

II. *An Account of divers Schemes of Arteries and Veins, Dissected from Adult Human Bodies, and given to the Repository of the Royal Society by John Evelyn, Esq; F. R. S. To which are subjoyn'd a Description of the Extremities of those Vessels, and the manner the Blood is seen, by the Microscope, to pass from the Arteries to the Veins in Quadrupeds when living: With some Chirurgical Observations, and Figures after the Life, by William Cowper, F. R. S.*

THE Annex't Figures of the *Arteries and Veins* (i. e. Fig. Vid. Act. Erud. pag. 2. Anno MDCLXXXII. the 1st, 6th, and 8th,) were drawn after the Vessels themselves Pasted and dryed, which were Dissected from *Adult Human Bodies*, and display'd on *Tables* now to be seen in the *Repository* of the *Royal Society*, and are the Generous Present of *John Evelyn, Esq;* from whom I received the following *Letter*, concerning them and other *Tables* of the *Nerves, &c.*; to which I have subjoyn'd a further account, &c.

For Mr Cowper.

HEaring, Sir, that you are causing the *Tables* of *Veins, Nerves, &c.* (which I some time since brought out of Italy) to be accurately delineated, in order to their being *Ingraven*, as more Correct than any that are yet to be found among the *Figures* of those *Vessels* in *Books* of *Anatomy*; and desirous to understand how they came to my hands, I send you this little *History* of them, for your satisfaction.

T t t t t t t

Being

Being some years since in Italy, and Curious of seeing the many repeated Dissections at the Anatomical Theatre at Padoa, Cavalier Vestlingius being then Professor, and Reading on divers Bodies several days, during the Lent; Dr Johanno Athelsteinus Leoncenæ, who was then Opera or, by Extracting the Veins, and other Vessels which contain the Blood, Spirits, &c. out of Humane Bodies, (which the many Hospitals and Infirmaries of that City plentifully afford) begun to apply, and distend them on Tables, according to their natural proportion and position, as an Improvement which might be of use in Anatomy. Some of these Tables, being finish'd, with the Direction and Public Approbation of the Professor and several other Learn'd 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 Padoa 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, Galtrick Nerves and other Vessels, to compleat the Fourth: When these were perfected, I immediately sent them to Venice, from whence they were shipp'd for England: But, upon what Accident or Occasion I know not, the Vessel was carried into Holland, and lay there a year or two, (without any tydings what was become of my Concerns, being then my self at Paris) till coming at last to be unladen, Sir Richard Ford (afterwards Lord Mayor) finding by some Papers and Letters, with Directions on the Cases, and several Bales of Books, and other things (which I had been collecting in Italy, that they belonged to me) took care to have them all safely convey'd to me at London, to my no small charges. Dr Scarborough was one of the first I shew'd the Tables to; who would have tempted me to part with them for a very considerable sum, as I suppose, for my Lord Marquess of Dorchester; which I refusing, he desir'd I would lend them a little while to the Colledge; where he Read
upon

upon them, and kept them above a year, and thence return'd them to my House at Says-Court near Deptford; where they remained till the happy Restauration, when his Majesty Charles the II. bearing of them, was pleas'd to come and see them himself with great satisfaction. The Royal Society, for the promotion of Natural, and Experimental Knowledge, being a little after Instituted and Founded by that Curious Prince, and meeting at Gresham Colledge, I made a Present of my Tables to the Repository.

J. Evelyn.

These * Figures are closely Drawn after the Original ^{* Fig. 1st, 6th and 8th.} Schemes, and I am apt to flatter my self they will be acceptable to the Inquisitive. It is some satisfaction that I find the *Arteries* here so 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 published 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. the 1st 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 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 *Splenick Artery* has a straight progress in the *Fœtus* and in *Infants*; but in the *Adult* I have hitherto constantly found it very much *Contorted*, as express in Fig. 1, 23.

The peculiar Contrivances of the *Spermatick Arteries* of *Quadrupeds* as well as *Men*, shew a Constant design in Nature of taking off that Velocity 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 *Abdomens*, that the canals of their Blood Vessels may be lengthened: for the *Spermatick Arteries* (contrary to all others) arise from their 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) 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 *Spermatick 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 *Spermatick Arteries* are lessen'd at their Original from the Trunk of *Arteria Magna* in *Men*, and that the *Spermatick 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 *Spermatick Arteries* of *Men* and *Quadrupeds* seems to be,

That

That if the *Humane Spermatick 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 we know nevertheless often happens: such *Ruptures* (as they are call'd) are not so Incident to *Quadrupeds*, tho' the Passages for their *Spermatick Vessels* (through 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 *Peritoneum*, as in *Men* who are *Erect*.

Besides these *Artifices* in disposing the Trunks of *Arteries*, I doubt not but much more will be Detected by the Inquisitive: In the mean time, I shall, at present, pursue the Thread, and 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 Refluent-Blood to the *Heart*.

After the *Circulation of the Blood* through the Heart, Lungs, and large Blood Vessels, was demonstrated by *Dr Harvey*, it was only guess how the extremities of the *Arteries* transmitted the Blood to the *Veins*, till Mr *Lewenboeck's* *Microscopes* had discovered the continuations of the Extremities of those Vessels in *Fish, Frogs, &c.* which is now commonly shewn by *Microscopes* made by other * *Hands*; See the following Transacti^ons. Yet there are not wanting those who doubt of 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 all Ani-
mals,

mials, that have. *Biventrans 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.

* Mr. Wotton in his Reflections upon Ancient and Modern Learning, Chap. xviii. 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 Leeuwenhoek tried it. Though the ways how it may be visible to the Eye in Men, have not, that I know of, been yet discovered.

* This Difference in the principal Organs of the *Circulation of the Blood* in those Creatures, (on which only these *Experiments* have been hitherto made) mov'd me to make some, on *Animals* whose Organs differ only from the *Humane* 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 through 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 its *Omentum*; but the motion of the Blood soon abated, and its Globules were withdrawn from the Extremities of its Blood Vessels; and in a little time became stagnant in their larger Branches.

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 express'd by Fig. 4. 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 express'd. After I had seen this, I attempted to shew the like to several *Friends*, but did not always succeed so well as when Mr *Chambers* and Mr *Buckeridge* favoured me with their presence, at a time when I happened to have a young lean Dog, that was not large; in whose *Omentum*

we saw it very well ; but by the Assistance of an Instrument I had prepar'd to expand the *Mesentery*, we all saw it there much better ; that part having not only larger and clearer spaces than the *Omentum*, but its Blood Vessels are distributed more regular, as appears by Fig. the 5th, where the same Letters of reference serve as above.

Those who will entertain themselves in viewing the transparent parts of Living Creatures with *Microscopes*, will find that the extremities of their *Arteries* and *Veins* are not all equally less'n'd, tho' united. In the Tail of the *Lacerta Aquatica*, *Tadpols*, 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 past 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 *Splenick Arteries*, to the *Veins*, shews the Communications between those Vessels are more open than the *Arteries* and *Veins* of other parts, of which I have elsewhere spoken.

