

XVI. *A Letter from Mr. Turbevil Needham, to the PRESIDENT; concerning certain chalky tubulous Concretions, called Malm: With some Microscopical Observations on the Farina of the Red Lily, and of Worms discovered in Smutty Corn.*

S I R,

Read Dec. 22.  
1743.

**T**Hough you desired me, when I had the Satisfaction of waiting upon you at *London* some Weeks ago, to commit to Writing the Observations I had made upon that chalky, alkalizate Substance, which they here apply to Manure, and call *Malm*; yet I purposely deferred complying with my Engagement, till a Review of some Particulars, which I had before observed but slightly, as well as some additional Remarks, which I have since made, should enable me to give in a more satisfactory Account, than I could engage to do at that time—. This Bed of *Malm* lies in a Valley, at the Foot of a long Ridge of chalky Downs; extends from *Winchester*, where it begins, as I have been informed, almost due South, about Four measured Miles; the Breadth not above a Quarter of a Mile; and Depth, at a mean Computation, about Five Foot. It is used in Manure for the same Purposes as Chalk is, but answers the Intent much better. It rises up in one continued Bed, almost to the Surface; where a thin Layer of common Earth but just hides it in all Places, where  
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continual Cultivation has not superinduced a new Soil. Horsetail, and a Species of Wild Trefoil, grows out of it very plentifully, especially the first, which sink their fibrous Roots to a considerable Depth in it: The whole Bed consists of separate detached Pieces, in the Nature of those which you have by you, and of several Dimensions, as those are, mostly long and tubular; some few round, with a small Cavity in the Centre, others quite flat, and some, as it were, excavated on one Side, as if the chalky *Laminae* had extended themselves round a Piece of Bark; but all of them hollowed within, agreeable to their exterior Shape, except very few. I believe it may be asserted, with some Confidence, that this Valley formerly was over-run with Wood, if not wholly, at least for some considerable Length and Breadth: Wild Boars Tusks, which are known by their Length; Stags-horns, and a Flint-knife, which have been found buried to some Depth, in the Malm, seem to evince as much. That Trees of considerable Dimensions have grown in it, is very evident; for, in a Drain, which they have lately made to convey the Water from the main River to the adjacent Meadows, Trees of a vast Size may be seen, at Two or Three Feet Depth, in no small Number, retaining both Shape and Substance in some measure, though much decayed, and not so compact and solid in those Parts, which have been exposed to the Water; these lie out of the Verge of this Bed of Malm, and are not consequently affected by it. Now I am much inclined to think, that these Trees, together with the rest of the Wood, might, by Age, and some Accident combining with it, have fallen; the uppermost might have served to bury  
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the rest, and preserve them from a more immediate Decay, by cutting off their Communication with the exterior Air. Rains, in Process of Time, must have washed off from the adjacent Hills to some certain Distance, and deposited in the neighbouring Valley, but mixt with other heterogeneous Substances, as decayed Wood, Earth, &c. a Quantity of chalky Particles, sufficient to involve, by a continual Addition of new *Laminæ*, Roots, Trunks, Branches, Twigs, and the broken Extremities of Twigs; and tending continually to form Masses resembling the supposed Particulars. I don't now imagine, tho' I once thought so, that these chalky Particles have penetrated the Wood itself, and converted it into its own Substance, in the Nature of ordinary Petrification, except here-and-there some few particular Pieces; but I rather suppose, that the Pieces of Wood have been invested continually by additional *Laminæ*; that the first *Laminæ* must have adapted itself to, and assumed the exterior Shape, whether smooth or knotty, of the inclosed Wood; that the others have proceeded accordingly; that the Extremities have gradually rounded themselves; and that in the Interim, till they were wholly closed, the included Wood has been insensibly attenuated by the passing Moisture, and, Particle by Particle, either intirely, or in Part only, wasted away. And, though it may be objected against this Supposition, that some Pieces are intirely solid, as one of those two large Pieces is which you have by you, and has the Resemblance of White-thorn; yet these are but rarely found, and may very well be supposed to have been a Species of Wood of a more solid and durable Contexture; which might consequently

quently withstand any considerable Attenuation by Water, long enough to permit the chalky Particles to penetrate, fix, and convert it into its own Substance; while other Woods, less tenacious, insensibly waste, and are carried off by the insinuating Liquid, together with the chalky Particles, which they not only could not arrest, but prevented effectually, by a Blending and Interposition of their own Parts, from adhering to each other. — The Reasons, why I apprehend the Process of the Whole to have been in the manner described above, and answerable to my Supposition, are, first, the close Vicinity, I may almost say, Contact of the chalky Hills, upon which this Bed of Malm attends throughout the whole Line, and no farther. Secondly, That this Malm is an Alkalizate Body, in a Degree something inferior to Chalk, as I found upon a Trial, some time ago, by putting equal Portions of each into equal Quantities of double-distilled Vinegar, and measuring the Height of the Fermentation in a long cylindrical Glass. Thirdly, The Reasons, which I gave above, for supposing that this Valley formerly has been over-run with Wood. Fourthly, The Disposal of the several detached Pieces of Malm, which lie in all manner of Directions. Fifthly, The Resemblance which they bear to Roots, Trunks, Branches, Twigs, &c. Sixthly, Some additional Observations, which I have made since my Return from *London*; and those, I think, are almost decisive. In the Hollow of some of the oblong tubular Pieces, which were closed at both Ends, upon breaking them open, I found the Remains of the included Wood attenuated to a mere Thread, which, though extremely tender, I could plainly discover to be Wood, both by

