III. *A Second Letter of Dr* Wallis *to the Publiſher, relating to Mr* Somner's *Treatiſe of* Chartham News: *And, ſome Magnetick Affairs.*

Oxford, Decemb. 30. 1701.

SIR,

SInce my Letter of *Septemb.* 20. 1701, (which, with the Poſt-ſcript, you have thougnt fit to publiſh in your Tranſactions, for *October* 1701.) relating to the Diſcourſe called *Chartham-News*, in your Tranſactions for *July* 1701, (miſ-numbred 271, inſtead of 272,) written by the inquiſitive and learned Antiquary Mr *William Somner*, (to whom, I ſince find, we are beholden for divers other Pieces, beſide thoſe I mentioned in that Letter:) I have ſeen a Letter of Mr *John Luffkin* (in your Tranſactions for *Sept.* 1701.) which informs us, of divers *Bones* (of an Extraordinary bigneſs) found lately (in a Gravel-pit) not far from *Harwich* in *Eſſex*, (much like to thoſe found at *Chart-ham* in *Kent*,) at a great Depth under Ground, which Bone, he thinks, rather to have been the Bone of an *Elephant*, than of an *Hippopotamus*, or other *Marine* Animal.

But, whether the one, or the other, it matters not much as to the preſent purpoſe. For, either way, it will equally prove, thoſe Valleys to have been much Deeper, in former times, than now.

If you could obtain from Mr Alderman *Gray* of *Canterbury*, a ſight of thoſe Pictures (which he hath) of the Bones mentioned by Mr *Somner* (which, I preſume, he would not deny:) or, cauſe new Draughts of them to be

be made, from the Originals, which are ſaid to be now in the Repoſitory of *Greſham* College: It would not be amiſs to give us a Copy of them, in your Tranſactions. Which would help to determine that Point in Queſtion.

I obſerve, that the River in *Eſſex*, and that in *Kent*, (near which the Bones were found,) are (both of them) named the *Stowr*. Which, whether it be a corruption of the Latin *Æſtuarium* (as Mr *Somner* conjectures;) or, of the Britiſh *ys-dwr* (that is, *the Water*,) I will not diſpute.

And, That the Bones were found (in both places) much at the *ſame Depth*, (about 16 or 17 foot, under the ſurface of the Earth;) which therefore may (probably) have been lodged (in both places) much about the ſame Time: And, perhaps, when the Emperor *Claudius* brought his *Elephants* into *Kent* and *Eſſex*; As Mr *Luffkin* intimates out of *Dio Caſſius*.

I obſerve alſo, that thoſe Petrified Bones, in both places, were found in *Gravelly grounds*, (as are thoſe Petrified Shells, and Bodies of Fiſhes, in Gravel Pits and Stone-Quarries, near *Oxford*.) How far the Steams, Fumes, or Fluors of the Earth, which contribute to the formation of Stone or Gravel, may conduce to the Petrifying of theſe Bones, Shells, or other Bodies; I leave to the conſideration of inquiſitive Naturaliſts.

And, Whether the Impregnation of ſuch *Steams*, may not *Swell* ſuch Petrified Bodies, to a larger Proportion than before they had. Like as we obſerve Wood (and other like Materials) in a Moiſt Air, to Swell; by the Diſtention of their Pores, upon the intromiſſion of Moiſt Particles. For I take all Petrifications to be made, either by *Incruſtation*, or *Intromiſſion* of Stony Particles.

And I well remember, that (many years ago) at *Moldaſh* in *Kent*, (not far from *Feverſham*) on ſome High Grounds, and very Stony, (which uſed to be, ſometimes Paſture, and ſometimes Plowed,) I have obſerved di-

vers *Oyſter ſhells* (Petrified, or partly ſo,) much Larger and Thicker, than the ordinary Proportion of Oiſters in thoſe Parts, and very Weighty, which Oiſter-ſhells might have been purpoſely thrown there long before, as being reputed a good Manure for Land; and might have been there Impregnated with like *Halitus*, *Effluvia*, as are the Numerous Stones on thoſe Lands.

I have known the Inhabitants, heretofore, have uſed to cauſe the Stones, in thoſe Lands (becauſe they are very numerous) to be gathered up, and carried off the Lands, by Cart-loads, to make more room for the Graſs to grow. But, of later years, they forbear (I have been told) ſo to do, as thinking the Warmth (or ſomewhat equivalent) of thoſe Stones, is rather an Help than Hinderance, of the Earths Fertility. Of which, I ſhall not adventure to deliver an Opinion; but refer it to further conſideration.

But (to return to what I was ſpeaking of) I ſee not why we may not think, the *Stowr* in *Eſſex*, and the *Stowr* in *Kent*, to have been (both of them) *Æſtuaries* of the *Northern Tyde*; before the Rupture of that *Iſthmus* between *Dover* and *Calais*: (And the like of the River near *Malden*, and other ſmall Creeks on the Coaſt.) Though not ſo Great as thoſe of *Humber* and the *Thames*: (which were then Æſtuaries of the ſame Sea:) as are many others on the Coaſt of *Scotland*.

I ſay, *Before that Rupture*. For, ſince that Rupture, the caſe (as to the *Thames*) is ſomewhat altered. For the Weſtern Tyde (between Us and *France*) which was then ſtopped at this *Iſthmus*; doth now flow-on (through that *Fretum*) beyond the Mouth of the *Thames*, (as high as the *Dogger-ſands*;) which doth therefore ſupply the Æſtuarie of the *Thames*, which was formerly furniſhed from the Northern Sea.