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

On viewing the Extremities of the *Pulmonick* 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

Humane 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, as before noted. Hence it appears 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 *Bronchia* separate their Liquor, if they were supplied with *Blood* from the Pulmonick Blood Vessels *which* is so quickly dispatched thro the Lungs.

On viewing the Membrane, that is between the Tocs 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, it was, I confess, not a little entertaining to see 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 offered to the part: While the Blood is thus leisurely creeping through the the Vessels, you may plainly see its Globules compress 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 *Lizzards*: But on examining the Blood of these Creatures with a Microscope, and comparing it with the Humane Blood, I found the Globules of the *Lizzards* Blood more incline to an oval Figure, and were as big again as the Globules of Humane 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 its Vessels often happens, and its *Circulation* in the same Vessels, is afterwards carried on without any impediment; as on some Passions of the
Mind,

Mind, Deliquiums by the effulion of Blood; or otherwise. But if the Blood is once become stagnant in its Vessels (especially the *Arteries*) the part is in no small danger of a Mortification, unless its 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 (in my opinion) 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 its Vessels will sometimes pass their sides, appear'd 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 its 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 tyed 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; some of which *parts* of the *Mesentery* I still keep by me. On laying one of these *Parts* of the *Mesentery* (thus expanded) in Water, the stagnant Blood in its Vessels disappear'd; but on just immersing another of those *Pieces* in Water, I could with my Naked Eye see the stagnant Blood diffus'd in the Interstices of the Blood Vessels, and between the Membranes of the *Mesentery*: Hence it's evident, the Blood may pass the sides of its *Vessels* after stagnation in *em*; but whither its *Globules* are broken, or what figure renders *them* fit to pass those pores that are in the sides of the Vessels, I leave to the Inquisitive; but we must return to our *Tables*, and first of that of the *System* of the *Vena Cava*.

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 in the *Arteries*, we find the common practice of *Nature*, in disposing the *Branches* of *Veins* to discharge the *Refluent* 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 its regular return to the *Heart*, as well as favour those *Contrivances* in the *Arteries*.

The *Trunks* of the *Carotid*, *Vertebral* and *Splenick 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. 7. 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 *Splenick Vein* has divers *Cells* opening into it near its *Extremities* in *Human Bodies*; but in *Quadrupeds* the *Cells* open into the *Trunks* of their *Spleenick Veins*.

The *Spermatick Veins* do more than equal the *Length* of the *Arteries* of the *Testes* in *Men*; their various *Divisions* and several *Inosculations* and their *Valves*, are admirably contriv'd 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 its current in the *Testes*; these *Spermatick 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

cessity of placing the Human Heart, as well as that of most Quadrupeds, so far from the *Center* of the Body towards its 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. 6. C, C, A) (for so its lower Trunk is call'd) would oppose the force the Heart could give it from the *Arteries*, and hinder its ascent: For this reason the *Vena Azgyos* (Fig. 6, b.) or *sine pari*, is contriv'd to convey the Blood sent to the *Muscles* of the *Back* and *Thorax* into the Descending Trunk of the *Vena Cava* (ib. B. A.) above the Heart: Hence it's evident, more Blood comes into the Heart by the Descending, or upper Trunk of the *Vena Cava*, Fig. ib. B, A. than passes out by the Ascending Trunks of the *Aorta*. Nor does this 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 *Inferiour Trunk* from its *Weight*: But perhaps it was necessary so much Blood should be ready there to joyn with the *Chyle*, (Fig. 6. †) for its better Mixture, before it reaches the *Right Auricle* of the Heart.

I might here add the Description of a *Peculiar Valve* I lately discovered in the *Lower Trunk* of the *Vena Cava*, near the *Right Auricle* of the Heart; but the Annex'd Figures have taken up too much room in these Copper Plates to insert it: For the same reason, the Figures of some *Contrivances* in the *Arteries* here mention'd, particularly the *Spermaticks*, are omitted: This being what occur'd to my Thoughts at present on this subject, which is not to be found (at least not commonly) in the Books of *Anatomy*: The greatest part of which have been added to these Papers, on their lying by me since the *Graver* began the Figures.

The Explications of the Figures.

Fig. 1.

Represents the Trunks and large Branches of the *Arteries*, Dissected from an *Adult Human Body*, when displayed and dried; as they are now to be seen in the *Repository* of the *Royal Society*.

1. The Trunk of the *Aorta* cut from the *Basīs* 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. 2, 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 express'd in a Figure given by *Bergerus* in the *Acta Eruditorum An. 1693. pag. 295*. But in all the *Human Bodies* in which I have hitherto Examined these *Arteries*, I have constantly found them as express'd Fig. 2. 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

12. The *Arteries* that convey Blood to the *Fauces Gargarcon* 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.

* That part of this *Artery* which is sometimes prickt in Letting Blood, and makes an *Aneurisma*, in which case this Trunk of the *Artery* must be bared and *firmly tyed 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, tho' the *Artery* has been *tyed above*: The *Operator* in that Case must make another Ligature on the Trunk of the *Artery below* its *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, tho' the *Trunk* is totally compress'd both *above* and *below*; and the same *Trunk* afterwards divided between those Ligatures. Hence it is, if one 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, then when the superior Ligature only is sufficient: These *Communicant Branches* (as I have seen them in some subjects) are here markt out in prickt Lines, *vid. the fig.*

While these Papers were lying by me, the two following Instances happen'd, in which the *Communications* of the large Trunks of the *Arteries* of the Cubit and Arm were remarkable. The first was

A *Boy* of thirteen years, who, about three weeks before I saw him, receiv'd a Wound near the middle of the *Cubit* in which the *Trunk* of the *Artery* (markt in the Fig. †.)

was

was divided. The Surgeon who was first call'd 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 6 or 7 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 appear'd ; but two or three hours were scarce elapsed ere I was alarm'd 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 happen'd : His Surgeon being out of the way, 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 its Orifice by the Flux of Blood. I pass'd a *Needle* with strong Waxed Thread under the *Artery*, and made a ligature on its 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 flow'd from the *Lower Trunk* of of the *Divided Artery*, yet the velocity of its Current was so much abated, that it seem'd 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 *Cicatriz'd*. The Learned 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* about eight years of Age, who came to *Town* with an *Aneurisma* of the Left Arm, upon Bleeding 6 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 loosning 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, tho' much abated. I then discovered another *Trunk* of the *Artery*, arising from the lower part of the *Tumor*, 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 stopt 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.

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 Celiaca*.

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

26. The superior Coronary branch of the Stomach.
27. 27. The superior Mesenterick Artery.
28. 28. The emulgent Arteries.
29. The inferior Mesenterick Artery.
30. 30. The Lumbal Arteries.
31. 31. The two Spermatick Arteries, which in this subject, seem to arise at a greater distance from each other than commonly.
32. The Iliack Artery.
33. The *Arteria Sacra*.
34. The Internal Iliack Branch.
35. The External ———
36. The Epigastrick Artery.
37. Branches of the External Iliack 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. 2.

THe Trunks and some of the Ramifications of the Arteries of an adult Human Body fill'd with Wax, to shew the Variety in Nature, and supply the defects of the former Figure.

