and not here and there dilated in divers Parts of them, as in the *Adult*.

The Trunk of the *Splenic Artery* has a straight Progress in the *Fœtus* and in *Infants*; but in the *Adult* I have constantly found it very much *contorted*, as expressed in *Fig. 164, 23*.

The peculiar Contrivances of the *Spermatic Arteries* of *Quadrupeds* is *Spermatic Ar-* well as *Men*, shew a constant Design in Nature of taking off that *Ve-* *teries*.
locity with which the Blood would otherwise pass thro' the *Glands* of the *Testes*: It seems to be for this End that the *Testes* of most Animals (especially *Men* and *Quadrupeds*) hang out of the Cavities of their *Abdomen*, that the Canals of their Blood-Vessels may be lengthen'd: For the *Spermatic Arteries* (contrary to all others) arise from the great Trunk, at a far greater Distance from the *Testes* than the *Arteries* of any other Part of the Body. Nor would the *Testes* (which are such necessary Organs) have been thus exposed to external Injuries, if the End of Nature in lengthening their Blood-Vessels had not been very considerable. Besides this Lengthening of the *Spermatic Arteries*, we find Nature still contriving other Impediments to *check* the Current of the Blood in those Parts; it seems for this End that the *Spermatic Arteries* are lessened at their Original from the Trunk of the *Arteria Magna* in *Men*, and that the *Spermatic Arteries* of *Quadrupeds* are so much *contorted* before they reach their *Testes*.

The principal Inducement of Nature in making use of these different Contrivances in the *Spermatic Arteries* of *Men* and *Quadrupeds*, seems to be,

That, if the *Human Spermatic Arteries* were *contorted* as in *Quadrupeds*, before they reach their *Testes*, the Apertures in the *abdominal Muscles* of *Man* must be much larger than they now are, and would frequently let the *Intestines* descend into the *Scrotum*; which nevertheless often happens: Such *Ruptures* (as they are called) are not so incident to *Quadrupeds*, tho' the Passages for their *Spermatick Vessels* (thro' their *abdominal Muscles*) are much wider than in *Men*, because the Position of the Trunks of their Bodies is *Horizontal*, and their *Intestines* therefore cannot press on the Processes of the *Peritonæum*, as in *Men* who are *erect*.

I shall now proceed to describe the Extremities of the *Arteries*, with their *Communications* with the *Veins*, and afterwards produce some Instances of the Art of Nature in conveying the reflux Blood to the *Heart*.

After the *Circulation of the Blood* thro' the *Heart*, *Lungs*, and large *Of the Com-* Blood-Vessels, was demonstrated by *Dr Harvey*, it was only guessed *munications* how the Extremities of the *Arteries* transmitted the Blood to the *Veins*, *of the Extre-* till *Mr Lewenboeck's Microscopes* had discovered the Continuations of *Arteries with* the Extremities of those Vessels in *Fishes*, *Frogs*, &c. which is now com- *the Veins, &c.* monly shewn by *Microscopes* made by other *Hands*: Yet some doubt of
the

the like Continuations of the Extremities of *Arteries* and *Veins* in *Human Bodies* and *Quadrupeds*: since those *Animals* it has hitherto been seen in (to any Satisfaction as Mr *Lewenboeck* confesses) have been either such *Fish*, or of the *amphibious Kind*, that have but *one Ventricle* in their Hearts, and their Blood actually cold, except in *Bats*, in which it appears very obscurely: Add to this, that the Blood in those Creatures does not circulate with such Rapidity as in *Animals* whose Hearts have *two Ventricles*. For in all *Animals*, that have *Biventrous Hearts*, the Vessels of the rest of the Body return their Blood to the Heart in equal Time and Quantity with those of the Lungs, notwithstanding the Inequality of their Course.

The Circulation of the Blood seen in the Omentum of a Cat.

* This Difference in the principal Organs of the *Circulation of the Blood* in those Creatures, (on which only these *Experiments* have been hitherto made) moved me to make some on *Animals* whose Organs differ only from the *Human* in their gross Figure, and not in their intimate Structure: For this End I took a young *Cat*, about ten or twelve Days old, and fastened it to a Board as in *Vivisection*; and making an Incision thro' the *Linea Alba*, the *Omentum* and *Intestines* were extruded; then causing the Creature to be so held (on the Board) under a large *double Microscope*, where a flat Glass for receiving of Objects was placed Horizontally, on which I expanded the *Omentum* or *Caul*, (a Light being placed underneath) I saw the Globules of the Blood move very swiftly in the small Vessels, which are only to be seen in the most transparent Parts of the *Membranes* of it's *Omentum*; but the Motion of the Blood soon abated, and it's Globules were withdrawn from the Extremities of it's Blood-Vessels; and in a little time became stagnant in their larger Branches.

Fig. 169.

This Appearance of the Continuation of the Extremities of the *Arteries* with the *Veins*, while the Blood was moving in them, in the *Omentum* or *Caul*, is expressed by *Fig. 169*. A, A, shews the Trunks of the *Arteries*. B, B, the *Veins*, which were distinguishable by contrary Currents of the Globules of the Blood in each Vessel. C, C, C, shews the Branching of the Extremities of the *Arteries* and *Veins*, that no longer associate with each other, but are united, as here expressed. I had once a young lean *Dog*, that was not large; in whose *Omentum* I saw it very well; but by the Assistance of an Instrument I had prepared to expand the *Mesentery*, I saw it there much better; that Part having not only larger and clearer Spaces than the *Omentum*, but it's

—In a Dog.
Fig. 170.

* Mr *Wotton* in his *Reflections upon Antient and Modern Learning*, Chap. 18. Since it has been constantly found, that Nature follows like Methods in all Sorts of *Animals*, where she uses the same Instruments, it will always be believed, that the Blood circulates in Men after the same Manner as it does in *Eels*, *Perches*, *Bats*, and some other Creatures, in which *Monsieur Lewenboeck* tried it. Tho' the Ways how it may be visible to the Eye in Men, have not, that I know of, been yet discovered.

Blood-Vessels are distributed more regularly, as appears by *Fig. 170.* where the same Letters of Reference serve as above.

Those who would view the transparent Parts of living Creatures — in Tadpoles, &c. with *Microscopes*, will find that the Extremities of their *Arteries* and *Veins* are not all equally lessen'd though united. In the Tail of the *Lacerta Aquatica*, *Tadpoles*, and in most Fish (I have examin'd) I have frequently observ'd several Communications between the *Arteries* and *Veins*, in which more than two Globules of Blood have past abreast: And in the same *Area* I have seen some of those *Communications* so small, as that but one Globule could pass, and that very slowly before the other. In young *Fish*, particularly in Grigs, I have frequently observ'd a *communicant Branch*, so very small as that one Globule of Blood only has pass'd it in two or three Seconds of a Minute: At other Times I have found considerable Intervals in passing of one Globule in such a *communicant Branch*; even half a Minute, a whole Minute, and once in two or three Minutes I have seen one Globule of Blood only pass in a particular Tract.

The prompt passing of Liquors, injected by the *Splenic Arteries*, *Vid. Supra*, to the *Veins*, shews the Communications between those Vessels are more open than the *Arteries* and *Veins* of other Parts. *p. 227.*

Liquors also injected into the *Pulmonic Arteries* pass to their *Veins*, tho' not altogether so freely as in the *Spleen*.

On viewing the Extremities of the *Pulmonic Blood-Vessels* in a living Frog with my *Microscope*, I found their *Communications* much larger than those that I had before seen in the Membrane between the Toes and in the Feet of the same Creature. Nor can we reasonably doubt of the like patent Communications of the *Arteries* and *Veins* of *Human Lungs*, and those of *Quadrupeds*, when we consider the *Blood* of their Lungs must return to the Heart in equal *Time* and *Quantity*, with that of all the Parts of the Body besides. Hence it appears that the *Bronchial Blood-Vessels*, (first taken Notice of by the accurate *Ruyfch*) are absolutely necessary, else the Parts of the Lungs could not receive Nourishment; nor could the Glands of the *Bronchie* separate their Liquor, if they were supplied with *Blood* from the *Pulmonic Blood-Vessels* which is so quickly dispatched through the Lungs. — in a Frog.

On viewing the Membrane, that is, between the Toes of one of the hinder Feet of a living Frog, after I had frequently taken hold of the same Leg of that Creature, to apply it to the *Microscope*, I found that Membrane very transparent, and without any Motion of the Globules of the Blood in it, as if the Part had been dead; but while I was looking on it, I saw the Globules creep into it by Degrees, and at length the Blood move in all the Branches of its *Veins* and *Arteries* as before, when no Violence had been offer'd to the Part. While the Blood is thus leisurely creeping thro' the Vessels, you may

plainly see it's Globules compress'd into oval Figures, which are made more or less oblong, by the Resistance those Globules meet with, by the Contraction of the Sides of the Vessels they pass through; and this I have more than once observed in the Tails of the Water *Newts* or *Lizards*: But on examining the Blood of these Creatures with a Microscope, and comparing it with the human Blood, I found the Globules of the *Lizards* Blood more incline to an oval Figure, and were as big again as the Globules of human Blood, and that of a small Fish; which I in like manner viewed at the same Time. It is not unlikely a sudden Retrocession of Blood from the Extremities of it's Vessels often happens, and it's *Circulation* in the same Vessels, is afterwards carried on without any Impediment; as on some Passions of the Mind, Deliquiums by the Effusion of Blood, or otherwise. But if the Blood is once become stagnant in it's Vessels (especially the *Arteries*) the Part is in no small Danger of a Mortification, unless it's neighbouring Vessels, which enjoy the Motion of the Blood, drive on the stagnant Blood, and it escape by the Sides of the Vessels that retain'd it. Experience assures us, that in Bruises when the Blood is extravasated, it goes off either by *Transcolation* or else causes an *Abscess*; for there's little Reason to suspect any of the stagnant Globules of the Blood will be fit to re-unite with the *circulating* Mass. But that the Blood after Stagnation in it's Vessels will sometimes pass their Sides, appeared to me from the following Experiment.

On viewing the *Mesentery* of a Dog when living, in which I had before seen the Blood passing the Extremities of the *Arteries* and *Veins*, I consider'd how to preserve the Blood in it's Vessels, that I might afterwards at any Time see it in their Extremities when stagnant: For this End I caus'd several Parts of the *Mesentery* to be tied on as many Pieces of small round *Pill-Boxes*, cut transversely like little Hoops; on which, *Portions* of the *Mesentery* were extended like the Head of a *Drum*; and on viewing *them* afterwards with my *Microscope*, I found the Extremities and Branches of the Blood-Vessels charged with Blood, which before appeared in Motion. On laying one of these *Parts* of the *Mesentery* (thus expanded) in Water, the stagnant Blood in it's Vessels disappear'd; but on just immersing another of those *Pieces* in Water, I could with my naked Eye see the stagnant Blood diffused in the Interstices of the Blood-Vessels, and between the Membranes of the *Mesentery*: Hence it is evident, the Blood may pass the Sides of it's *Vessels* after Stagnation in *them*; but whether it's *Globules* are broken, or what Figure renders *them* fit to pass those Pores that are in the Sides of the Vessels, I leave to others. But to return to our *Tables*, and first of that of the *System* of the *Vena Cava*.

Remarks on
the Veins.

As the *Arteries* are known to export the Blood, so the *Veins* carry it back again to the *Heart*; but having already described their Extremities, we come next to the large Trunks of the *Veins*; and here, as
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in the *Arteries*, we find the common Practice of *Nature*, in disposing the Branches of *Veins* to discharge the reflux Blood into the next adjacent Trunk, and so on to the Heart. As the *Arteries* afford abundance of Instances of *Checks* given to the Velocity of the Current of the *Blood* through several Parts, so the *Veins* supply us with as many *Artifices* to assist it's regular Return to the *Heart*, as well as favour those *Contrivances* in the *Arteries*.

The Trunks of the *Carotid*, *Vertebral*, and *Splenic Arteries*, are not only variously contorted, but are also here and there *dilated*; so the *Veins* that correspond to those *Arteries* are also variously *dilated*. The Beginnings of the *Internal Jugulars* have a *bulbous* Cavity, (Fig. 171. H, H,) which are *Diverticuli* to the Refluent Blood in the *Sinus's* of the *Dura Mater*, lest it should descend too fast into the *Jugulars*. The like has been also taken Notice of by Dr *Lower* in the *Vertebral Sinus's*. The *Splenic Vein* has divers *Cells* opening into it near it's Extremities in *Human Bodies*; but in *Quadrupeds* the *Cells* open into the Trunks of their *Splenic Veins*. Fig. 171.

