

A Note of Dr. Wallis, sent in a Letter of Febr. 17. 1672, Upon Mr. Lister's Observation concerning the Veins in Plants, published in Numb. 90. of these Tracts.

— **A**S to the *Veins* of Plants, which Mr. *Lister* observes not to be ramified, but rather bundles of them divaricate †; they do in this represent the Nerves, which (as in Dr. *Willis de Cerebro* is observed) go together in that which seems the common trunk, like a bunch of Threads, which after separate and are variously divaricated; and these Nerves, being cut, shrink up (as the *Veins* of Plants,) as much or more than do the *Veins* or *Arteries* of Animals.

Dr. *Willis* observes also, that there are two sorts of Nerves; one arising from the *Cerebrum*; subservient to Voluntary motions, and of which we are conscious or take notice (and which properly belong to the Functions of the Sensitive Soul, at least to the Functions of Sense;) the other, from the *Cerebrum*, subservient to the Involuntary motions, and of which we are not conscious or sensible, (and which belongs rather to the functions of the Vegetative Soul, (Nutrition, &c.) or at least the Intensible Loco-motive faculty :) And to these latter seem reducible those *Acts of Sense*, which Mr. *Lister* speaks of in Plants. See Dr. *Willis de Cerebro*. c. 19. pag. 241. Edit. in 4°. and c. 15. p. 187.

A Letter of Mr Lister dated May 21. 1673. in York, partly taking notice of the foregoing Intimations, partly communicating some Anatomical Observations and Experiments concerning the unalterable Character of the Whiteness of the Chyle within the Lacteous Veins; together with divers particulars observed in the Guts, especially several sorts of Worms found in them.

— **I** Come to your Letter, where the Analogy betwixt the *Veins* in Plants and the *Nerves* in Animals, hinted by Dr. *Wallis*, is a considerable notion, and I shall set myself a task e're long to examine them both again on purpose, and to give you my thoughts. In the mean time, I will entertain

ertain you, if you please, with some Anatomical Observation; and Experiments.

It hath been long in my thoughts and desires to have discovered the *Actual passage* of the Chyle into the *Lacteous Veins*; of which yet I never doubted, as I find some do at this day. The difficulty lyes in the certain and unalterable character of the Chyle's *Whiteness*, especially when received into those Veins. And yet it is as certain, that in a *Diabetes* the Urine retains all the qualities of the liquor drunk. Also in that famous instance of those that eat the fruit call'd the *Prickle-pear* (if I remember aright,) their Urine hath affrighted the Eater with the colour of blood, that is, with the not-alter'd color of the Juice of the Fruit. In these instances at least we cannot doubt but the Chyle, even in the *Lacteous Veins*, was qualified according to the food and drink.

To effect then something to this purpose, we have formerly, and that very often, repeated the Experiment of injecting highly tinged liquors into the Guts of a live Animal. It would be too tedious and impertinent, to write down the circumstances of many different tryals: We will only in short tell you the manner of performing it and the success.

We laced the skin of the *Abdomen* of a dog loosely for a hands breadth, and then opening it underneath the stitches, we took out either the *duodenum*, or any other part of the *tennia intestina*. The Gut, took out, we open'd with a very small orifice, and having ready the tinged liquor luke-warm, we injected it upward and downward: Carefully stitching up the gut, and then drawing the Lace, we unloosed two of the Dogs feet, laying him on his side for what time we thought convenient. The tinged liquors we used, were good *Barbado's Indigo*, in fair water, and filtrated; also lumps of Indigo thrust down his throat; good broth (as they call it) of a blew fat; Indigo in Milk Saffron in Milk. Again, we tried in some Dogs fed before hand, and injected the liquors in the very height of the Chyle's distribution; into others yet fasting, and that for a longer or shorter time.

The Success was so constant, that we cannot say, we ever did find the least discolouring of the Chyle on the other side

the Guts, that is, the within Lacteous Veins, but ever white and uniform. Whence we judge it not very feasible to tinge the Venal chyle in a well and sound animal. And He that would demonstrate the matter of fact to the Eye, must probably do it by giving him some such thing in the food, as shall cause a *Diabetes*, or some distemper equivalent to it.

Though we have observ'd many odd things in the several Exercises of this nature; yet we shall not trouble you at present with any other particulars, than what we have further observ'd in the *Guts*, to which we shall confine our paper. Of these we shall proceed to speak though possibly the things may be better known to you already:

As 1. of the *Glandulae miliares* of the small Guts, which may also in some Animals be well call'd *fragi-formes*, from the figure of the one half of a *Strawberry*, and which yet I take to be *Excretive* glands, because *Conglomerate*.

2. The Use of the *Intestinum cecum*, subservient to that of the *Colon* and *Rectum*, manifest in such Animals, where Nature intends a certain and determinate figure to the Excrements.