its exterior Appearance, as well as by rubbing in my Hand, in order to try if it would colour it, as decayed Wood, that has imbibed Moisture, will do. Within the *Laminæ* of several, I found a fair Impression of Leaves, in no small Number, and with little Trouble: The Leaves I knew not, as not being very familiar in the Vegetable World, though they appeared to me much to resemble White-thorn-leaves in their Shape, differing in this alone, that the Impression of the fore Part of the Leaf had many small indented Cavities, equal in Size to a Pin's Point, which had been formed by small Protuberances in the Leaf itself. Some Pieces I found quite flat, as if the chalky *Laminæ* had involved a Chip, and the Cavity consequently went off insensibly less towards each Extremity. Others I found, whose Cavities at the Extremities were irregularly shaped, agreeable to the jagged Ends of broken Sticks. Some, in fine, I found excavated on one Side, and convex on the other, as if the *Laminæ* had surrounded a Piece of Bark. These are the chief Observations which I have hitherto made, and which, I hope, are sufficient either to fix the Point where I have placed it, or to enable you to draw better Consequences; a Communication of which, at your Leisure, would please me much more than my own Supposition does, and inance my past Obligations. I cannot say, that I am so thoroughly satisfied with what I have advanced, as to judge it unquestionable; though I am sensible, that the finding of several Masses of Malm, the Structure of which is not reducible to, nor explicable by, this Scheme, is no Objection to it; because, as every one knows the Tendency which chalky Particles have to dispose them-

themselves in *Laminæ*; so these *Laminæ* may involve Bodies of different Kinds, as Parts of the fibrous Roots of Weeds, small Seeds, or the like; may assume their Shapes, increase continually in Bulk, and insensibly raise the Height of the Bed, where they are first formed. Perhaps an Examination of those Pieces of *Malm*, which you have by you, may enable you to form a better Judgment of the Whole.

I beg Leave to add a few Particulars relating to some microscopical Discoveries I have lately made. Upon viewing an Infusion of the *Farina Fœcundans* of the *Lilium rubrum flore reflexo* in common Water, I thought I perceived some Alteration in several of these minute Bodies, as if the outward Shell or Husk had, at a small lateral Orifice, shed a long Train of Globules adhering to each other, and enveloped in a filmy Substance. I, immediately upon this, applied some fresh *Farina*, adapted my Microscope before-hand, with the Tip of my Brush dropped a small Globule of Water upon the Object, and in a few Seconds, I plainly perceived a Rope of exceeding small Globules to be ejaculated with some Force from within, and contorting itself from one Side to the other, throughout the whole Line, during the time of Action, which does not last above a Second or Two, and is to be expected from a few only of these farinaceous Globules. These emitted Particles are very different from the small Globules of Oil, with which the *Farina* of the Lilly abounds; for these diffuse themselves equally on all Sides, while those, on the contrary, go off in one continued Train, like the ejected Pulp of a roasting Apple; and are involved in a filmy Substance, as the Eggs of some

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aquatic Insects arc. I have since chosen the *Farina* of a Pompion to repeat this Experiment upon, which is not of an oily Nature; and, upon account of its Size, may be conveniently observed with the Second Magnifier, where I have the Advantage of a larger Field. I viewed some few of these also out of the many farinaceous Globules, which were within the Area of my Microscope, with the same Success, and yet greater Pleasure: For I could plainly perceive, during the time of Action, by Two or Three lucid Specks in the Centre of the Globule, which continually shifted their Places, an intestine Commotion within the farinaceous Corpuscle, and a stronger Ejaculation of the emitted Particles. Mr. *Chambers* says in his Dictionary, that no Alteration has been observed upon the Infusion of the *Farina* in Water: But this, I apprehend, is owing to the Observer's not being ready with his Microscope, and present at the time of Action, which is almost instantaneous; and, as the Orifice at which these Particles emerge, is but small, it produces no very sensible Alteration in the Globule itself.

Upon opening lately the small black Grains of smutty Wheat, which they here distinguish from blighted Corn, the latter affording nothing but a black Dust, into which the whole Substance of the Ear is converted; I perceived a soft white fibrous Substance, a small Portion of which I placed upon my Object-plate: It seemed to consist wholly of longitudinal Fibres bundled together; and you will be surpris'd, perhaps, that I should say, without any the least Sign of Life or Motion. I dropped a Globule of Water upon it, in order to try if  
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the Parts, when separated, might be viewed more conveniently; when, to my great Surprize, these imaginary Fibres, as it were, instantly separated from each other, took Life, moved irregularly, not with a progressive, but twisting Motion; and continued so to do for the Space of Nine or Ten Hours, when I threw them away. I am satisfied they are a Species of aquatic Animals, and may be denominated Worms, Eels, or Serpents, which they much resemble. This, if considered, will appear to be something very singular: But I have since repeated the Experiment several times, with the same Success, and gratified others with a Sight of it. I hope these few Discoveries will prove as agreeable to you, as they were to him, who begs Leave to subscribe himself,

S I R,

*Your most obedient  
humble Servant,*

Twiford, Aug. 11. 1743.

Turbervill Needham.

E R R A T A.

In N<sup>o</sup> 468. p. 374. l. 22. for *nor ever* read *but*: And ib. l. 23. for *even* read *ever*.

N<sup>o</sup> 470. p. 551. under the Crown, for *E. L.* read *E L.*

N. B. At the End of N<sup>o</sup> 465. after p. 188. Two Leaves were cancelled; and therefore N<sup>o</sup> 466. begins at Page 193. and not with 189.

N. B. The spare *Titles* to N<sup>o</sup> 446. and to N<sup>o</sup> 467. may be cancelled.

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