The *Spermatic Veins* do more than equal the Length of the *Arteries* of the *Testes* in *Men*; their various *Divisions* and several *Inosculation*s and their *Valves*, are admirably contrived to suspend the Weight of the *Blood*, in order to discharge it into the larger Trunks of the *Veins*; and were it not that the Refluent Blood from the *Testes* is a *Pondus* to the Influent Blood from the *Arteries*, and still lessens it's Current in the *Testes*, these *Spermatic Veins*, like those of other Parts, might have discharged their Blood into the next adjacent Trunk.

Who can avoid Surprize at the Art of *Nature*, in contriving the *Veins* that bring Part of the Refluent Blood from the lower Parts of the *Body*? When they consider the Necessity of placing the *Human Heart*, as well as that of most *Quadrupeds*, so far from the *Centre* of the *Body* towards it's upper Part? It is for that End necessary † the large Trunks of the *Veins* and *Arteries* should not associate each other; for if all the *Blood* sent to the lower Parts, by the descending Trunk of the *Aorta*, should return to the *Heart* again by one single Trunk (as it is sent out from thence) the *Weight* of so much *Blood* in the Ascending Trunk of the *Vena Cava*, (Fig. 165. C, C, A.) Fig. 165. would oppose the Force the *Heart* could give it from the *Arteries*, and hinder it's *Ascent*: For this Reason the *Vena Azygos* (*b*) or *sine pari*, is contrived to convey the *Blood* sent to the *Muscles* of the *Back* and *Thorax* into the descending Trunk of the *Vena Cava* (*B, A,*) above the *Heart*: Hence, it is evident, more *Blood* comes into the *Heart* by the descending or upper Trunk of the *Vena Cava*, *B, A,* than passes out by the ascending Trunks of the *Aorta*. Nor does this

† Vid. Lower de Corde, cap. 1. pag. 1.

Quantity of Blood, convey'd to the Heart by the *Superior Trunk* of the *Cava*, seem without some other Design in Nature, besides transporting it thither to free the *Inferior Trunk* from it's Weight: But perhaps it was necessary so much Blood should be ready there to join with the Chyle, for it's better Mixture, before it reaches the right Auricle of the Heart.

I have lately discovered a *peculiar Valve* in the *lower Trunk* of the *Vena Cava*, near the right Auricle of the Heart.

Fig. 164.

Fig. 164, represents the Trunks and large Branches of the *Arteries* dissected from an *adult Human Body*, when displayed and dried.

1, The Trunk of the *Aorta* cut from the *Basis* of the *Heart*.
 2, That Part of it, whence the *Coronary Artery* of the *Heart* does arise. 3, That Part of the *Arteria Magna*, where the *Canalis Arteriosus* of the *Fœtus* terminates; which in an *Adult* becomes a *Ligament*. (Vid. Fig. 167. 3.) 4, 4, That Part of the *Axillary Arteries*, by some called the *Subclavian Arteries*. 5, The *Left Carotid Artery* (in this Subject it seems) arising from a common Trunk with the *Right Carotid* and *Axillary Arteries*, as in some *Quadrupeds*. 6, The *Left Cervical Artery*, in this Subject arising from the Trunk of the *Arteria Magna*, as expressed in a Figure given by *Bergerus* in the *Acta Eruditorum*, An. 1698, pag. 295. But in all the *Human Bodies* in which I have hitherto examined these *Arteries*, I have constantly found them as expressed Fig. 165. 6, 6. 7, The *Arteries* that carry Blood to the lower Parts of the *Face*, *Tongue*, adjacent *Muscles* and *Glands*. 8, The Trunk of the *Temporal Artery*, springing from the *Carotid*, and parting with Branches to the *Parotid Gland*, 9, and *Temples* 10, and Parts adjacent. 11, The *Occipital Arteries*. 12, The *Arteries* that convey the Blood to the *Fauces*, *Gargareon*, and adjacent *Muscles*. 13, The Trunk of the *Carotid Artery* cut off, before it is contorted in passing the *Skull*. 14, The Trunk of the *Artery* of the *Arm* parting with Branches to the adjacent *Muscles* and *Parts*.

—Of an *Aneurisma*.

* That Part of this *Artery* which is sometimes pricked in letting Blood, and makes an *Aneurisma*, in which Case this Trunk of the *Artery* must be bared and firmly tied above the *Aneurisma*; and if it afterwards happens (as it has been frequently known) that the Flux of Blood to the *Aneurisma* in the *Artery* is not very much abated, though the *Artery* has been tied above; the *Operator*, in that Case, must make another *Ligature* on the Trunk of the *Artery*, below it's *Aneurisma*: These collateral Communications of the Trunk of the *Artery* at the bending of the *Cubit*, preserve the Circulation of the Blood in the *Cubit* and *Hand*, though the *Trunk* is totally compressed both above and below; and the same *Trunk*, afterwards, divided between those *Ligatures*. Hence it is, if one
 Ligature

Ligature made above the Wound in the Artery is not sufficient, but the Blood still pours out from below, the *Patient* will sooner recover the Action and Strength of the Muscles of the Cubit, than those in whom the upper Ligature proves sufficient; the reason of which is obvious to any, who consider that the *Communicant Branches* must be larger where the lower Ligature is required, than when the superior Ligature only is sufficient: These *Communicant Branches* (as I have seen them in some Subjects) are here marked out in prick'd Lines: *vid.* the *Fig.*

The two following Instances have lately happened, in which the *Communications* of the large Trunks of the *Arteries* of the Cubit and Arm were remarkable.

A Boy of thirteen Years, who, about three Weeks before I saw Two Cases of an Aneurisma. Fig. 164. him, received a Wound near the Middle of the *Cubit* in which the *Trunk* of the *Artery* (marked in the *Fig.* †) was divided. The *Surgeon* who was first called, had frequently bound up the Wound, and put a Stop to the several Discharges of Blood (which, they told me, did not amount to less than six or seven Quarts, at times), but not without a Compress on the Trunk of the Artery, above the Wound. On another impetuous Flux I was called; but seeing no small Quantity of Blood discharged, I was contented to let the Wound be bound up, in the same manner as it had been done before; omitting the Compress on the Trunk of the *Artery* above, and adding a Piece of Deal-Board, on which the Hand and Cubit were fastened, to prevent any Motions of those Parts, as well as the Fingers: Three Days after, the Applications were taken off, and little or no Blood appeared; but two or three Hours were scarce elapsed, e'er I was alarmed with Notice of a fresh Flux. The *By-standers* being instructed in that Case, to compress the *Trunk* of the *Artery* above the *Cubit*, they had thereby prevented no small Effusion of Blood, which must otherwise have happened. I laid the Trunk of the Artery bare above the Wound as expeditiously as I could, being forced more than once to let loose the Compress above, to discover it's Orifice by the Flux of Blood. I passed a Needle with strong waxed Thread under the Artery, and made a Ligature on it's Trunk, which lay concealed in the Interstice of the *Musculus Flexor Digitorum*, and the *Musculus Ulnaris Flexor Carpi*; but notwithstanding this Ligature on the Trunk of the Artery above the Wound, the Blood still flowed from the *Lower Trunk* of the *Divided Artery*; yet the Velocity of it's Current was so much abated, that it seemed like Blood flowing from a Vein. I left the Wound with a Digestive, and the Part without hard Bandage; it being now five Weeks since, I hear the Wound is almost *cicatrix'd* Dr *Harris* was present at the other *Operation*, by which the *Communications* of the large Trunks of the *Arteries* of the Arm were very evident.

A Boy

Fig. 164.

A Boy about eight Years of age came to Town with an *Aneurisma* of the left Arm, upon bleeding six Weeks before: The *Tumour* was indeed very large, in Proportion to so small an Arm. After laying the *Aneurisma* or *Tumour* bare, and making a Ligature on the Superior Trunk of the *Artery* (in the annexed *Fig.* *) I found, on loosening the *Compress* on the Superior Trunk of the *Artery*, very little Abatement of the *Pulsation* of the *Aneurisma*; I then passed a Ligature in like manner on the Trunk of the *Artery* below the *Tumour*; but notwithstanding, the *Pulsation* continued, though much abated. I then discovered another Trunk of the *Artery*, arising from the lower Part of the *Tumour*, on which also I made another Ligature, and the *Pulsation* was then taken off. However, on cutting off the Surface of the *Cystis* or dilated *Artery*, and clearing it of the coagulated Blood, there still poured out some fresh Blood, which was soon stopped with a common Astringent; I left the Part without any other Ligature or hard Bandage. It is now eighteen Days since the Operation, the Ligatures on the *Arteries* are all come off, and the *Pulsation* of the *Artery* of the *Wrist* begins to be very manifest; nor does any Symptom appear that threatens Success.

N, 285.
p. 1391.

[This Patient has since recovered the Use of his Arm, and is in perfect Health.]

15, The Division of the *Trunk* of the *Artery* of the *Arm* below the Flexure at the *Cubit*. 16, The *external Artery* of the *Cubit*, which makes the *Pulse*, that is commonly felt near the *Carpus*. 17, The *Arteries* of the *Hand* and *Fingers*. 18, The *Mammary Artery*. 19, 19, The *descending Trunk* of the *Arteria Magna*. 20, 20, The *Intercostal Arteries*. 21, The *Arteria Cœliaca*. 22, The *Arteria Hepatica*. 23, The *Trunk* of the *Arteria Splenica*. 24, The *Arteria Epiploica Sinistra*. 25, A Branch of an *Artery* which passes to the Bottom of the *Stomach*. 26, The Superior *Coronary Branch* of the *Stomach*. 27, 27, The Superior *Mesenteric Artery*. 28, 28, The *Emulgent Arteries*. 29, The *Inferior Mesenteric Artery*. 30, 30, The *Lumbar Arteries*. 31, 31, The two *Spermatic Arteries*, which in this Subject seem to arise at a greater Distance from each other than commonly. 32, The *Iliac Artery*. 33, The *Arteria Sacra*. 34, The *Internal Iliac Branch*. 35, The *External* ———. 36, The *Epigastric Artery*. 37, Branches of the *External Iliac Artery*, passing to the *Oblique Muscles* of the *Abdomen*. 38, 38, The *Arteries* that pass to the *Muscles* of the *Thigh* and *Tibia*. 39, The *Crural Artery*. 40, The *Umbilical Artery*, with those of the *Penis*. 41, That Part of the *Crural Trunk* that passes the *Ham*. 42, The three *Trunks* of the *Arteries* of the *Leg*. 43, The *Arteries* of the *Foot* and *Toes*.

Fig. 167.

Fig. 167. The *Trunks* and some of the *Ramifications* of the *Arteries* of an Adult *Human Body* filled with Wax, to shew the *Variety* in Nature, and supply the *Defects* of the former Figure.

1, The

1, The *Aorta* cut off at the *Basis* of the Heart. A, The three *Semilunary Valves*, as they appear when the *Heart* is in *Diastole*, and hinder the Blood coming back from the *Arteries* into the *Left Ventricle* of the Heart. B, a Portion of the *Trunk* of the *Arteria Pulmonalis*. *b, b*, It's Division before it passes to the right and left Lobes of the Lungs. C, The *descending Trunk* of the *Arteria Magna*. D, D, The *Internal Mammary Arteries*. 2, The *Trunk* of the *Coronary*, cut off. 3, The *Ligamentum Arteriosum*, which in the *Fœtus* is the *Canalis Arteriosus*, and conveys Blood from the *Pulmonic Artery* to the *Great Artery*. 4, The *Trunk* of the *Subclavian Artery*. 5, 5, The *Carotids*. 6, 6, The *Vertebrals*. 7, 7, The *Arteries* which pass to the lower Parts of the *Face, Tongue, adjacent Muscles and Glands*. 8, 8, The *Trunks* of the *Temporal Arteries* arising from the *Carotids*, giving Branches to the *Parotid Glands* (9, 9,) and the *Temples* (10, 10,) &c. 11, 11, The *Occipital Arteries*. 12, The *Arteries* of the *Fauces, Gargareon, &c.* 13, 13, The *Contortions* of the *Carotid Arteries*, as they pass the *Basis* of the *Skull*: These *Trunks* of the *Carotid Arteries* in *Dogs* (like those, I guess, of most *Quadrupeds*) are very much *contorted* before they reach the *Basis* of the *Skull*; on filling these *Vessels* of that *Animal* with *Wax*, I found those Branches of them which pass to the *Brain*, first clipping the hinder Parts of the lower *Jaw*, immediately under it's *Condiloide Processes*; where those *Arteries* are received in two *Sinus's* of that *Bone*; which *Sinus's* may also be seen in the *Jaw-bones* of other *Quadrupeds*, but not in *Human Bodies*. 14, 14, Those Parts of their *Trunk* that pass by each *Side* of the *Sella Turcica*, whence divers small Branches arise, and help to compose the *Rete Mirabile*; which is more conspicuous in *Quadrupeds* than in *Human Bodies*. 15, 15, The *Contortions* of the *Vertebral Arteries*, where we find their *Trunks* considerably dilated. 16, The *Vertebral Arteries*, as they ascend on the *Medulla Oblongata* towards the *Annular Protuberance* or *Pons Varolii*. 17, 17, The *communicant Branches* of the *Vertebral* and *Carotid Arteries*. 18, 18, The *Arteries* of the *Brain* displayed.