1. The *Aorta* cut off at the *Bas*s 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. its division before it passes to the right and left Lobes of the Lungs.

C. The descending Trunk of the *Arteria Magna*.

D. D. The

DD 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 Pulmonick Artery to the Great Artery.
4. The Trunk of the Subclavian Artery.
5. 5. The Carotids.
6. 6. The Vertebrales.
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 these Branches of *them* which pass to the Brain, first clipping the hinder parts of the lower Jaw, immediately under its Condiloide Process ; where these 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 Trunks 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 Varoli*.

17. 17. The Communicant Branches of the *Vertebral* and *Carotid* Arteries.

18. 18. The Arteries of the Brain displayed.

FIG. 3.

I Choose to place this Figure on the *Copper Plate* of one of the Trunks of the Arteries of the *Tibia* (dissected from the Leg after *Amputation*) rather than the following *Distich*, which I find written on the *Original Table* of this Scheme of the *Arteries*.

*Pulsificus Sanguis de Cordis Ventre sinistro,
Funditur ut Corpus nutriat hisce vijs.*

Before I explain the Letters of Reference of this 3d Figure, it will be necessary to let you know that 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*, an *Expert Surgeon* 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 inflam'd, the Tumor extending itself above the *Malcoli*: A Sinuous Ulcer pass'd by the side of one of the *Metatarsal Bones*; the extremity of which Bone (whence the Toe was taken off) lying bare. In this condition I found the Left Foot and Leg of this *Gentleman*, when I had the Honour to wait on him by Command of the *Right Honourable* the present *Earl of Shaftsbury*, he living in the Neighbourhood of that *Noble Peer* in *Wiltshire*; where I met with Mr *Goldwyer* above-mention'd; and finding the Leg very chilly, the necessity of parting with it was too evident; which

which Mr *Stringer* suffer'd with extraordinary Fortitude, He not so much as expressing the least Outcry 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, I must confess, 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 dy'd not long after an Amputation of the part, tho the *Gangreen* 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 thickn'd, that the Diameter of its Bore was Contracted to less than a third part, and would scarce admit a Common Probe to pass it, *vid.* Fig. G. H. I. When I had found the ends of the *Arteries* in the Leg above-mention'd, I endeavour'd 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 further dissection I clear'd 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 clear'd two of *their Trunks*, I left one of *them* at *Salisbury*, the *other* I brought to Town, and is here Figur'd.

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 dry'd to shew its 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 its Canal ; From C to

X x x x x x 2

D The

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.

G, A Portion of the Trunk of the Artery of the Arm above mention'd.

H The sides of the Artery very much thickned, whereby the *Diameter* of its *Canalis* was so Diminished that the Probe

I, would not pass it.

The *Ossifications* in the Coats of *Arteries* have been frequently Observ'd, 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 Limbs; or that such impediments in their Canals have been found the Cause of Mortifications of particular parts, as in the Instance above mention'd; tho I doubt not; but the like has often happen'd in Aged people, especially where we find the progress of the Gangreen not very swift, and its 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 Instance I now mention'd; for tho no Gangreen came on the stump, yet the other Foot and Toes began to Mortifie about 6 weeks after the Amputation, as did the parts about the Hips, which were Comprest in Laying or Sitting, before he expir'd.

F I G. 4.

R Represents the Extremities of the Blood Vessels, as they appear while the Blood is passing them in the *Omentum* of a live Dog, view'd with a *Microscope*.

A A The

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. 5.

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. 6.

THe Trunks of the *Vena Cava*, with their Branches Dissected from an Adult Humane Body, done from the Original Scheme in the *Repository* of the *Royal Society*.

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 *Thoracick Duct* enters it, and discharges itself of its *Chyle* and *Lympha*.

b, The *Vena Azygos* with its Branches going to the Ribs, c, c.

c. The Superior Intercoastal Veins.

d, d, The Internal Mammary Veins.

E, E, The Right and Left Iliack Branches.

F, F, The Internal Jugular Veins.

G, G, The External Jugulars.

H, H, The Veins which bring Blood from the lower Jaw and its 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 Thyroid Glands.

h, The *Vena Sacra*.

i, The Internal Iliack Branch.

k, The External———

K, K, The Occiputal Veins.

L, The Right Axillary Vein.

M, The Cephalick.

N, The Basilick.

O, The Median Vein.

P, The Trunk of the Veins of the Liver.

Q, The Phrenick Vein of the Left side.

R, The Right Phrenick Vein.

r A large Vein from the left *Glandula Renalis* and parts adjacent.

S, The Left Emulgent Vein.

T The Right Emulgent, in this subject very much lower than the Left, which is not usual.

V V The two Spermatick 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 tyed 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 Iliack Branch.

z The Epigastrick 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. 7.

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 dryed together with the *Falx*, &c.

A The extremity of the *Falx* cut from the *Crista Galli*.

a Its lower *Limbus* that touched the *Corpus Callosum*, as it divides the Right Hæmisphere of the Brain from the left; where the Fifth *Sinus* passes, which is here dryed and disappears.

B. B. The second *process* of the *Dura Mater*, which supported the hindmost parts of the Lobes of the Brain, and defended the *Cerebellum* from being prest 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. 8.

THe Trunks of the *Vena Porta* dissected and displayed; done from the Original Scheme in the *Repository* of the *Royal Society*.

A A The Branches of the *Vena Porta* freed from the Liver.

a The Umbilical Vein.

B The

B The Splenick Branch.

C C The Mesenterick 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 call'd *Vas Breve*.

d The *Vena Duodeni*.

H The *Vena Hemorrhoidalis* arising from the *Rectum* and *Anus*, in this subject emptying itself into the left Mesenterick Branch; but in other Bodies (and particularly in a preparation of these Veins, which I have now by me) I find this Trunk of the *Hemorroide* Veins ending in the *Ramus Splenicus*.

The length of the Trunk of this *Hemorroide* Vein, and its progress under the *Intestines*, renders it liable to be compress'd, and its Refluent Blood retarded; whence its Branches in the *Intestinum Rectum* and *Anus* become distended with Blood, and cause the *Hemorrhoides Cæcæ* and *Apertæ*; which are frequently attended with *Aposithumations* in the *Anus* and parts adjacent; which disorders are the more incident, not only because these *Hemorroide* Veins (like the rest of the Branches of the *Vena Portæ*) are without *Valves*, and the Blood has 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's no wonder we find *Women* more

more afflicted with the *Hæmorroides* at that *time*, than at any other. Nor are the *Iliac Veins* and the *Lympheduct* 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 these Limbs are so frequently swoln; 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 happy *Delivery* of two large Children.

III. *Part of two Letters to the Publisher from Mr James Cunningham, F. R. S. and Physician to the English at Chusan in China, giving an account of his Voyage thither, of the Island of Chusan, of the several sorts of Tea, of the Fishing, Agriculture of the Chinese, &c. with several Observations not hitherto taken notice of.*

S I R,

MY last to you was from the Island of *Borneo*, in which I gave you an account of our arrival there the 17th of *July*, where we staid but 2 days, the Season of the year being so far past, and from thence made the best of our way through the Streights of *Banca* with favourable Winds and Weather, till we came on the Coast of *China* the 13th of *August*, then we had variable Winds which carried us abreast of *Emuy* the 19th following, at which time the North East Winds setting in fresh, put us in great fears of losing our passage; whereupon we were forced to turn it up against Wind and Current all the way, the Weather so favouring us, that we were never but by our Topails, else we should have lost more Ground in one day, than we

Z z z z z z

could

Fig. 6.