3. Of some sorts of *Vermin*, we found in the Guts. And first of the *Lumbrici lati* or *Tape worms*. Of these, I say, we found in the guts of one Dog, perhaps more than an hundred in all. The *duodenum* was exceedingly stuffed out and extended with them. Which also well agrees with an other Observation I made in a Mouse, where I found the *duodenum* to be far bigger than the Stomach it self, by reason of the great numbers of these worms for *kind*, which were contained in it: For *kind*, I say; for these *Tape-worms* were of a quite different shape from those of the Dog, or any that I have ever yet seen. To proceed, we found them also in the Dog's *Jejunum* and *Ileon*; but not any one lower than the *Valvula coli*, nor any higher than the *duodenum* or within the *Pilorus*. Below the *duodenum* they lay at certain distances one from another, though sometimes by pairs or more of them twisted together. Near them was constantly to be observed an Excrement of their own, distinct, for colour (more grey) and consistence, from the Chyle, (the observation being made
in

in a Dog plentifully fed for other purposes;) just as we find in worm-eaten tracks of wood, where the *Cossi* leave behind them the wood which hath pass'd through their bodies: These worms lay mostly with the small ends upward, as feeding upon and expecting the Chyle in its descent. These *lumbrici lati* were none of them above one foot long, and most of them of an equal length and bigness. The one end was as broad as my little finger-nail, and pointed like a *lancet*; the other end, coming small gradually for the third part of the whole length of the animal, was *knott'd*, or ended in a small button like a pin-head. They were every-where and in all parts of them alike milk white, of a flat and thin substance like fine Tape, divided into infinite rings and incisures; each incisure having *sharp angles*, on both sides, *looking* to the broader end standing out beyond each other: From which also I take the small end to be the head; else the sharp corners of the *annuli* would necessarily hinder the Ascent of the Animal; whereas, if the contrary be true, they serve to keep it up. Each ring hath also on the one side only, and that alternately, one small protuberance, much like the middle feet of the body of some Caterpillers.

After I have thus described them to you, I desire you to view the Cut of *Tulpius* in the last years Edition of his *Medic. Observat. l. 2. c. 42*; where he retracts the first *figure*, given us in the Edition of that book in the year 1652. And yet I cannot say, that all in this last is true; for, to me, the *riclus* and eye in the there supposed head of the animal seem to be the meer fancies of the painter; not to say, that probably the smaller end is the head, which, indeed, is in this Cut wholly neglected. Comparing our Animals with that Cut of *Tulpius*, it was not very easy for me to observe, because of the great resemblance, the specifick difference of the *lumbrici lati* of Men and those of this Animal.

I was not so happy as to discover any motion in any part of them, in water or out of it, nor did they seem, if pricked or otherwise hurt, much (if at all) to contract themselves or shorten the *Annuli*, so that they then appear'd to me as things without motion or sense.

There

There is an other sort of *lumbrici lati* to be met with very frequently also in Dogs, called *Cucurbitini*, from the likeness each *annulus* or link hath to a cucumber seed. I have found of them about half a foot long, but more often broken into shorter pieces. The *former* by us described is undoubtedly a complete and entire Animal; but there is great reason of suspicion, that *this* is a *chain* of many Animals linked together. These Animals for Kind have been observed to have been voided by Men, and found enclosed in a Gut or Membrane of a prodigious length: And (which yet is more notable,) a person of great integrity and worth, Mr, *T.I.* affirmed to me, that he once assisted at the opening of a Dog, in which one of the Kidneys was observed to be quite wasted and become a perfect bladder, and in that bladder they found something like an Animal of a monstrous shape, which being dissected, was nothing else but a skin full of these *lumbrici cucurbitini*. It were to be desired, that such as have the opportunity of such new *Phænomena*, as of Snakes, Lizards, Beetles, Catterpillers, Toads and such like things, as we read of in Medicinal histories to have been voided or found in any part of the body, would carefully examine, whether they are not the like disguises of this sort of Worms, much assisted by the surpris'd fancies of the first Observers.

And because these sort of Wormes are sometimes said to be found out of the Guts, their most proper place, we shall conclude with a very recent observation of the last month in this *Ci y.* A Chirurgion brought me about 20 worms, which he had just then taken out of an ulcerated Ankle of a Girl of about eight years old. I had the curiosity to go my self and see it. I found the leg sound all but the Ankle, which was vastly swell'd, and the Girl otherwise hearty and well coloured. She had been in great misery for some months; had been sent up to *London*, where she was touch'd and dress'd for the *E-vil*. Sometimes after her return, her pain continuing, a young Puppy was opened and applyed to the Soars. The Chirurgion, who took of the puppy, found it, to his great admiration, full of worms, at least 60. in number, what those he found in the body of the Puppy, and what he drew out of the soar Ankle; into

into which, he said, they crawled down as worms do into the ground. The same puppy was again applyed, and it was then (at the second taking off of the puppy) that I made the visit, and saw only one worm got out into the puppy, but a very live and stirring one. Many were afterwards kill'd by injections These worms I affirm, according to my best Knowledge, (and I had the opportunity of comparing them) were of the very Species of the *Lumbrici teretes*, which Children familiarly void from the Guts. They were betwixt three and four inches long; all, about the matter, of an equal bigness, as of one brood; something thicker than a Ducks quill; very sharp at both ends; stiff, and exactly round; without incisures, visible at least, and yet could move and twist themselves readily enough. All the difference was in the colour, these being much whiter than any I have seen from the Guts. *Vid. Barthol. in Hist. 60 Cent. 5.* where near twenty worms, as long as my finger, were found in a Lady's arm, probably of this Species too.

I beg your pardon for my, &c.

The Undertakings of Mr. Henry Bond Senior, a famous Teacher of the art of Navigation in London, concerning the Variation of the Variation of the Magnetical compass and the Inclination of the Inclinary Needle; as the Result and Conclusion of 38. years Magnetical Study.

THE said Mr. Bond can shew the Cause of the Variation of the Variation of the Magnetical Needle or Compass by the Motion of two *Magnetical Poles*; how these Poles are found; and what their Distance is from the Poles of the Earth; what their *Annual Motion* is, and from whence it proceeds.

By Calculation he finds all the *Variations* that have been observed at or near *London* for above 90 years past, and so by consequence it may be found at *London* to the end of the World.

He hath calculated a *Table* of every five minutes of the *Inclination* of the Inclinary Needle; so that by the Needles
Incli-