Fig. 168, represents one of the *Trunks* of the *Arteries* of the *Tibia* Fig. 168. dissected from the *Leg* after *Amputation*.

Mr *Stringer* was in his sixty-seventh Year when this *Artery* was taken from him, and near twenty Years before lost the Use of both his *Legs*; and in that time he had been so persecuted with *Convulsions* in them, that neither *Leg* was free a quarter of an Hour together, whether sleeping or waking. At length one of his little *Toes* mortified, which was taken off by Mr *Goldwyer* of *Salisbury*; not long after more *Toes* of the same *Foot* followed the like Fate: The *Convulsions* following that *Leg* stronger and quicker, that Part of the *Foot* next the *Toes* became tumid and inflamed, the *Tumour* extending itself above the *Malleoli*: A sinuous *Ulcer* passed by the *Side* of one of the *Metatarsal Bones*; the *Extremity* of which *Bone* (whence the *Toe* was taken

Of a Mortification.

taken off) lying bare. In this Condition I found the left Foot and Leg of this Gentleman in *Wiltshire*, where I met with Mr *Goldwoyer*; and finding the Leg very chilly, the Necessity of parting with it was too evident; which Mr *Stringer* suffered; not so much as expressing the least Out-cry during the Operation, tho' the Part did not want the most exquisite Sense of Feeling. On the Abcission (which was about five or six Inches below the Knee) it was unexpected, by me, to see so little Blood spouting from the Arteries. The Stump being bound up, and committed to the Hands of two or three Servants, a less number not being sufficient to hold it, by reason such strong convulsive Motions pursued the Part on the Operation, I was very desirous to examine the Arteries of the amputated Leg, having before discovered the Cause of a Mortification of the Arm of a young Gentlewoman, who died not long after an Amputation of the Part, tho' the *Gangrene* did not appear to reach near the Place where the Abcission was made (*i. e.* below the ending of the *Musculus Deltoides*): In which Case, I found the Sides of the Trunk of the Artery of the Arm so thickened, that the Diameter of it's Bore was contracted to less than a third Part, and would scarce admit a common Probe to pass it: *vid. Fig. 172. G, H, I.* When I had found the Ends of the Arteries in the Leg abovementioned, I endeavoured to pass my Probe into one of them; but meeting with some Opposition, I suspected I had mistaken the Vein for the Artery, and that the Valves opposed the passing of the Probe that Way: But, on farther Dissection, I cleared the Trunks of both those Blood-Vessels, and found the Veins in their natural State; but the Sides of the Arteries were grown bony or stony: Having cleared two of their Trunks, I left one of them at *Salisbury*; the other I brought to Town, and is here figured.

Fig. 172.

Fig. 168.

A, The upper Part of the Artery cut off in the Amputation of the Leg; from A to B, The Trunk of the Artery distended, and dried, to shew it's Canal. C, That Part of the Trunk of the Artery which was so contracted by the Petrification or Ossification, that a Probe would not pass it's Canal; from C to D, The Trunk of the Artery opened and expanded. E, E, The Petrifications or Ossifications in the Sides of the Artery. F, F, Their Specks in the lower Part of the Artery, not so large as in the upper Part, and placed at greater Distances. a, a, &c. The Branches arising from the Trunk of the Artery.

Fig. 172.

Fig. 172. G, A Portion of the Trunk of the Artery of the Arm abovementioned. H, The Sides of the Artery very much thickened, whereby the Diameter of it's Canalis were so diminished, that the Probe I would not pass it.

The Ossifications in the Coats of Arteries have been frequently observed, especially in their large Trunks within the Cavities of the *Thorax* and *Abdomen*: But I don't remember the like has been taken Notice of in the *Libms*; or that such Impediments in their Canals have

have been found the Cause of *Mortifications* of particular Parts, as in the Instance abovementioned; though I doubt not but the like has often happened in aged People, especially where we find the Progress of the *Gangrene* not very swift, and it's Beginning from no external Cause; the Consequences of which are commonly found fatal. When the Arteries of one Leg (or of any other Limb) are so affected, we may well suspect the like in *those* of other Parts; which, probably, happened in the Case abovementioned; for tho' no *Gangrene* came on the Stump, yet the other *Foot* and *Toes* began to *mortify* about six Weeks after the Amputation, as did the Parts about the *Hips*, which were compressed in lying or sitting, before he expired.

Fig. 169, represents the *Extremities* of the *Blood-Vessels*, as they appear while the Blood is passing them in the *Omentum* of a live Dog, viewed with a *Microscope*. Fig. 169.

A, A, The *Branches* of *Arteries*, and B, B, the *Veins* which associate. C, C, their *lesser Branches* where they pass from each other, and are united at their *Extremities*.

Fig. 170. The like appearing in the *Mesentery* of a Dog when living. D, D. The *Arææ*, that are here viewed with the *Microscope*, as they appear to the naked Eye. Fig. 170.

Fig. 165. The *Trunks* of the *Vena Cava*, with their *Branches* dissected from an adult Human Body. Fig. 165.

A, A, The Orifice of the *Vena Cava*, as it appears when cut from the *Right Auricle* of the *Heart*. a, The Orifice of the *Coronary Vein* of the *Heart*. B, A, The *Superior* or *Descending Trunk* of the *Vena Cava*. C, C, A, The *Inferior* or *Ascending Trunk*; so distinguished, from the Motion of the Blood in these Trunks, which is contrary to their Position. D, D, The *Subclavian Veins*. †, That Part of the *Left Subclavian Vein*, where the *Thoracic Duct* enters it, and discharges itself of it's *Chyle* and *Lympha*. b, The *Vena Azygos*, with it's *Branches* going to the *Ribs* e, e. c, The *Superior Intercostal Veins*. d, d, The *Internal Mammary Veins*. E, E, The *Right* and *Left Iliac Branches*. F, F, The *Internal Jugular Veins*. G, G, The *External Jugulars*. H, H, The *Veins* which bring Blood from the *lower Jaw* and it's *Muscles*. I, I, The *Trunks* of the *Internal Jugulars* cut off at the *Basis* of the *Skull*. f, The *Veins* of the *Thymus* and *Mediastinum*. g, g, The *Veins* of the *Thyrotid Glands*. h, The *Vena Sacra*. i, The *Internal Iliac Branch*. k, The *External* ———. K, The *Occipital Veins*. L, The *Right Axillary Vein*. M, The *Cephalic*. N, The *Basilic*. O, The *Median Vein*. P, The *Trunk* of the *Veins* of the *Liver*. Q, The *Pbrenic Vein* of the *Left Side*. R, The *Right Pbrenic Vein*. r, A large *Vein* from the *Left Glandula Renalis* and Parts adjacent. S, The *Left Emulgent Vein*. T, The *Right Emulgent*

Emulgent in this Subject, very much lower than the Left, which is not usual. V, V, The two *Spermatic Veins*. X, X, Two *Communicant Branches* between the *Ascending Trunk* of the *Vena Cava* and *Vena Azygos*, by which the Wind passes into the *Descending Trunk* of the *Cava*, when we blow into the *Ascending* at A, P, C, tho' the Trunk at A, P, and C, is firmly tied on the Blow-pipe. * An uncommon Branch between the Lower Trunk of the *Vena Cava* and the *Left Emulgent Vein*. y, A Vein which brings Blood from the *Muscles* of the *Abdomen* into the *External Iliac Branch*. z, The *Epigastric Vein* of the *Right Side*. l, The *Vena Saphena*.

The rest of the Branches here displayed commonly differ so much in various Subjects, that the particular Descriptions of them, (which none but the *Operator* who dissected them could pretend to be Master of) would be perhaps as useless, as tedious to repeat; wherefore I pass to those considerable venous Trunks which are wanting in this Scheme.