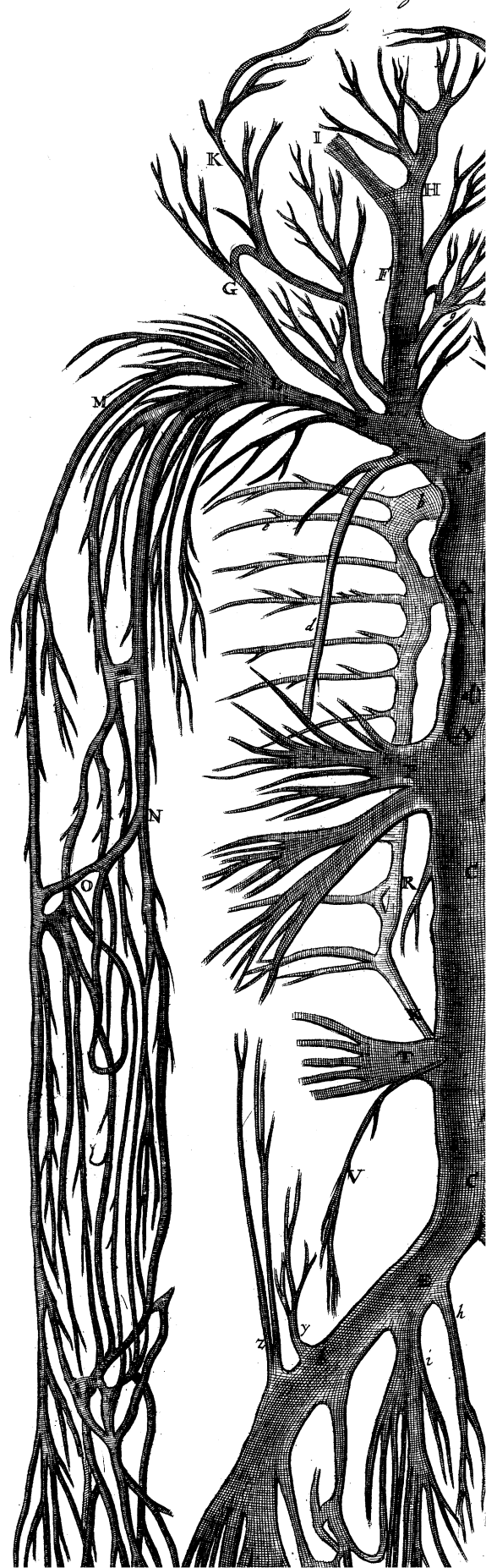


Fig. 5.



Fig: 6.

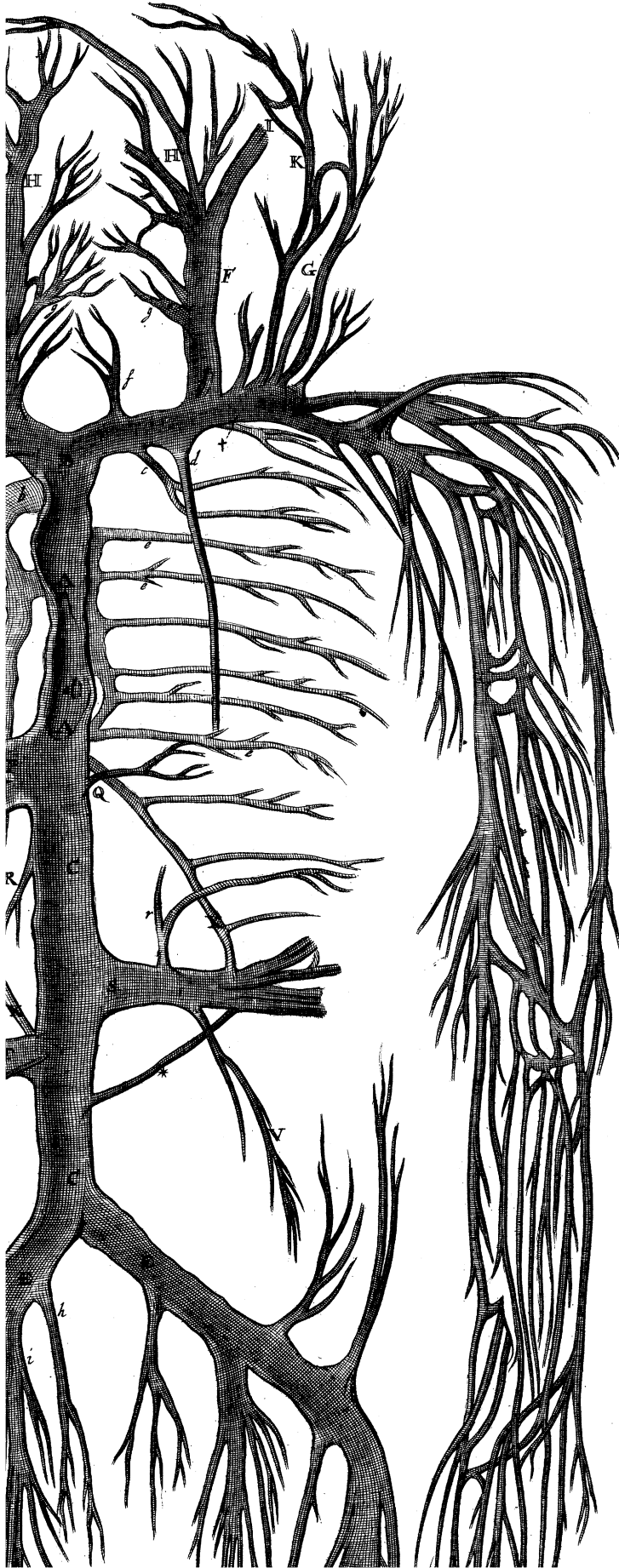
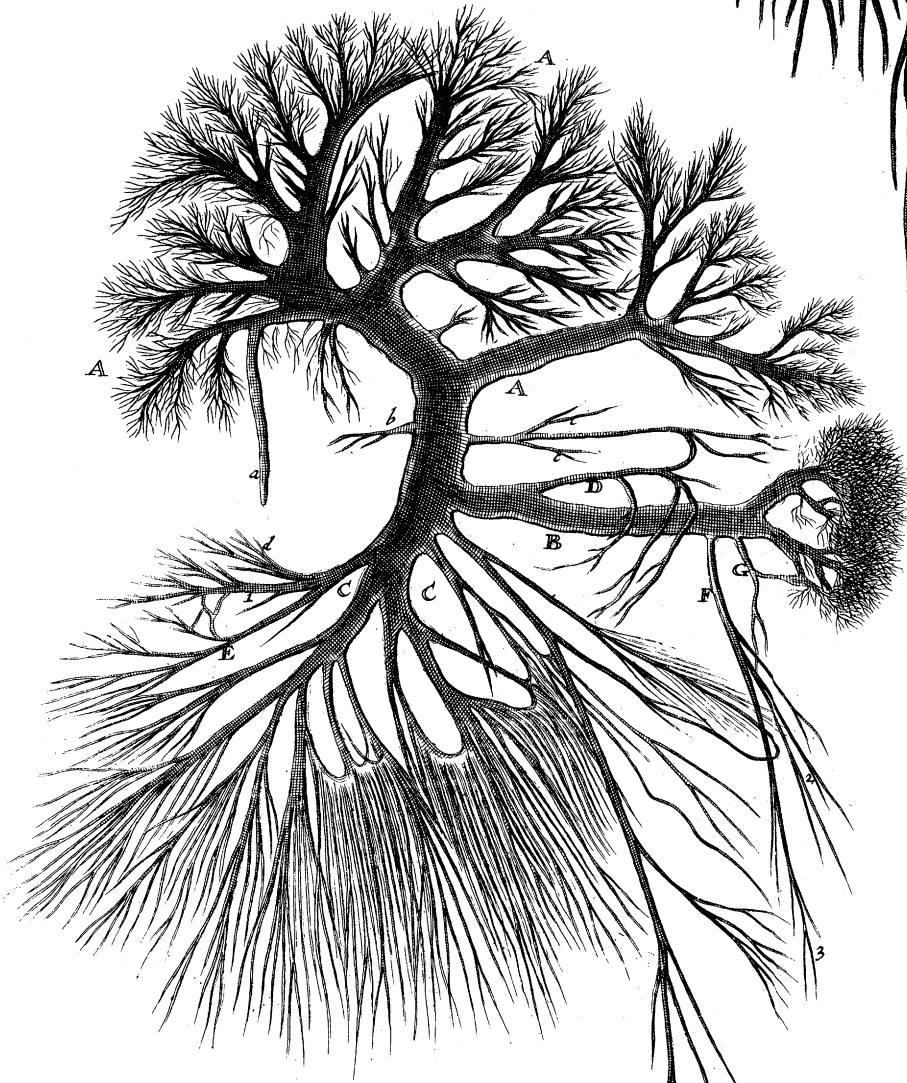


