

A Letter of Mr. Martyn Lister, written to the Publisher from York, Januar. 10. 1673, containing an Ingenious account of Veins by him observ'd in Plants, analogous to Human Veins.

S I R,

I Am very much pleased, when you give me to understand, that something is published of the *Anatomy of Vegetables*, and

* *This Learned and Accurate Philosopher hath already presented to the R. Society, in a very obliging manner, his Manuscript, containing the Sum of his Observations and Labours about the Structure of Plants; and he hath also very generously engaged himself, that, upon the Approbation of that Illustrious Body, he will enlarge his Papers, illustrate all the particulars, therein contained, with Schems, and then publish the whole.*

that more is designed by that excellent person Signior *Malpighi* *. And since the receipt of your last, I have perused the very ingenious Book of *Dr. Grew*; and, as far as I have observed these matters, all things therein are faithfully delivered, and with great sagacity. In turning over my Notes, made some years agoe, I find, among

other things of this nature, some few Observations concerning the *Veins* of Plants or such *Ductus's*, as seem to contain and carry in them the noblest juices of Plants. Of these there is little or no mention made in this curious *Treatise*, unless under the notion of *Pores*. And because I am of the opinion, that they will prove vessels Analogous to our *Human Veins*, and not meer *Pores*, they shall, if you please, be the subject of your entertainment in this Letter; and the rather that, if they prove *Veins* (as I little doubt them) they are not to be passed over in silence, but are early to be accounted for in the *Anatomy of Vegetables*.

To avoid ambiguity: Those parts of a Plant, which *Pliny* (*lib. 16. cap. 38.*) calls by the names of *Venæ* and *Pulpæ*, are nothing else, in my opinion, but what our late late Author, *Dr. Grew*, calls *Fibres* and *Inserments*, or the *Lignous* body interwoven with that which he takes to be the *Cortical*, that is, the several distinctions of the *Grain*. Now, that the vessels, we are about to discourse of, are not any of the *Pores* of the *Lignous* body (to use the *Doctors* terms) is plain in a traverse Cut of *Angelica Sylvestris magna vulgarior* *J. B.*, for example; the *Veins* there
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very clearly shew themselves to an attentive view to be distinct from *Fibres*, observable in the *Parenchyma* of the same Cortical body together with themselves; the Milky juice still rising *besides* and not *in* any *fibre*. Also in the like cut of a *Burdock* in *June*, the like juice springs on this and on that side of the *radii* of the Woody circle, that is, in the *Cortical* body and *pith* only. Again, where there is no *pith*, there is none of this juice to be observed, and consequently none of these *Veins* as in the Roots of plants, and Trunks of trees; but ever in the *Bark* of either. I need not here enumerate the many Plants, wherein these particulars are most plainly observable, as in *Sphondylium*, *Cicutaria*, many of the *Thistle* kind, &c.

Further, Neither are they probably of the number of the *Pores*, described by our Author in the *Cortical* body, or *Pith*. Not surely of those *Pores* extended by the *breadth*, because the course of the juice in these vessels is by the *length* of the plant; as I have sometimes very plainly traced in the pith of a dried *Fennel-stalk*, following them by dissection quite through the length of the pith. It remains, that, if *Pores*, they are of those pores of the *Cortical* body, that are supposed to be extended by the *length* thereof; which yet seems (to me at least) not enough, but we think them vessels invested with their own proper membranes, analogous to the *Veins* of our *Humane* body; for these reasons: 1. Because they are to be found in the *Pith*, and sometime in the *Cortical* body of a plant, not included within the *common* Tunicle of any *Fibres*, as is above noted: (that *Fibres*, or the *Seminal* root are cloathed, is most plain in some plants, as in *Fern* and *Geranium Batrachoides*, the *Fibres* of the former are coated, at least in some parts of the plant, with a black skin, in the latter likewise with a red one:) And in these cases, had they not, I say, their own proper membranes, we see no cause, why the very porous and spongy body of the *Pith* and *Cortex*, should not be in all places filled alike with the juice, and not rise (as most plainly it doth) in a few determinate and set places only, that is, according to the position and order of these vessels. 2. Again the Experiment I made, which you were pleased to publish*, concerning the effect