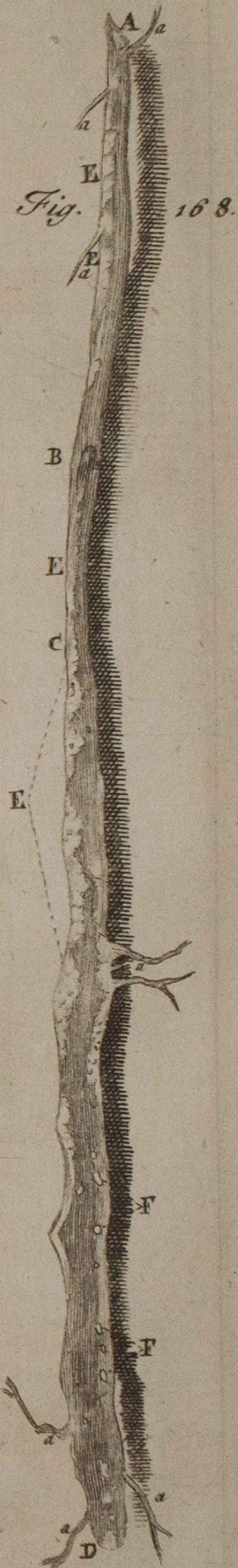
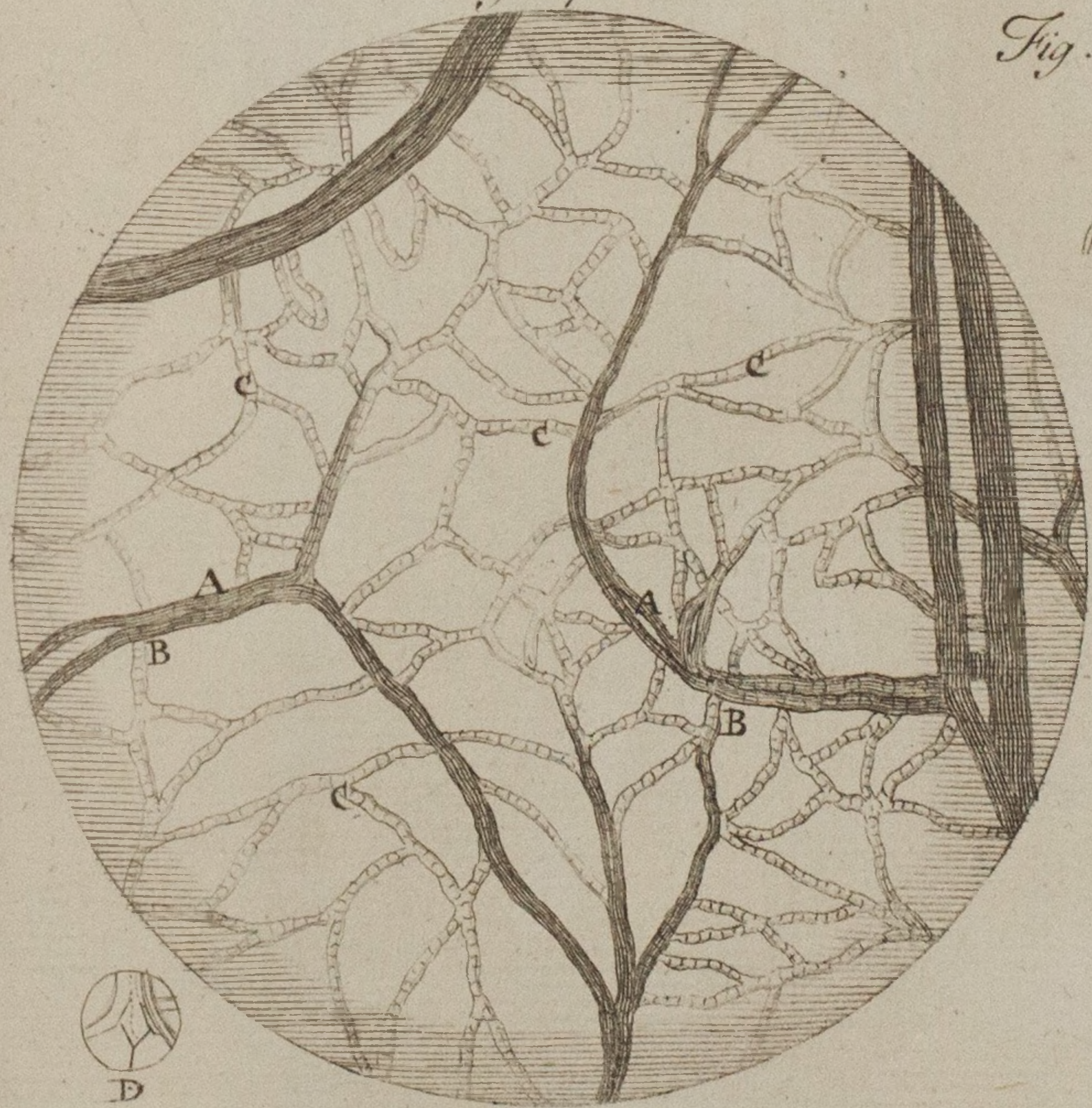
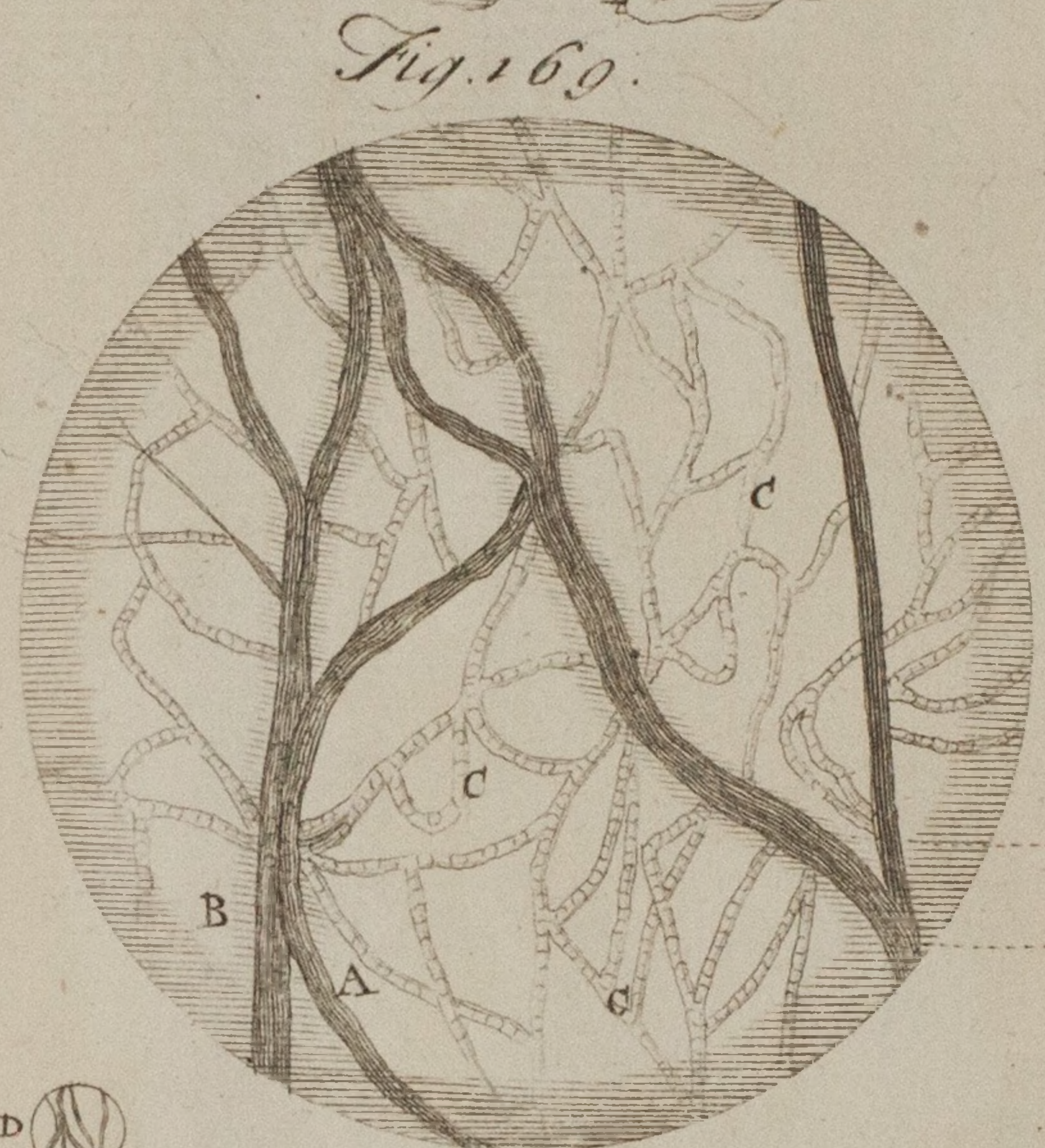
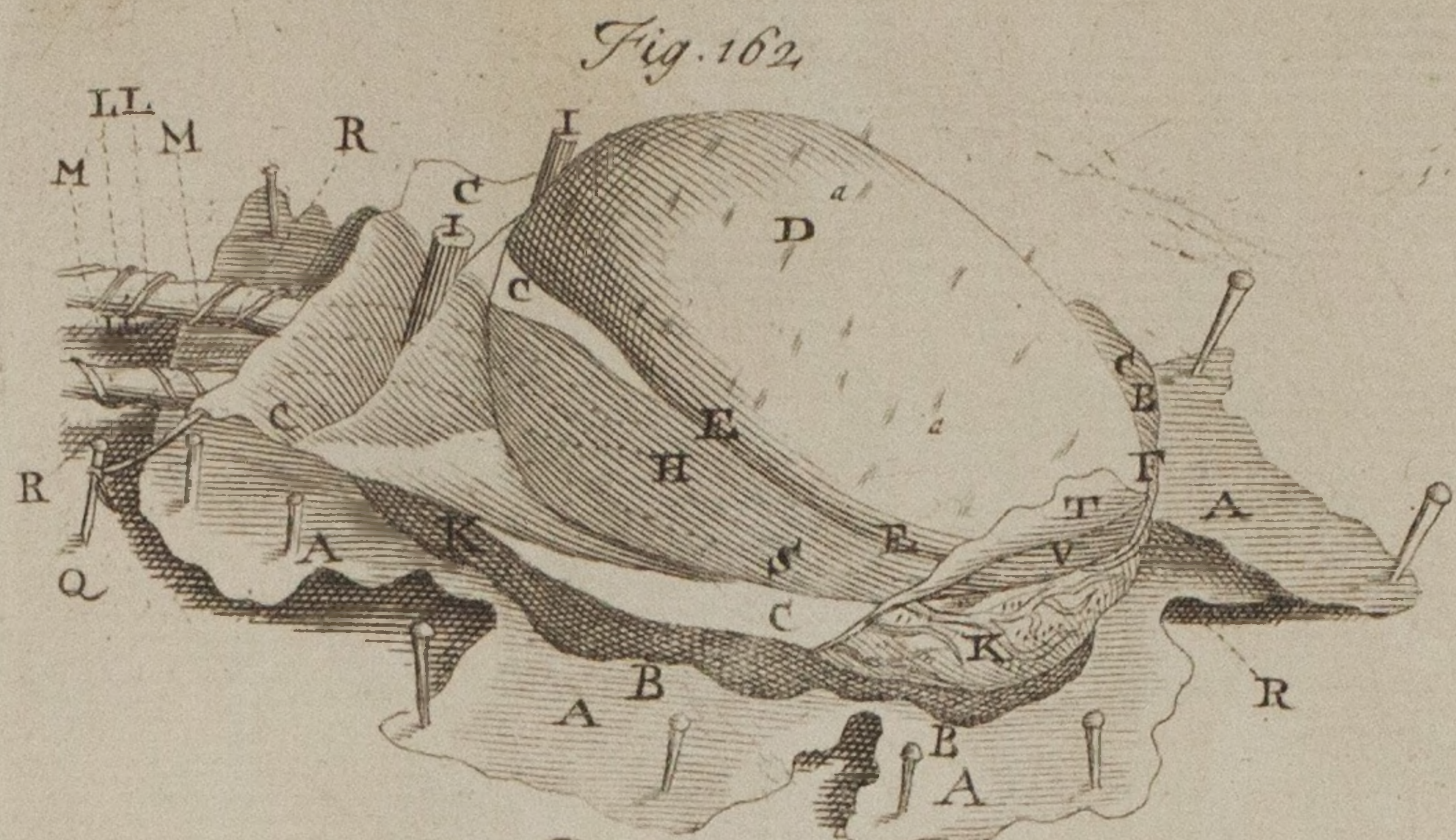
Fig. 171.

Fig. 171. Some of the large Trunks of the Veins and their Sinus's within the Skull, with the Beginnings of the *Internal Jugular Veins*, filled with Wax, and dried together with the *Falx*, &c.

A, The Extremity of the *Falx* cut from the *Crista Galli*. a, It's lower *Limbus* that touched the *Corpus Callosum*, as it divides the right Hemisphere of the Brain from the left; where the fifth *Sinus* passes, which is here dried and disappears. B, B, The second *Process* of the *Dura Mater*, which supported the hindermost Parts of the *Lobes* of the *Brain*, and defended the *Cerebellum* from being pressed by those Parts of the *Cerebrum*. C, A Portion of the *Dura Mater*, remaining to the *longitudinal Sinus*. D, D, Several Trunks of the *Veins* of the *Brain* cut off before they enter the *longitudinal Sinus*. E, E, The *longitudinal Sinus's*. F, F, The two *lateral Sinus's*. G, The *fourth Sinus*. g, The Veins from the *Plexus Choroides*. H, H, The *Bulbi* or *Diverticuli* at the Beginnings of the *Internal Jugular Veins*. I, I, The *Internal Jugular Veins*. K, K, The Trunks of *Veins*, which bring Blood from the lower *Jaw*, and Parts adjacent.

Fig. 166.

Fig. 166. The Trunks of the *Vena Portæ* dissected and displayed. A, A, The Branches of the *Vena Portæ* freed from the *Liver*. a, The *Umbilical Vein*. B, The *Splenic Branch*. C, C, The *Mesenteric Branches* which are continued from the *Intestines*. b, The Trunk of the *Vena Pancreatica*, which receives Branches also from the *Duodenum*. c, c, The *Vena Gastrica dextra Coronaria Superior*. D, The *Superior Coronary Vein* of the *Stomach* of the left Side. E, The *Inferior Coronary Branch* of the *Stomach* of the right Side; and F, The same *Coronary Vein* of the left Side removed from their proper Situations; from these two last are continued the *Vena Epiploica Superior dextra* 1, and the *Sinistra* 2, with the *Media* 3. G, The Vein called *Vas Breve*. d, The *Vena Duodeni*. H,



H, The *Vena Hæmorrhoidalis* arising from the *Rectum* and *Anus*, in this Subject emptying itself into the *left Mesenterick Branch*; but in other Bodies I find this Trunk of the *Hæmorrhoid Veins* ending in the *Ramus Splenicus*.

The Length of the Trunk of this *Hæmorrhoid Vein*, and its *Of the Hæ-* Progress under the *Intestines*, render it liable to be compressed, *morrhoid* and its reflux Blood retarded; whence its Branches in the *In-* *Vein.* *testinum Rectum* and *Anus* become distended with Blood, and cause the *Hæmorrhoides Cæcæ* and *Apertæ*; which are frequently attended with *Aposthumations* in the *Anus* and Parts adjacent; which Disorders are the more incident, not only because these *Hæmorrhoid Veins* (like the rest of the Branches of the *Vena Porta*) are without *Valves*, and the Blood had an ascending Progress in them, together that the long Trunk (H) is not only exposed to the Compressions made by the *Intestines* in both Sexes; but particularly the *Uterus* in *Women* in time of *Gestation*, especially near the Birth, so compresses this Trunk, that it is no wonder we find *Women* more afflicted with the *Hæmorrhoids* at that Time than at any other. Nor are the *Iliac Veins* and the *Lympheducts* that accompany them, without being exposed to the like Incumbrance in *Women* with Child, whence the Veins of the Legs and Thighs become *varicose*, and those Limbs are so frequently swelled; which in a late Instance, I was acquainted with, when the Intumescence proved so great, that at length the Abdominal Teguments were vastly extended; but the Gentlewoman recovered (beyond the Expectation of some) on the Delivery of two large Children.