Fig: 8.





Venas has et Humani Corpo.
Arterias Geminis Tabulis ad
citas Patavio a se pridem ded
tas : Regali demum Societat
dit *Iobannes Evelynus* ejusden
cius MDCLXVII . —

M: V: D: Gucht Sculp:

Fig: 2.



Fig: 4.

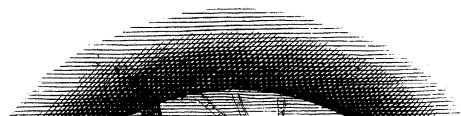


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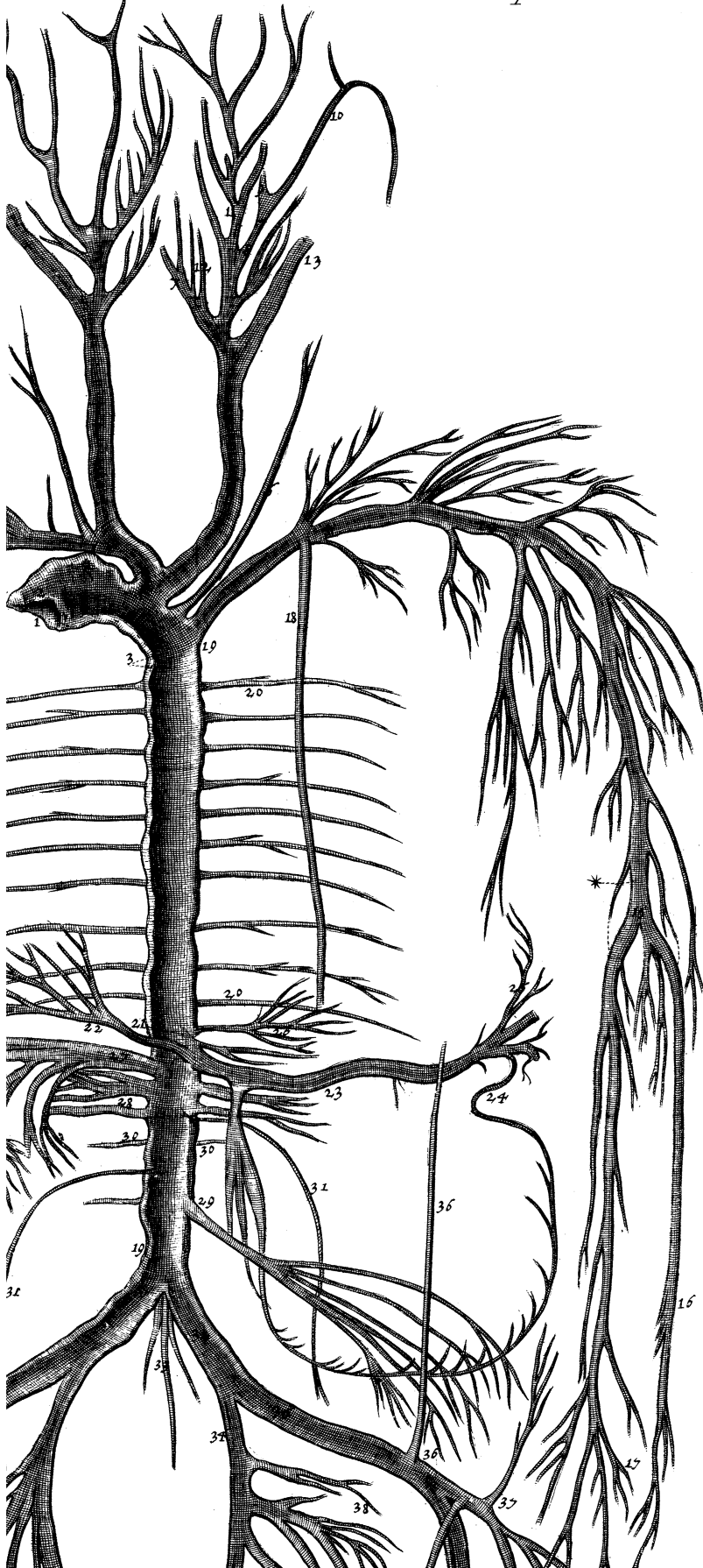
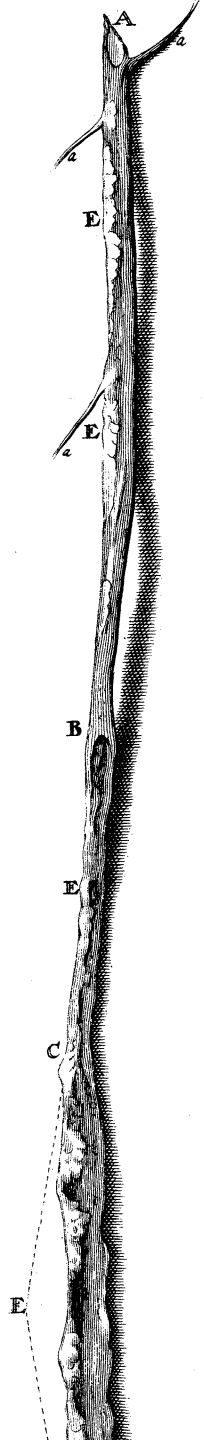
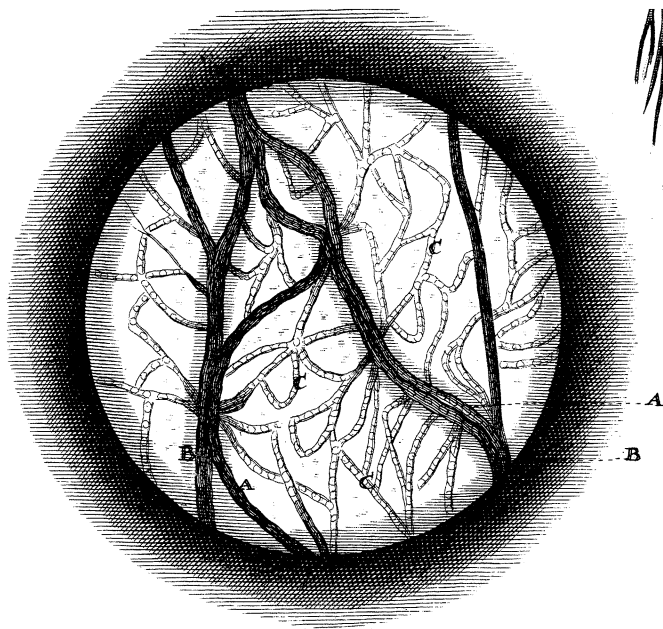