* See Numb. 70.
p. 2122, & 2123.

of a ligature on *Cataputia minor Lobel*. viz. the sudden springing of the Milky juice out of infinite pores besides the Incision : (the cause of which *Phænomenon* I take to be, the dissected veins impetuously discharging themselves of part of their juice within the porous *Parenchyma* of the Bark ;) whence it is probable, that, if there was no coated vessel to hold this milky juice, we might well expect its springing upon the bare ligature, as when we squeeze a wet Sponge ; the external Cuticle of the plant, as this Experiment shews, being actually perforated.

In the next place it is very probable, that these vessels are in *all* Plants whatsoever. For, as it is truth-like of all the other *substantial* parts of plants, that they are actually in, and common to all plants, though specified by divers accidents in Figure and Texture ; so of these *Veins*, which, though they be discernable mostly in those plants where they hold *discoloured* juices, yet we may very probably think, that they are wanting, where the eye finds not that assistance in the challenging of them. As in these very plants, where they are *least* visible, there is yet a time when they are, if not in all, yet in some parts of these plants, plain enough to the naked eye : The tender shoots of the Greater and Lesser *Maple*, in *May*, are full of a milky juice ; viz. the known liquor of these Veins. Again to this purpose, If you apply a clean knife blade to a travers cut of the like Shoots of *Elder*, the Gummy liquor of these Veins will be drawn forth into visible strings, as is the nature of Bird-lime, of the bark of *Holly*, or the milk of *Cataputia minor Lobel*. Further, The leaf stalks of our *Garden Rubarb* do sometimes shoot (by what accident, we enquire not here) a transparent and very pure ChrySTALLIN *Gumm*, though the Veins, that held this gummy juice, are by no ordinary means visible in them, and yet by comparing the nature and properties of this Gum, with that of the Gums of other Vegetables, we cannot doubt but this *Gum-Rubarb* is the juice of these Veins, as well as we are assured, the Gum of other Vegetables to be of theirs, by the same comparative Anatomy. Lastly, we think, that even *Mushromes* (that seemingly inferior and imperfect order of Vegetables) are not exempt and destitute

destitute of these Veins, some of them yielding a milky juice, hot and fiery, not unlike some of the *Spurge* kind, or *Euphorbium*.

It might be expected, that I should add, somethings at least, concerning the Original and Productions of these Veins, if not an exact description of them, the course of the juices in them, and their more immediate and primary uses in the matter of Vegetation: But I must acquaint you, that (besides the season is not now proper to improve and verifie, if I had leisure, the Observations formerly noted, and that they were things thrown into my *Adversaria* without other order, than that nothing should slip from me in the quest of Medicaments, that might be of light) although I find indeed many scattered particulars (besides them already delivered) concerning the Position, Order, Number, Capacity, Distributions, Differences, Figure, &c. of these Veins; you will be pleased to take in good part, if I think fitting to reserve them until the opportunity of another Summers review: It seeming to me no small matter, to have fairly hinted the existence of them to such curious persons as shall have the leisure, and find themselves in better circumstances, than I can pretend to, as to those great advantages of Glasses. Designing, &c.

To conclude with the *primary* use of these *Veins*; which is, in my opinion, to carry the *Succus nutritius* of *Plants*, because, where they are not, there is no Vegetation; as it is seen, if an engrafted Branch or Arm be bared and stripped off the clay, &c. in *June*, all the course of Vegetation will appear to have been made only by the *Bark*, and not by the *Wood*, that is, in the place only, where these veins are. A *secondary* use is the rich furniture of our Shops; for, from these *Veins* only it is, that all our *Vegetable Drugs* are extracted, and an infinite more might be had by a diligent enquiry, and some easy means, which I have not unsuccessfully put in practice; witness the *black Resin*, I not long since sent you a specimen of.