IV. I have given an Account before † of a Case, when the *Of Ossificati-* Trunks of the Arteries of the Leg, were obstructed by Petri- *ons in the* fications or Ossifications, in a Person about the 67th Year of his *Coats of the* Age; since which I have met with several of the like Instances in *Arteries, &c.* *by Mr W.* People of Years; particularly in the Leg of an old Gentleman, *Cowper.* whose Toes and Foot were sphacelated, the Arteries of whose Leg *n. 299. p.* I have by me injected, (as much as they could be) with red Wax; *1970.* in which the Ossifications diminishing their Channels in some Pla- *† Vid. Supra.* ces, and totally obstructing them in others, is made very evident, *p. 343.* in the Preparation in the Repository of the Royal Society.

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 Human Bodies I am well 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: I shall set down the Symptoms before Death, which may help our Conjectures when the like offers again. A spare Man

about 30, who languished with an Ulcer in the Thigh, attended with a *Caries*, or Rottenness of that Bone at it's Articulation with the *Tibia* and *Patella*, called 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; the Artery there missing sometimes one, sometimes two Strokes in six or seven: At first he told me he observed it missed but one in ten; but at length those Stops became more frequent, especially on any Agitation of the Body or Mind: Though 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 appeared on opening the Heart and great Artery of this Person. A, A, A, D, G.

Fig. 173.

A, A, The Trunk of the *Great Artery* opened and displayed.

a, a, a, The three *Semilunary Valves* of the *Aorta*, which hinder the Blood from returning to the *Heart*, after it is expelled thence by it's *Systole* or Contraction; these *Valves* in this Case were somewhat thicker, and not so pliable as naturally, and did not so adequately apply to each other, as is expressed *Fig. 176, a, a, a.* Whence it happened sometimes, that the Blood in the great Artery (A, A, A, *Fig. 173.*) would recoil, and interrupt the Heart in it's *Systole*. But this Stubbornness of these Valves was owing to a bony or stony Body, marked *b, Fig. 173.* which appeared much plainer when the Valves were dry; as is represented in the Figure beneath, marked with an *: a, a, The two *Valves* pinned out and dried; *b,* The *Petrification* or stony Body at their Junction. In this Instance I observed the *left Ventricle* of the *Heart*, expressed at G, G, D, D, e, e, f, f, *Fig. 173,* to be a little dilated from it's 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 forty 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 complained of great Faintness, and now and then Pain about the Heart; the extream Parts often cold, which, towards his Death, increased more and more on him; his Legs and Arms being gangrened some Hours before; infomuch that the Corps was very offensive in opening, though 'twas done within 24 Hours after he expired, in the Month of *November.*

Upon opening the Chest, the *Heart*, particularly it's *left Ventricle*, was found larger than that of an ordinary Ox, and filled with coagulated Blood. The *Valves* of the *Great Artery*, A, A, *Fig. 173,* were petrified, infomuch that they could not approach each

each other, as express'd, *Fig. 174*, and *176*; but an *Orifice* represented at *Fig. 177*, remained always open by the Petrifications *b, b*, *Fig. 175*, and *a, a*, *Fig. 177*, which had clogg'd these Valves, and hindered their Application to each other, as in the natural State is represented in *Fig. 174*, and *176*, *a, a, a*.

The Explication of the Symptoms in both these Cases is obvious enough; for though the Person first instanced did not die 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 rendered more or less useless: For as their Office is to prevent the Return of the Blood into the Heart, in it's *Diastole*, by exactly shutting up the Passage of the *Aorta* (as the Flaps in Water-Engines); so if by any Accident they are hindered from doing their Duty, as they were by the Petrifications, the Consequences must be, not only a Regurgitation of Blood into the Heart, but they baulk it's 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 extream Parts, Gangrenes, &c. In both these Cases the left Ventricle 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 it's Office, that it cannot be without, and that it gradually suffers according to their Indisposition.

I have lately observed a like Instance in 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.

I might here add some Anatomical Remarks on the Structure and Mechanism of this Organ, particularly of the Use of that *Transverse Tendon* express'd at *f, f*, *Fig. 173*, and the Progress and Insertions of the *Tendons f*, *Fig. 175*, arising from the *Carneæ Columnæ, e, e*, which do not all terminate in the lower Margin of the *Mitral Valve d*, *Fig. 174*, and *175*, 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*.

Fig. 173, represents the *left Ventricle* of the *Heart* opened, &c. *Fig. 173*.
A, A, A, The Inside of the *Aorta* slit open to the *left Ventricle*.
B, B, The *Bulbous Trunk* of the *Vena Pulmonalis* divided through, and pinned aside, to shew, *a, a, a*, the three *Semilunary Valves* of the *Aorta*, which hinder the Blood from returning to the Heart.
b, A

b, A small stony Body at the Conjunction of two of the *Semilunary* Valves, express'd at the * below this Figure. *a, a*, Parts of the two Valves. *b*, The *Petrification*, as it appears in the dried Valves. *C*, Part of the lower Trunk of the *Vena Cava*, cut off immediately above the *Liver*. *c, c, c*, The *left Auricle* opened and pinned out. *D, D*, The Sides of the *left Ventricle* divided and drawn aside, to shew it's 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 turned aside. *e, e*, The *Carneæ Columnæ*, whence spring the Tendons fastened to the Valves, *d, d*, express'd *Fig. 175, 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. 175, and 177*) draw the *Mitral* Valve laterally; by which means it's 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. 174*, from the Orifice of the *Aorta, a, a, a, g*. *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. *b, b*, 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. 174.

Fig. 174. *A*, Part of the *Aorta* next the *Heart*.

a, a, a, The three *Semilunary Valves* as they appear next the *Heart* in a *natural State*, when the *Heart* is in *Diastole*, and the Blood hindered by these Valves from returning to it's left *Ventricle*. *b, b*, Part of the *Basis* of the *Heart* cut off. *e, e*, The two *Columnæ Carneæ* 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 it's lower Margin; which is better express'd in the following Figure. *g*, The Orifice of the *Aorta* compleatly closed by the Application of these three Valves to each other.

Fig. 175.

Fig. 175, shews the same Parts express'd 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 were not cover'd with the *Petrification*, *b, b, b*, The *Petrifications* on the rest of the *Valves*.
† A small *Petrification* on the *mitral Valve*. *b, b, b* Some of the *transverse Tendons* which draw the *Carneæ Columnæ* to each other,
when

Venas has & Humani Corporis Arterias
Geminis Tabulis adplicitas, Patavio
a se pridem deductas, Regali demum Societati
dedit Johannes Evelynus,
Ejusdem Socius.

MDCLXVII.



Fig. 166.





when the *Heart* is in *Systole*, for the more effectual closing the *Orifice* of the *mitral Valve*, express'd here at *g*.

Fig. 176, 177, shew the same Parts represented in the two preceding Figures, as they appear view'd towards the *Heart*, when dry'd and display'd. Fig. 176,
177.

A, A, The Trunk of the *Aorta*. *a, a, a*, *Fig. 176*. 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. 177*. the *Semilunary Valves* petrified. *c*, The *Orifice* of the *mitral Valve* next the *Vena Pulmonalis*. *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*.

V. John Bayles, the old *Button-maker* of *Northampton*, is commonly reputed to have been 130 Years of Age when he died. There is no Register so old in the *Parish* where he was *Christened*; but the oldest *People*, of which some are 100, others 90, and others above 80 Years, remember him to have been old when they were young. Their *Accounts* indeed differ much from one another, but all agree that he was at least 120 Years. He himself did always affirm that he was at *Tilbury Camp*, and told several Particulars about it; and if we allow him to have been but 12 Years old then, he must have been 130 when he died.

An Anatomical Account of Old Bayles, supposed to have been 130 Years old; by Dr James Keill. n.306.p.2247.

He used constantly to walk to the neighbouring *Markets* with his *Buttons* within these 12 Years, but of late he has been decrepid, and carried abroad. His *Diet* was any thing he could get. I never heard he was more fond of one sort of *Food* than another, unless it was that about a Year before he died he longed for some *Venison-Pasty*, but had it not. He died the 4th of *April 1706*. He lived in three *Centuries*, and in seven *Reigns*.

His *Body* was extremely emaciated; and his *Flesh* feeling hard, the *Shape* of all the external *Muscles* was plainly to be seen through the *Skin*.

The *Abdomen* being laid open, the whole *Viscera* appeared in good *Order*, but more pale than they are commonly.

The *Omentum* was very small.

The *Stomach* was very much distended with *Wind*, and the *Bottom* of it wore extremely thin in that Part which is next the *Spleen*, being hardly thicker than thin *Writing Paper*. In the *Inner Membrane* there were no *Plicæ*.

The *Liver* was pale, but, upon cutting, was found perfectly found. The *Gall-bladder* was of a larger *Size*.

The

The *Spleen* was not so big as one of his Kidneys.

His *Kidneys* were firm and found, as were all the Urinary Passages. In the right Kidney were a few small yellow Grains of Gravel.

The *Intestines* were all found: The Mesentery was cover'd with Fat.

The *Cartilages* of the *Sternum* were not harder than usually they are. The Ribs were brittle; for by leaning gently upon one of them, it broke.

The *Lungs* were attach'd to the *Pleura*: They were spongy, whitish, with many small black Spots of Blood. The Cavity of the *Thorax* was large and clear.

The *Heart* was large, thick, and fat; and though he was always a little Man, yet the Diameter of the *Aorta*, before the *Carotidales* go off, was above two Inches; which is considerably bigger than ever I remember to have seen.

The *Aorta* in the *Abdomen* and *Iliacs* were, for the greatest Part, cartilaginous.

The Bones of the *Skull* were found and good.

On the Inside of the *Dura Mater*, by the *Falx*, was a small Ossification.

The *Brain* was more firm and solid than usual, and, in cutting, hardly moisten'd the Sides of the Knife. The *Ventricles* were full of *Serum*. He had lost the Use of his Eyes for some Years; but his Hearing was good 'till he died. His Genitals, both *Testicles* and *Penis*, were of a large Size.

There is no doubt but that the Weakness of his *Stomach*, and the Hardness of the *Aorta*, were the Causes of his Death. The Coats of the Stomach were so thin, that they had not Strength enough to keep out the Air, and consequently his Digestion must have been spoil'd. He had not eat Meat for some Years, and of late he lived only on Small-Beer, Bread and Butter, and Sugars. And it was impossible that his Blood could circulate duly, whilst the Great Artery, having lost it's Elasticity, by being become cartilaginous, could give no Motion to the Blood. It is very probable that this was the Cause of his irregular and intermitting Pulse, which I have felt some Years before he died. It is observable, that the greatest Part of his Blood (which was in greater Quantity than I expected) was contained in the Arteries; whereas, generally, in all dead Bodies the Veins are full, and the Arteries almost empty: For the Arteries being distended by the Blood, which they receive upon the last Systole of the Heart, by their natural Elasticity contract again, and empty themselves into the Veins, from whence it returns no more; but in this Man, the Great Artery having lost the

the Power of contracting itself, it retain'd the Blood it receiv'd by the last Systole of the Heart.

This Account agrees with that given of Old *Parre* by Dr *Harvey*, in most Particulars, except in the Causes of their Deaths. But in both, nothing seem more remarkably the Effects of Old Age, than the Smallness of their *Spleens*, which undoubtedly was owing to the Contraction of their Fibres in such a lax and spongy Bowel.

The Whiteness of the Bowels in both, must be likewise either from the same Contraction or Closeness of the Coats of the Blood-Vessels, or from a Want of Blood. *Harvey* says nothing of the Quantity of Blood he found in Old *Parre*; but if we may guess from his Body being fleshy, from the Goodness of his Stomach and Appetite, and from the Disease he died of, there could be no Want of Blood in him. In this Man there seem'd to be more Blood than in several others I have seen, whose Bowels appear more red. And it can hardly be conceiv'd that the *Aorta* could be so large, without a large Quantity of Blood, unless there had been some Stricture upon some other Parts of it, which I did not perceive: And therefore it seems not improbable, that this Whiteness of the Bowels, was owing to the Closeness of the Blood-Vessels in both. It is no small Confirmation of this Opinion, that the Flesh and Skin felt hard, and the Brain firm and solid. I might add, that it is highly probable that the same Disposition might give a Closeness or Hardness to the Vessels every-where else. It is true, this was a Distemper; but then it is as true, that it is a Disease of Old Age, and may justly be reckon'd one of the Effects of it. And for a farther Proof of what I have said, I cannot but take notice, that in preparing a Piece of the Small Gut for an Injection, the *Tunica Villosa* felt more like a fine File, than the softest Velvet; and that I could use more Violence in injecting the Vessels, than these Parts will usually bear. Whoever considers how soft a Substance an Animal Body is at it's first beginning, and how from time to time it acquires a Firmness and Solidity, will easily be induced to believe, that old Age brings a more than ordinary Hardness to all the Fibres and Vessels.