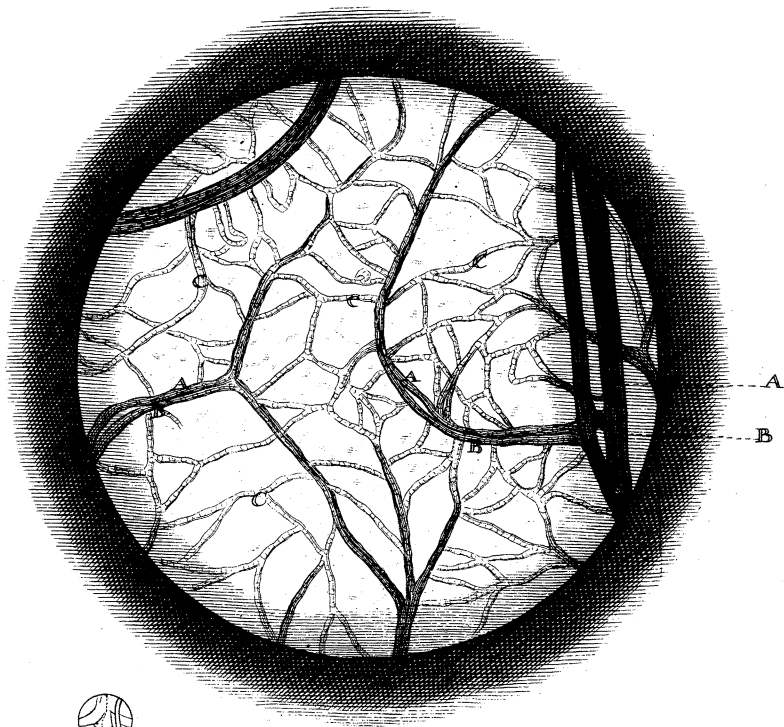
Fig: 3.



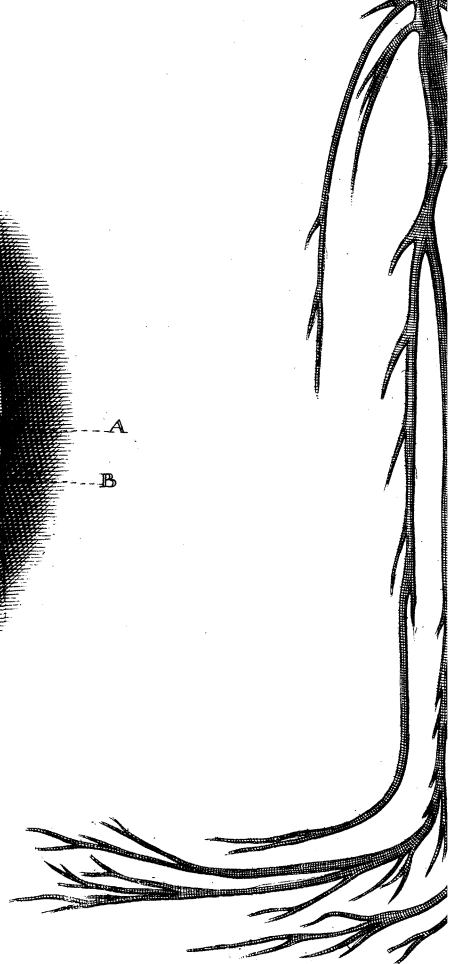


D 

Fig: 5.




D





M. V. Gucht Sculp

Fig. 7.



Fig. 6.