The necessary Consequence of this Hardness and Contraction of the Fibres and Vessels of Old People, is a Diminution of their Secretions, which, *cæteris paribus*, are always proportional to the Orifices of the Glands. Hence it is, that we find the Skin of Old People always dry, their Perspiration being very little: They are likewise generally bound; Old *Bayles* went to Stool but once in ten or twelve Days, for some Years; and Old People are always complaining of a want of Moisture; not that the Radical Moisture is dried up, but because the natural Secretions, by reason of the

Contraction of the Glands, are diminished. I have already observed, that we found in this Old Man more Blood than could have been expected in such an emaciated Body; and without doubt it had been larger, if his Stomach and Appetite had been as good as Old *Parre's*. The Fullness of the Vessels, and the frequent Rheums and Catarrhs of Old People, evince this necessary Consequence of the Closeness of the Coats of the Vessels: All which agrees with what the Writers of *Institutions* say, that old Men are *ratione partium solidarum frigidi & sicci, ratione excrementorum frigidi & humidi*.

From this Retention of the excrementitious Parts of the Blood, we may expect all the ill Consequences of a vitiated *Plethora*, and languid Motion of the Blood; for the Fibres of the Arteries being now become hard, they, instead of assisting, obstruct the Heart in circulating the Blood; and the Quantity of animal Spirits separated in the Glands of the Brain must likewise be less, not only because of the Retention of the Excrementitious Humours, but also because of the Closeness and Firmness of the Brain itself; so that the Contractions of the Heart and all the Muscles must be weak, and consequently the Motion of the Blood languid.

A due Conformation of all the Vital Parts, is most certainly necessary to bring a Man to a full old Age; but above all the rest, there are two which to me seem to have had the greatest Share in procuring a Longævity to Old *Parre* and *Bayles*, by retarding the ill Effects just now mentioned. The first is the Heart, which in both was strong and fibrous; for that being left alone to labour, the Circulation of a large Quantity of sluggish Blood, a great Strength is absolutely requisite to propel the Blood through unactive Vessels to the Extremities of the Body, and back again. No doubt this is more easily done in Men of a low Stature, (as Old *Bayles* was) which, I am apt to think, was a Qualification of Old Age. The second was, the Largeness of their Chests, and Goodness of their Lungs, by which the Air had it's full Effort upon every Particle of the Blood, in rendring it florid, and attenuating it, that it might easily move through the contracted Channels of an old Body.

In order, then, to attain Old Age, the Indication seems to be, to preserve such a Softness in all the Fibres, that they may easily yield to the Pressure of the Blood, and, by their Elasticity, restore themselves to their former State, giving thereby a new *Impetus* to the Blood.

V. 1.] Madam R————'s Girl fell into violent Convulsion Fits; and while she was in them, voided a large Quantity of Blood by the Mouth, the Nose, the Ears, and the Eyes. The Mother shewed me some bloody Tears she had gathered. All these Symptoms were over in half an Hour's time; and the Girl, who some Days before had been taken with a violent Head-ach attended with a Fever, and a mighty Oppression, was very well presently after that *Hæmorrhagia*. The same Accidents, as I hear, have happened several times. I was apt to believe they were *Epileptic Fits*; but the sudden Relief and Cessation of them, by bleeding through all these Parts, is wonderful.

*A strange Hæ-
morrhage; by
Mr F. Mon-
gino, n. 268.
p. 756.*

I have enquired more nicely into this Case, and had the following Particulars from the Mother. Her Daughter was between two and three Years old, when on a sudden she complained of a very violent Head-ach: She was also observed to be feverish, and extremely restless. At the same time her Eye-lids did very much swell, and they were so heavy, that one could hardly open her Eyes but with a great deal of Pain. These Symptoms did continue for three or four Months, though sometimes more or less violent. At last she fell into Convulsive Motions of her Arms, Legs, and other Parts, and these were very fierce for two Days, 'till she began to bleed by the Nose, the Mouth, the Ears, and the Eyes: The Linen Cloths, that were then applied to the Eye-lids, were all wet and bloody. This *Hæmorrhagia* lasted above a Day; and, what is more remarkable, when it was expected that the Child should be extremely weakened, she found herself so well freed from her Illness, that she came to her Gaiety again, and asked for some Victuals. Within twelve Months after she had four of these *Attacks*, but not so great; in particular, the Convulsion-Fits were very inconsiderable, in comparison of the first. The same Symptoms did not return again, above two or three times every Year, and the Head-ach did not continue above eight Days before the *Bleeding*; and even then it was much more supportable. About two Months ago I was sent for to see the Girl, who is now seven Years old. I found her in Bed, complaining extremely of a Head-ach attended with a Fever, a great *Catarrh*, and such a Shortness of Breath, as if she had had a *Peripneumonia*. She had been three Days in that Condition. I told the Mother, My Opinion was, she should be blooded presently. To which she readily consented; telling me withal, That she did not doubt but these were the Fore-runners of the same *Hæmorrhage* the Girl had before. This made me the more insist upon the Opening of a Vein; but it being very late, it was put off till next Morning, and then indeed it was needless; for very early in the Morning, after some Convulsion-Fits, she began to bleed from the Nose, the Mouth, &c. When I came, it was

—*ibid.*

almost over; I could only see a little bleeding from the Mouth; but all the People in the House told me, they had seen the Blood drop from all these Parts. The Girl was then pretty well, without any Fever or Catarrh; she could breathe freely, was in good Humour, and had a good Stomach; and ever since has continued in perfect Health. Now since the Returns are not so frequent, and the Symptoms are diminished, I am in Hopes this may soon have an end; or at least, 'tis very probable that these Accidents will totally cease, whenever she comes to have her *Catamenia*.

Of an Eruption of Blood from several Parts of the Body; by Dr A. Meisaportius, n. 303. p. 2144.

2.] A very beautiful young Lady, of a good Family, who had enjoyed a good State of Health, and chearful Spirits, till the Age of Eighteen, after having suffered various other Complaints, was taken with a bleeding from very unusual Parts, and at last with the worst Kind of partial Sweats. She was first seized with a Sense of Heaviness, about the Time that the *Menses* were expected to flow, and after a tedious Complaint of her Stomach, she began to cough up Blood, occasioned by a bastard Pleurisy, which began with her the *ninth* of *April* with a Fever, Pain in the Side, and Difficulty of Breathing. The *fourth* Day after she was taken ill of this Disease, the Complaint in her Breast leaving her, she was seized with a Pain in her Head, which she had been troubled with before, and a bleeding at the Nose without finding any Relief from it. The Surgeon who had bled her twice at the Arm in the Beginning of the Pleurisy, and observed her Blood glutinous, to remove these two Complaints bled her plentifully at the Feet. But the Disease, which had sufficient Matter to make further Progress, did not yield to this; on the contrary, she had superadded a Pain in her Stomach, whence a vomiting, first of a viscid green Stuff, soon followed with Blood; nor was the Pain in her Head hereby relieved, but returning as it were by turns, the Hæmorrhage from the Stomach and Nose continued for several Days. The restless Vicissitude of the Symptoms plagued her still extreamly, when, about the Beginning of *May*, the *Menses* broke out, and in sufficient Quantity as she usually had them. The Surgeon after the *seventh* Day gave her a Potion of Manna, and though it disturbed her not a little, and seemed rather to make her worse, yet soon after the Fever, which till then had always been more or less upon her, attended with watchings, entirely disappeared. She had scarce had a Week's Respite from her Complaints, when she was attacked again with the Fever, attended with Pains in her Joints, and especially in her Belly, for which although she took immediately the *Oil of Sweet Almonds*, extracted without Fire, yet she was constantly pressed with vomiting and Loss of Blood.

In order to overcome this direful Symptom, the Physicians advised Blood to be taken in smaller Quantities, and at different Times from the *Salvatella*, applying Anodynes, Astringents, and several other Medicines, by turns. But though this Method was put in practice, the Disease was so irregular, that after the Hæmorrhage had gone through the more usual Roads of the Excretions, it began to search out very uncommon Paths for itself.

After the Blood, then in the Beginning of *June*, had flowed out at the Ears, it began soon to burst, first from the Tops of the Fingers, and then from those of the Toes; soon after this from the Navel, and the Corner of the Eye; then frequently in Sweats; next from the Middle of the Breast; afterwards from the Foot, and at that Part where we commonly open the *Vena Saphena*; at length from the Palms and Backs of both her Hands; two Days after from the Chin, and at Night from the Tip of the Tongue; so that in the Space of a Fortnight it had run through all these different Courses, which are so various and singular as to appear really fabulous. Struck with the Novelty of the Disease, I went to visit her, and was surprized to find her still pretty strong, and she told me every Circumstance very chearfully herself, her Account agreeing exactly with that I had heard from others. I could observe still a little Cicatrix in the Palm of the left Hand, like an unequal Puncture, whence the Blood had issued the Day before, and she told me that it occasioned a disagreeable Sensation, as it always did when it flowed from a particular Part; but when it was voided in form of Sweat from her Breast, or other Parts of her Body, it then left no Vestige of the opened Pores remaining. In this Case her Linen was only marked with it, and I saw two of her shifts that were stained here and there to the Breadth of a Golden Shield, with a florid Blood. The fourteenth of *June*, the *Menses* coming down upon her in greater Quantity than usual, some People imagined that the Disease would thereby be removed, especially as she had had no Complaints for three Weeks before. But the bloody Sweats returning again, and continuing a long while, she found herself weakened by it, and the Blood began to lose it's wonted red Colour. Hence in order to refresh her Spirits, and try what Effects the Change of Air might have upon her, she went into the Country. But finding no Benefit from that, she returned to Town the fifth of *August*, rather weaker than before, having, besides what she suffered from a cruel Disease, the Mortification to find, that after trying almost every thing that could be thought of, she received no manner of Benefit. Thus the Disease continued, with very few Intervals, the Blood oozing out sometimes at one Part, sometimes at another, and frequently by Sweats, till the middle of *September*. After she returned home, I went to
visit

visit her, and as I staid a long while talking with her, it happened, according to my Wish, that she felt, by a pricking Pain in the Extremity of one of her Fingers, that an Hæmorrhage was a coming there, and I observed the Blood bursting out as from a deep Puncture, and presently after it began to drop from another Part at a little Distance, and before I took my Leave, I saw a recent Stain of Blood in the Linen upon her Breast. Three Days after the bloody Sweats were surprizingly increased, and her Shift, where it covered her Breast, was painted with several Crosses, and other Characters of the divine Passion. After this she sweated none at all, or very little. But I must not neglect to mention, that from a flight Excoriation above the Ankle, occasioned by a false Step, there was such a Quantity of a serous Humour supplied, that it was hard enough to stop it by means of Stypticks, and Compresses.

This extraordinary Case has puzzled a great many Physicians to account for it. *Fabricius Andisonus* tells, that he formerly cured a Woman of thirty Years of Age, who had a Suppression of the Menses, and a Bleeding for a long while from the Angle of the Eye, only by bringing back the Menstrua upon her. There are other Examples of the same kind related by Authors, as *Benivenius*, *Hollerius*, &c. But in all these Cases there was some Obstruction or other to be blamed, whence the Blood was forced beyond it's proper Limits. The present Case again must be accounted for in a different Manner; for here it is plain we have nothing to do with Obstructions. What we are to consider here, is, the attenuated Crasis of the Blood, whereby it's Colour appeared florid in the Beginning, and presently after sufficiently diluted. Nor is it to any Purpose to object here, that it was observed to be gelatinous in the Beginning, for this does not demonstrate it's Substance to be thicker, but only a greater Ebullition of it's concrescible Parts, as appears chiefly from this, that it was less during the Accession of the Fever.

Of White
Blood.

Several Years ago, being called to visit a Nobleman's Daughter, who was very young, and ill of an acute Disease, I ordered her to be bled; but instead of red Blood, there flowed out a white thin Serum, which after standing some Time coagulated. But I do not deny that that Cause will not satisfy, and far less will it fully please, as adequate to the Disease, those Interpreters of Nature, whom I leave to guess at a certain, and a Kind of insensible Disposition of the red Blood. I have laid aside this Study upon several Considerations, not only because in Practice, we deceive ourselves by turning our Thoughts upon Things that are less sensible, when the Patient is very ill; but because *Anatomical Observations* plainly demonstrate to us, that for the most Part there

is

is something remarkable found, which would never have entered into our Minds to conceive.

VII. I some Years since received an Account of a surprizing Illness, from the Person who had laboured under it: The same has been attested to me by his Wife and several of his Acquaintance.

Mr *H*, formerly a Servant to Queen Dowager, of late to Mrs *Jennings* of *Burton* in *Somersetshire*, had (from his Infancy, as he has been informed, but) to his certain Knowledge, from as far back as he can remember, up to the twenty-fourth Year of his Age, a *Periodical Hæmorrhage* in one of his *Thumbs*.

An extraordinary Periodical Hæmorrhage in the Thumb; by Dr W. Musgrave, n. 272. p. 864.

The *Time* of the Eruption was about the Full of the Moon, seldom more than a Day before or after it: In the Orifice on the Right Side of the Nail of the Left Thumb. He has not known the Blood to be less in Weight at any one Periodical Discharge, than four Ounces; and is positive, that when he came to be sixteen Years of Age, the Quantity was then increased to half a Pound at each Eruption; he and his Friends having often viewed the Quantity, and found it to be thus much.

The *Manner* of the Flux was also remarkable; for without any Pain of Head, Streightness of Breath, or any Signs of Fulness, or other Symptoms whatever observed by him, excepting only a Stiffness on the utmost Joint of the said (Left) Thumb, the Blood used to spin out, with a considerable Force, on a sudden, in several little Streams, and continue so to do, until the greater Part of the Quantity was discharged. Under this Discharge, however copious, he was strong and vigorous to the Age of twenty-four, from his most early and tender Years.

At that Age (of 24) finding this Evacuation troublesome, and being uneasy under it, he seared with a hot Iron the Part which used to open and give Vent to the Flux of Blood. I saw that Part it was hard and callous to the Diameter of a quarter of an Inch. The Searing had stopped the Hæmorrhage for about twenty Years.

This Stoppage was in it's Effects very dangerous, and of ill Consequence; for within one quarter of a Year after it, he fell into a *Sputum Sanguinis*; bringing up from his Lungs vast Quantities of Blood. This new Complaint, together with a Cough attending it, reduced him very low; so that Dr *Dike* thought him utterly lost in a Consumption; but by frequent Bleeding, &c. delivered him from this *Hæmoptoe*; yet not with that Relief which was expected: For in a very little Time the Patient fell into a most violent *Cholic*; from no other Occasion (that he could discover) than his late Illness putting on a new Form, and the Matter settling on the Bowels.

This

This Cholick was, in good measure, overcome by purging Medicines: but a Disposition to it still remains; for he has ever since been often troubled with it (as also with a Spitting of Blood) on the least Excess of Cold or Motion.

He has, ever since the Stoppage of the first Hæmorrhage, been weakly, sickly; of a fallow, faint Look; much impaired as to Health, in comparison to what he enjoyed during the time of his Periodical Returns; and gives an Argument, *That when Nature has chosen, and for some Length of Time, exercised new and extraordinary Methods of Oeconomy, she seems to be as fond of their Continuance, as, at other Times, and in her most regular State, she is of that which is her most usual and ordinary Course.*

There is a further Use to be made of this, and such-like monthly Hæmorrhages, *in Men*; whether by the Thumb, (as in the present Case) or *per Penem*, (of which there have been in this Country two considerable Instances in my Time), or any other Part of the Body. For these Evacuations, being analogous to the *Menfes* in Women, confute the Opinion of all such as derive that Discharge from a *Fermentum Uterinum*. For how can we think that the *Menfes* come from such a local Ferment; when a Discharge, in all respects equivalent to them, takes Place, where no such Ferment is, or can be supposed?

Of a Woman
who had the
Menfes to 70
Years of Age;
by Mr J.
Yonge. n. 337.
p. 236.

VIII. At *Lamerton*, 15 Miles from *Plymouth*, died lately a Woman of 86 Years old, who to the Age of 70 had her *Menfes* plentiful and regular. At that time they ceased; and soon after followed the like Efflux from the *Hæmorrhoids*, which continued 'till she was past fourscore.

She was till then healthful and strong, of a vigorous Aspect, smooth, plump, and florid in Countenance, like one not half so old: Her Appetite was very good; her Intellects clear and sound; and her Sight so perfect, that she could to the last thread a Needle, and read a small Print without Glasses.

When that Flux ceased, she became Gouty; and about one Year before she died, there arose an Aposthumation in one of her Wrists, which opened and discharged much chalky Matter, and some Stones. The Day she died, she rose out of her Bed, and, after performing her Devotions, expired

She was never sick before the Hæmorrhoidal Flux stopped, except once at *Exeter* (where she was born, and then lived) she became infected with what they call the *Plague*: It ended in a critical Abscess in one of the Emunctories; and, which is very strange, during all the time of that Sickness, she nursed a Male Child, who is yet alive, and one of our Faculty, from whom I have this Relation.

IX. I have had Reason to give a great Character of *Sugar*, on account of some extraordinary Effects it seemed to have on my Grandfather 40 Years since : He made it his daily Practice to take as much *Sugar* as his Butter spread upon Bread would receive, for his constant Breakfast, unless he happened to exchange it for Honey sometimes. He frequently sweetened his Ale and Beer with *Sugar* : He had *Sugar* put to all the Sauces he used with his Meat. He had all his Teeth in his Mouth at 80 Years, strong and firm ; never had any Pain or Soreness in his Gums or Teeth ; never refused the hardest Crust. In his 82d Year one of his Teeth dropped out, and after that a second, which he put into my Hand, and was one of the Fore-Teeth : He bid me feel the Cavity, where I struck my Nail upon a Bone. In short, all his Teeth came out in two or three Years, and the young ones filled up their Room : He had a new Set quite round : His Hair, from a very candy'd white, became much darker. He continued in good Health and Strength, without any Disease, and died in his 99th or 100th Year of a *Plethora*, as I guess, for want of Bleeding. This reconciled me much to vindicate *Sugar*, and to shew that *Dr Willis* has unjustly charged it with a corrosive Liquor as bad as *Aqua fortis* : I examined it, and found the Charge unjust ; That *Sugar* contained no worse Substance in it than Milk, and Honey, and Manna, nay, even Bread itself. I have been some Time in finding the Figure which *Sugar* will shoot into : For the Difficulty lies here ; all other Salts shoot or crystallize, and make their Figure in a cool Place ; but *Sugar* will crystallize only in a hot Stove, and is more apt to be compounded, and not to shew it's true primitive Texture : Thus it happens to Snow, which in it's true simple Shape is an Hexagon ; but cannot be always discovered single. This is yet more easy to be accounted for than Snow ; and we have been able to chuse such Paarcels of that *Sugar* called Candy, as do represent the following Figure, being a Prism, I never questioned but that it was a true Salt, having all the Properties of a Salt.

Of a Person who had a New Set of Teeth after 80 Years of Age : And of the Virtues of Sugar ; by Dr F. Stare. n. 337. p. 273.

Fig. 192, shews the Form of the Crystals or Salts of *Sugar*, having two Bases, opposite, equal, and parallel ; the other are Parallelograms.

Fig. 192.

Fig. 193, shews the Basis of the preceding Figure.

Fig. 193.

X. May the 13th, Anno 1694, one *Samuel Chilton* of *Tinsbury* near *Bath*, a Labourer, about 25 Year of Age, of a robust Habit of Body, not fat, but fleshy, and a dark-brown Hair, happened, without any visible Cause, or evident Sign, to fall into a very profound Sleep, out of which no Art used by those that were near him could rouse him, 'till after a Month's time ; then rose of himself, put on his Cloaths, and went about his Business of Husbandry as usual ; slept,

Of an extraordinary sleepy Person ; by Dr W. Oliver. n. 304. p. 2177.

could eat and drink as before, but spake not one Word till about a Month after. All the time he slept, Victuals stood by him: His Mother fearing he would be starved, in that fullen Humour, as she thought it, put Bread and Cheese, and Small-Beer before him, which was spent every Day, and supposed by him, tho' no one ever saw him eat or drink all that time.

From this time he remained free of any Drowsiness or Sleepiness 'till about the 9th of *April* 1696, and then fell into his Sleeping Fit again just as he did before. After some Days they were prevailed with to try what Effect Medicines might have on him; and accordingly one Mr *Gibs* an Apothecary went to him, bled, blistered, cupp'd, and scarified him, and used all the external irritating Medicines he could think on; but all to no Purpose, nothing of all these making any Manner of Impression on him; and after the first Fortnight he was never observed to open his Eyes. Victuals stood by him as before, which he eat of now and then, but no-body ever saw him eat or evacuate, though he did both very regularly, as he had occasion; and sometimes they have found him fast asleep with the Pot in his Hand in Bed, and sometimes with his Mouth full of Meat. In this manner he lay for about ten Weeks, and then could eat nothing at all; for his Jaws seemed to be set, and his Teeth clinched so close, that with all the Art they had with their Instruments they could not open his Mouth, to put any Thing into it to support him. At last, observing a Hole made in his Teeth, by holding his Pipe in his Mouth, they, through a Quill, poured some Tent into his Throat now and then: And this was all he took for six Weeks and four Days, and of that not above three Pints, or two Quarts: He had made Water but once, and never had a Stool all that time.

August the 7th, which is seventeen Weeks from the 9th of *April*, (when he began to sleep) he awaked, put on his Cloaths, and walked about the Room, not knowing he had slept above a Night: Nor could he be persuaded he had lain so long, 'till going out into the Fields, he found every Body busy in getting in their Harvest; and he remembered very well, when he fell asleep, they were sowing of Barley and Oats, which he then saw ripe, and fit to be cut down.

There was one thing observable, That tho' his Flesh was somewhat wasted with so long lying in Bed, and fasting for above six Weeks, yet a Gentleman his Neighbour assured me, when he saw him, which was the first Day of his coming abroad, he looked brisker than ever he saw him in his Life before; and asking him whether the Bed had made him sore, he assured him, and every Body, that he neither found that, nor any other Inconveniency at all; and that he had not the least Remembrance of any thing that passed or was done to him all that while. So he fell again to his Husbandry as he used to do, and remained well from that time till *August* the 17th, Anno

Anno 1697, when in the Morning he complained of a Shivering and Coldness in his Back, vomited once or twice, and that same Day fell into his Sleeping Fit again.

Being then at *Bath*, and hearing of it, I went on the twenty-third to inform myself of the Matter of Fact. When I came to the House, I was by the Neighbours (for there was no Body at Home at that time besides the sick Man) brought to his Bed-side, where I found him asleep, as I had been told before, with a Cup of Beer and a Piece of Bread and Cheese upon a Stool by his Bed within his Reach. I took him by the Hand, felt his Pulse, which was at that time very regular; I put my Hand on his Breast, and found his Heart beat very regular too, and his Breathing was easy and free; and all the Fault I found, was, that I thought his Pulse beat a little too strong: He was in a breathing Sweat, and had an agreeable Warmth all over his Body. I then put my Mouth to his Ear, and, as loud as I could, called him by his Name several times, pulled him by the Shoulders, pinched his Nose, stopped his Mouth and Nose together, as long as I durst, for fear of choaking him, but all to no Purpose; for in all this time he gave me not the least Signal of being sensible. I lifted up this Eye-lids, and found his Eye-balls drawn up under his Eye-brows, and fixed without any Motion at all. Being baffled with all these Trials, I was resolved to see what Effects *Spirit of Sal Armoniac* would have, which I had brought with me, to discover the Cheat, if it had been one; so I held my Phial under one Nostril a considerable time, which being drawn from Quick-lime, was a very piercing Spirit: Then I threw it, at several times, up that same Nostril; it made his Nose run and gleet, and his Eye-lids shiver and tremble a very little; and this was all the Effect I found, though I poured up into one Nostril about a half Ounce Bottle of this fiery Spirit, which was as strong almost as Fire itself. Finding no Success with this, I crammed that Nostril with Powder of *White Hellebore*, which I had by me, in order to make farther Trials; and I can hardly think any Impostor could ever be insensible of what I did. I staid some time afterwards in the Room, to see what Effects all together might have upon him; but he never gave any Token that he felt what I had done, nor discovered any manner of Uneasiness, by moving or stirring any one Part of his Body, that I could observe. Having made these my Experiments, I left him, being pretty well satisfied he was really asleep, and no sullen Counterfeit, as some People thought him.

Upon my Return to *Bath*, and relating what I had observed, many Gentlemen went out to see him, as I had done, to satisfy their Curiosity, who found him in the same Condition I had left him in the Day before; only his Nose was inflamed and swelled very much, and his Lips and the Inside of his right Nostril blistered and scabby, with my *Spirit* and *Hellebore*. His Mother, for some time after, would suffer no Body to come near him, for fear of more Experiments upon her Son.

An Extraordinary Sleepy Person.