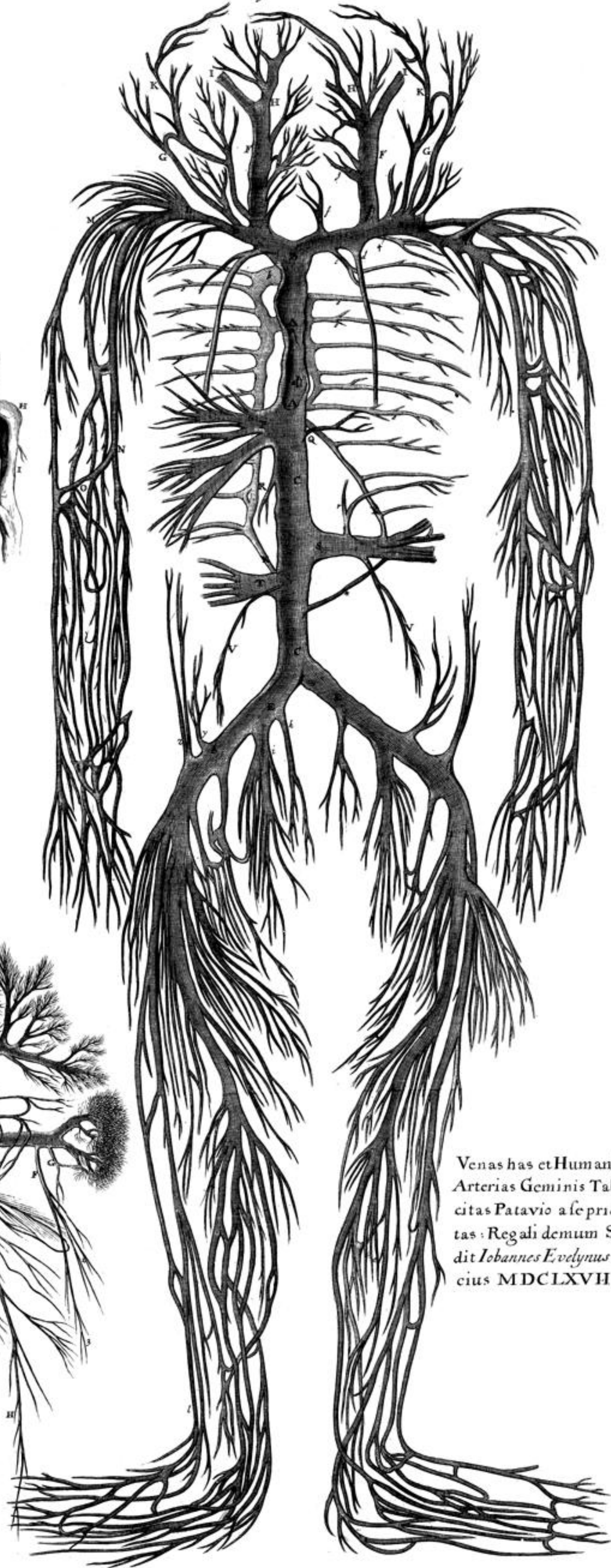
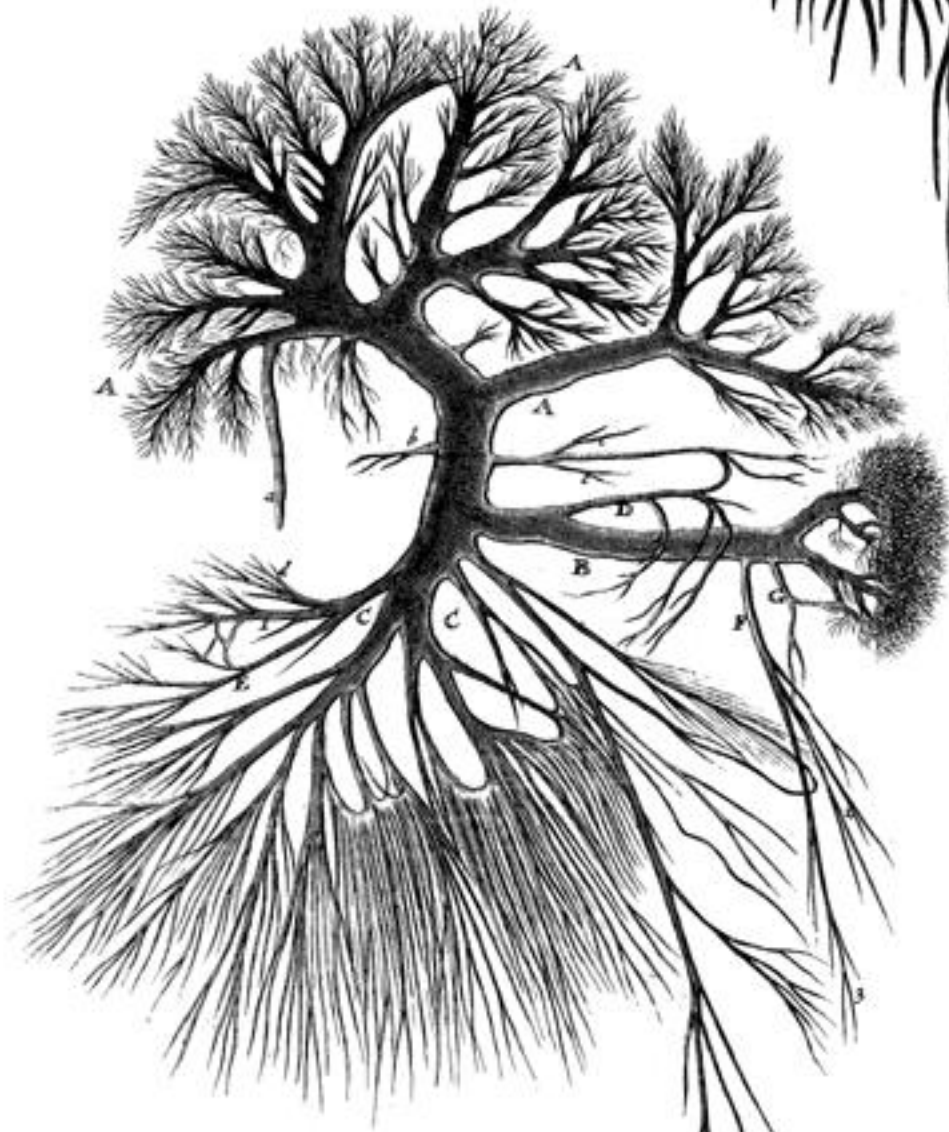


Fig. 8.



Venas has et Humani Corpo
 Arterias Geminis Tabulis ad
 citas Patavio a se pridem ded
 tas : Regali demum Societat
 dit Iobannes Evelynus ejusden
 cius MDCLXVII . —

Fig. 1.