About ten Days after I had been with him, Mr *Woolmer*, an Apothecary at *Bath*, called at the House, being near *Tinsbury*, went up into the Room, finding his Pulse pretty high, as I had done, takes out his Launcet, lets him Blood about fourteen Ounces in the Arm, ties his Arm up again, no Body being in the House, and leaves him as he found him; and he assured me he never made the least Motion in the World when he pricked him, nor all the while his Arm was bleeding.

Several other Experiments were made by those that went to see him every Day from the *Bath*, but all to no Purpose, as they told me on their Return: I saw him myself again the latter end of *September*, and found him just in the same Posture, lying in his Bed, but removed from the House where he was before about a Furlong or more; I found now his Pulse was not quite so strong, nor had he any Sweats, as when I saw him before. I tried him again the second time, by stopping his Nose and Mouth, but to no purpose; and a Gentleman ran a large Pin into his Arm to the very Bone, but he gave us no manner of Tokens of his being sensible of any thing we did to him. In all this time they assured me no Body had seen him either eat or drink, tho' they endeavoured it all they could, but it always stood by him, and they observed sometimes once a Day, sometimes once in two Days, all was gone. 'Tis farther observable, he never fouled his Bed, but did his necessary Occasions always in the Pot.

In this manner he lay till the 19th of *November*, when his Mother hearing him make a Noise, ran immediately up to him, and found him eating; she asked him how he did? He said, Very well, thank God: She asked him again, Which he liked best, Bread and Butter, or Bread and Cheese? He answered, Bread and Cheese; Upon this, the Woman over-joyed left him, to acquaint his Brother with it; and they came straight up into the Chamber to discourse him, but found him as fast asleep again as ever, and all the Art they had could not wake him. From this time to the End of *January*, or the Beginning of *February*, he slept not so profoundly as before; for when they called him by his Name, he seemed to hear them, and be somewhat sensible, tho' he could not make them any Answer. His Eyes were not now shut so close, and he had frequently great Tremblings of his Eye-lids, upon which they expected every Day when he would wake, which happened not till about the time mentioned, and then he waked perfectly well, not remembering any thing that happened all this while. 'Twas observed he was very little altered in his Flesh, only complained the Cold pinched him more than usually, and so presently fell to Husbandry as at other times.

I have no Reason to suspect this to be a Cheat, because I never heard of any Gain to the Family by it, tho' so near the *Bath*, and so many People went thither out of Curiosity to see the Sleeper; who when awake was a Support to his old Mother by his Labour, but

now

now a certain Charge to her. Besides, there was seldom any Body in the House to attend any Profit that might be made by it, he being left alone in the House, and every Body at Liberty to go up to his Bed-side.

XI. There happened at *Newberry* a very remarkable Case of one Mrs *Lovelock*, who had been ill of a Fever from the 17th of *January*; which affected her so, as to make her light-headed to a great Degree, convulsed and restless; upon which the Physicians agreed to give her great Quantities of Opiats, in order to compose her; but, with the Doses below attested, they could never procure any thing like Sleep; but still as she took them they seemed to refresh her, and make her sensible, but caused nothing of Rest. And the Women about her began at last to scruple her taking any more, upon a Notion they had, that, by the Effects, this Medicine was too high a Cordial for her, and still kept her waking; upon which the Physicians were forced to alter the Form. The Quantity she took from *Tuesday* Night twelve o'Clock to *Friday* Night twelve o'Clock was as follows. *Jan.* 29, 4 Bolus's with 2 Grains each of *Laud. Lond.* made up in the *Venice Treacle*. 6 Pills, with 2 Grains each of the same. A Bolus with 8 Grains of the same in *Ven. Treacle*. *Jan.* 30. Twelve Pills with 2 Grains each, and one Bolus with 10 Grains of the same in *Venice Treacle*. *Jan.* 31. 4 Draughts with 10 Grains of the said *Laud. Lond.* one Ounce of *Syr. de Mecon.* in each Draught. So that in all she took in the time abovementioned 102 Grains of *Laud. Lond.* and ʒiij of *Venice Treacle*, and ʒiiij of *Syr de Meconio*.

Of a great Quantity of Opium taken without causing Sleep.
n. 275. p. 999.

This is attested under the Hands of her three Physicians, and the Apothecary.

Dr *Franc. Willis* of *Oxford*.

Dr *Step. Flavell*.

Dr *John Cooke*.

Ri. *Fanner*, Apoth.

} *Newberry*.

Signed in the Presence of

Rich. Smith.

Rich. Spicer.

Robert Greenham.

She died the 1st of *Febr.* about 5 in the Afternoon.

XII. *Daniel Frazer*, a Native of *Strabarig*, some six Miles from *Inverness*, continued Deaf and Dumb from his Birth, 'till the seventeenth Year of his Age. The Countess of *Crawford* kept him in her Family for the space of eight or nine Years: After seventeen Years he was taken ill of a violent Fever, but being let Blood, his Fever abated, and had not it's natural Course: About five or six Months after, he contracted a Fever again, and had no Blood drawn from him; and this went on with it's natural Course. Some Weeks after his Recovery he perceived a Motion in his Brain, which was very uneasy to him, and afterwards he began to hear, and in Process of time to understand Speech; this naturally disposed him to imitate others, and attempt

Of a Deaf and Dumb Person recovering his Speech and Hearing after a Fever; by Mr M. Martin.
n. 312. p. 1469.

attempt to speak: The Servants were much amazed to hear him; he was not understood distinctly for the Space of some Weeks: he is understood now tolerably well, tho' he yet retains the *Highland* Accent, as *Highlanders* do who are advanced to his Years before they learn the *English* Tongue: he can speak no *Irish*, for it was in the *Low-Lands* of *Scotland* that he first heard and spoke.

An Account of
a Woman who
had lain
covered with
Snow six
Days without
any Nourish-
ment; by Mr
S. Bowdich.
n. 337. p. 265.

XIII. *Joanna Crippen* of *Chardstock* in *Dorset*, going from thence on the 24th of *January*, 1708-9. (being *Chard* Market) to her Master's for Work, she being a Spinner of Yarn or Worsted, and coming Homeward with some of her Neighbours, it snowing very hard, and being very deep, was forced into a poor Cottage for Shelter, desiring she might abide there in the Chimney-corner for that Night, offering a Penny to the Woman of the House, which she refused. The Persons that came with her, went to their respective Places of Abode, which were not far from the Place where she begged to lie; so that she was alone, and had almost a Mile thence to her own Home; having no manner of Sustenance with her, only a quarter of Tobacco, a Pound of Worsted Yarn, and three Pence in Copper, not so much as a Bit of Bread, Bisket, or the like. And being forced out of this Place, was constrained to travel, as well as a poor tired Creature could, towards her own Home; but going not far from thence, was met with by a Man of our Parish; who seeing her tumbling in the Snow a Distance off, as he was going to his Home, and finding her lying in a Ditch, helped her up, and bid her observe to go in his Track, which he observed she did indifferently well. But she had not gone a quarter of a Mile before she was forced to lie down under a Hedge, having lost one of her Shoes; and her Cloaths, which were very mean, were with the Brambles and Thorns torn almost quite off her Back; In which Place she lay from *Monday* Evening about Six o'Clock, until *Sunday* following about Four in the Afternoon, and then was discovered by fundry of our Neighbours, who went out with Poles, Shovels, &c. to search for her; and after some time spent in it, at last found her buried in four Foot of Snow or thereabouts, it being more than so much higher before the Thaw. One of the Men with his Pole thrusting at her, cried out, She was there; then the rest advanced up; and opening the Snow, one of the Men said, She was alive. She immediately spoke, and begged he would not poot her too hard, (as she expressed it) for she was almost naked; and desired that some of the Women would come to her and take her forth, which accordingly was done; they finding her without Stockings or Shoes, an old Whittle about her Shoulders, with a large Hole in it, which she had eat thro'; the Snow melting down on her, which she drank to quench her Thirst. From thence she was brought near my Habitation, where the best Care has been taken of her. She had a Mortification on one of her great Toes, which now is in a good way of Recovery;

Recovery; and now she is very hearty and in a fair way of a perfect Recovery.

She was very sensible at the first taking her out, and still continued so; knowing every Body perfectly well. Her Tobacco and Three-pence were in her Pocket. She had no manner of Food with her, as Bread, or any Eatable whatsoever. I have been concerned with her ever since she was brought hither. This Story, however strange it may seem, is in every Particular true, as will more plainly appear from a Narrative subscribed by two neighbouring Ministers, Church-Wardens and Overseers, with many others who were present at the finding her, which I suppose will soon be printed.

XIV. The Administrators of the *Hôtel Dieu*, having been informed of the vast number of Scorbutic Persons, which came daily into that House, or were brought there, as also of the strange Symptoms, and dangerous Consequences of this contagious Distemper, gave Orders for their being removed to the Hospital of *St Lewis*, the second Day of *March*, where many of them continued till the End of *August* in the same Year.

An Account of the prodigious Scurvy at Paris, 1699; by Mr Poupart. Extracted from the Memoirs of Hist. Acad. Scien.

I went to the Hospital of *St Lewis*, to make my Observations on it; and soon perceived, that this Distemper had something in it of that *Plague*, with which the * *Athenians* formerly were afflicted.

n. 318. p. 223.

The Disease was yet a true Scurvy; for they, who were sick of it, felt, as common Scorbutic Persons do, Pains in their Thighs, the Calves of their Legs, their Belly and Stomach, and were deprived of the Motion or Use of their Limbs, though they still retained their Feeling. They were troubled with Head-achs, Convulsions, and such strange Itching in the Gums, that the Children pulled off certain Pieces of them with their Nails. The Blood, which came from them, was watery, salt, and corrosive; and the Stink, which came from their Mouth, was intolerable. They had hard blue Spots on their Legs and Thighs, frequent Hæmorrhages, or Bleedings at the Nose and Fundament, and also so great Weakness in their Knees, that they could not go without reeling or staggering. These were the Symptoms which they had in common with other Scorbutic Persons: What they had in particular, were,

When we removed these sick Persons, we heard a small Clattering of their Bones, which Particular Mr *N. V.* hath mentioned in his *Treatise of the Scurvy*.

I observed at the opening of all those Bodies or Cadavers in which we heard the aforesaid little Noise, that the *Epiphyses* were entirely separated from the Bones, which by rubbing against each other, occasioned this Clattering.

* *Lucret. lib. 6.*

We have opened several young Persons, in whom we also perceived a small low Noise when they breathed. In all these Sorts of Bodies we found that the Gristles of the *Sternum* were separated from the bony Part of the Ribs; and as the Gristles are of a softer Substance than the *Epiphyses*, the Noise, which their rubbing produced, was greater than that of those Bones which rubbed against the *Epiphyses*.

They, in whom we heard this Noise at the time when they breathed are all dead, except one young Man, whose Ribs were visibly reunited to the Gristles; for after his Cure, we heard no more of this Noise.

All those, in whose Breasts any Matter or Serosity were found, had their Ribs separated from their Gristles, and that bony Part of those Ribs which were over-against the *Sternum*, was rotted for the length of four Fingers; which is an Evidence that the *Lympha* of these Bodies was extremely caustic.

The greatest Part of those Bodies which were opened, had their Bones black, Worm-eaten, and rotten.

Most of the sick went staggering: This is an Accident common to Scorbutic Persons; the Reason of it is, that the Support of the Joints proceedeth from the Force and Spring of the Ligaments, which bind the Bones close to each other; the Ligaments of these sick Persons were corroded, loose, and the Bones were separated from each other; which proceeded from this, That instead of finding in their Joints that sweet Oily *Lympha* (which commonly aboundeth there, in order to make the Joints supple, and give them an easy free Motion) there was nothing but a greenish Water, which, by it's over-caustic Quality had corroded the Ligaments, and consequently destroyed the Force of their Spring.

All the young Persons under eighteen, had in some Degree their *Epiphyses* separated from the Body of their Bones, and by the least Endeavour or Force we separated them entirely. The Reason of it is this, that young Persons have not yet their *Epiphyses* so strongly fastened to the Bones, so that when they are never so little soaked with that corrosive *Lympha* which is in the Joints, that caustic Liquor may easily separate them entirely from the Bones.

All the Bones which we found entirely separated from their *Epiphyses*, were more than twice as big as they should be in their natural State; because these *Epiphyses* were separated in them only, whose Bones were well soaked with a Water which had penetrated into their very Substance, and made it swell.

The Bones of those which recovered, or were recovering, remained swelled, without giving them any Pain. They might grow less in time, as it happens to Children which are troubled with the Rickets, whose Bones grow dry by little and little as they grow up.

All they who had any Difficulty in Breathing, or had their Breasts stuffed or stopped up, had there good Store of *Lympha*, or Matter; and