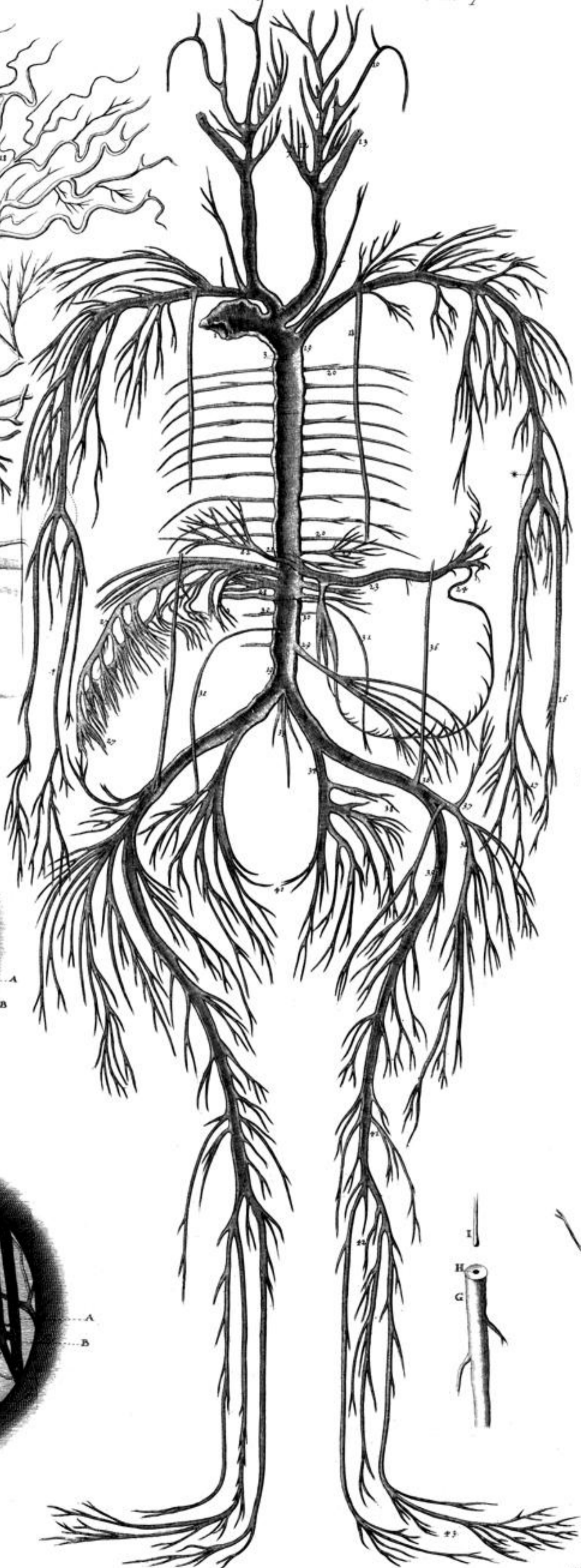


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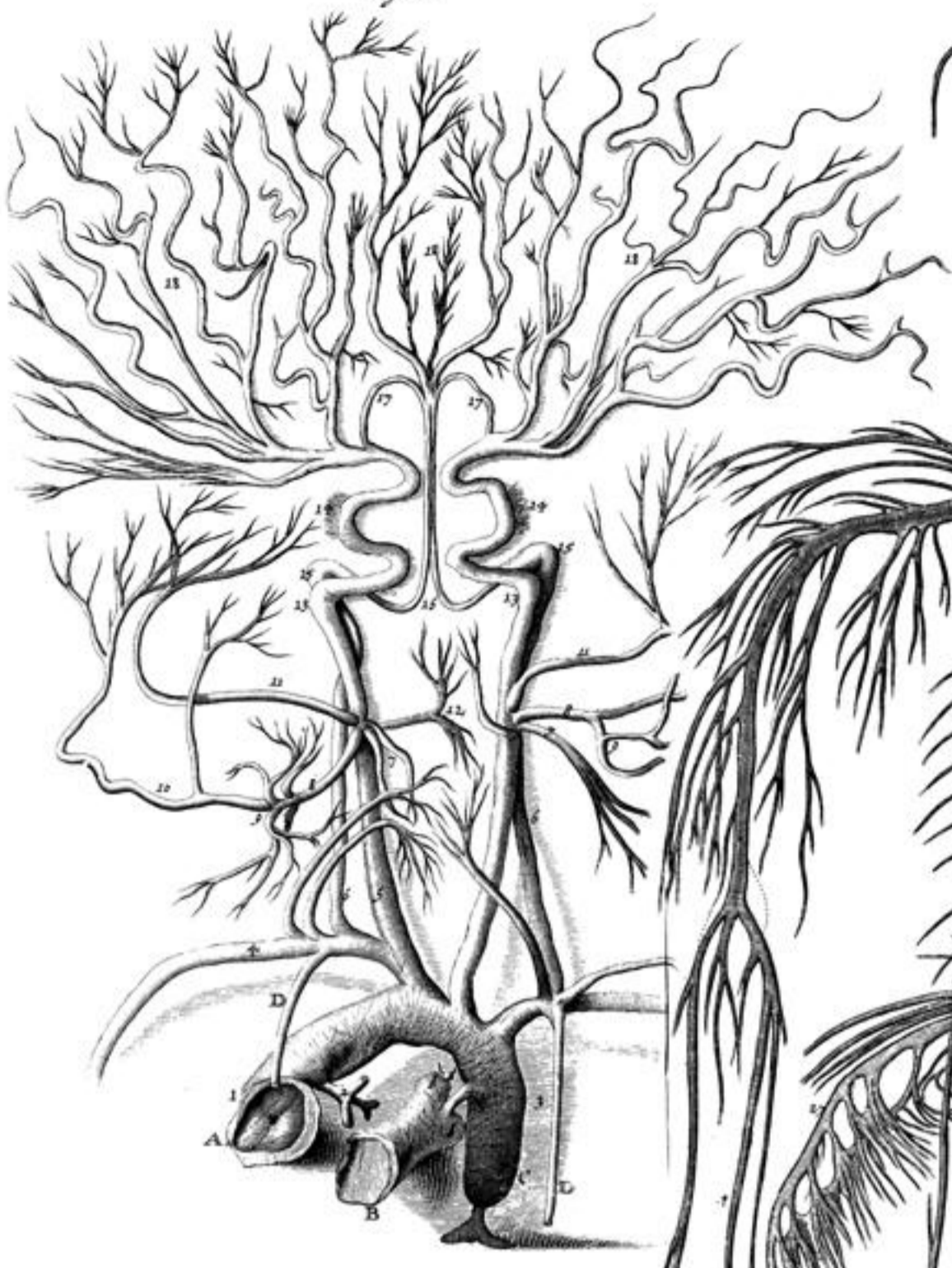


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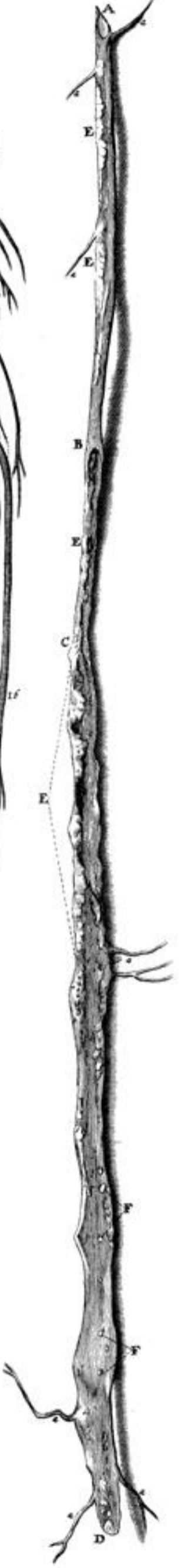


Fig. 4.

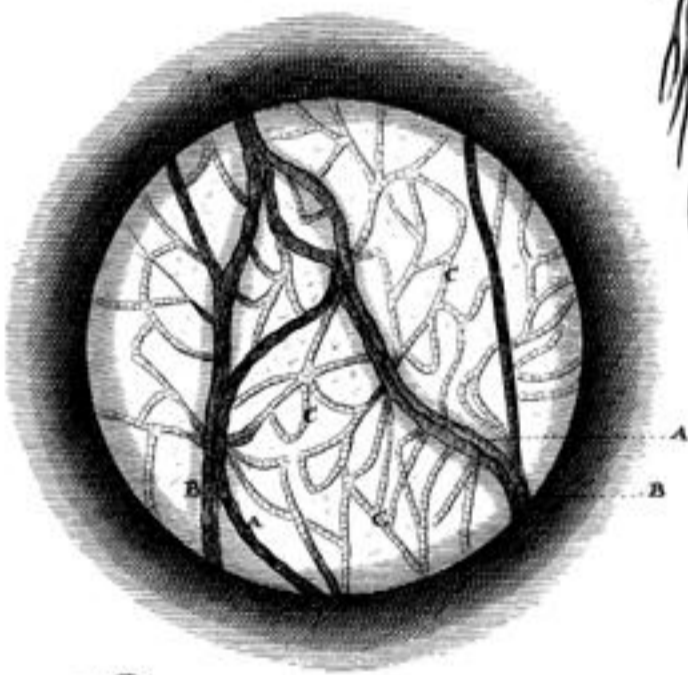


Fig. 5.