And, theſe ſmaller Æſtuaries might ſooner be ſwarved-up (by what every Tyde lodgeth there,) while, thoſe Greater

Greater Eſtuaries, are but Shortened, and become Narrower, than they had formerly been.

And, as to the *Thames* in particular; It ſeems very Evident, (if we conſider their Situation, and the Nature of their Soil,) that much of the Low Grounds (in *Kent* and *Eſſex*,) on both ſides of the Mouth of the *Thames* (adjacent to the Sea,) had formerly been Sea, (as well as that of *Romney* Marſh.) And when the Mouth of the *Thames* was ſo much wider, no doubt but it Flowed much further than now it doth. And, how far, who can tell?

It may perhaps be objected, that the ſmall Rivers now remaining, in the bottom of theſe Vallies, which may have been ſuppoſed (in former times) to have been Æſtuaries; do now run more Wriggling (with more Turnings and Windings) than do theſe Vallies. But this need not at all to ſeem ſtrange, when as we may daily ſee the ſame, in the Bottom of a Muddy Ditch (or Water-courſe) when the Water is almoſt Drained-off, the Mud yet remaining ſoft: the little Water, yet remaining, will work out of it ſelf (amidſt the Mud) a Wriggling paſſage (according as the Mud will more or leſs give way) much more Crooked than was ſuch Ditch when full of Water. And the like muſt needs happen in the (gradual) Draining of ſuch Æſtuaries, according as the (ſoft) Earth will permit. Which Crookedneſs will continue, when the Banks on both ſides do (by degrees) grow firmer.

Theſe Notions I give ye, as my preſent Thoughts; upon ſuppoſition that there have been ſuch an *Iſthmus* and ſo broken. If in ought I have miſtaken; I am willing to be ſet right, by thoſe who are better acquainted with theſe Seas, than I am: with whom (at this diſtance) I have not the opportunity of diſcourſing, for better information.

As to what I ſay, concerning the Iſle of *Oxney*; I did then purpoſely omit many Circumſtances, which I did not think much material to the point in hand: Chooſing ſo to do, rather than to be in danger of miſrepreſenting (on my preſent Memory) what I had heard long before. That which I thought material to the point in hand, was this, That a low Level, in the Iſle of *Oxney*, (which had for divers years lain under Water,) is now Raiſed by intromitting the Tyde) to a conſiderable height above what it had formerly been; And, that the Channel from thence to *Rye*, is (by the Tydes paſſing in and out become much Wider and Deeper than heretofore. Both) which are Evident, and not to be denyed.

If you would have me ſpeak more particularly to this matter (ſo far as my Memory ſerves me) I take it to be thus.

If we look in the more Antient Maps of *Kent* (older than the year 1640) you will find, that (what we call) the *Iſle of Oxney*, was then but a *Pen-inſula*; being (by a ſmall *Iſthmus* or neck of Land at the North-Eaſt corner of it) continued to the reſt of the Country: And the Tyde from *Rye* to that place (which now flows ſtraight onward on the North ſide of the Iſle) was there ſtopped by that *Iſthmus*, and did wheel about on the South ſide of it: Or rather, the River *Rother*, did (from the North ſide of the Iſland) wheel about by the South ſide (to that Eaſtern corner,) and thence (by the Chanel) to *Rye*.

While things were in this ſtate; divers Mooriſh or Marſh-lands, adjoining to the River *Rother*, were oft in danger (upon great Rains) to be Drowned. But ſo it once happened (by what accident I know not,) that, this Drowned Land, had unexpectedly (in a nights time, or little more) diſcharged itſelf on another Level, ſomewhat lower than itſelf.

Upon

Upon which Indication; it was thought Adviſable (by cutting that *Iſthmus*) to allow thoſe Waters (on the North ſide of the Iſland) a ſtraighter paſſage toward *Rye*; and, to let thoſe Lower Grounds (for ſome time) to lye under Water (paying the Rent of them,) till ſuch time as (by intromitting the Tyde) they might be ſomewhat hightened; and, then, timely recovered.

In order to which; *Commiſſions of Sewers* have ever ſince (from time to time) been iſſued out for that purpoſe; and the work (in good meaſure) effected, though not quite finiſhed.

This I take to be the true ſtate (in brief) of that affair: But, under correction, if (in ſome circumſtances) my Information, or my Memory, may have failed me.

But I think it might be Acceptable, if ſome Gentleman (who is an Inhabitant of thoſe parts, and hath been acquainted with the Proceedings of the *Commiſſioners of Sewers* there (for Fifty or Threeſcore years laſt) would give us a more particular Hiſtory of thoſe Proceedings. Which might be of good uſe for the Direction of others (in like Circumſtances) for obtaining like Advantages as theſe have done; and, avoiding Inconveniences which may have happened.

And the like, if Mr *de la Pryme* (whom you mention, to good purpoſe, in your Tranſactions for *October* 1701) could give us an Account of the Methods uſed by Sir *Cornelius Vermuiden* in his Draining of *Hatfield-Chace*.

I was about to end here. But (while diſcourſing of Maritime Affairs) a Friend of mine would have me ſuggeſt to you, a Conceit of mine concerning the *Mariners Compaſs*, (which being of prodigious Uſe in Navigation, it is not agreed, Where, or by Whom, it was firſt Invented.) I have Gueſſed it to have been an *Engliſh* Invention. Not only for that the *Engliſh* have been long converſant in Navigation: But, even from the Name *Compaſs*. Which is uſed in *England* (I am ſure it was wont

to

to be ſo uſed in *Kent*, when I was a Youth,) for what we otherwiſe call *a Circle*. And I take it to be an old *Engliſh* word in that ſenſe; though now (in imitation of the *French*) the word *Circle* be more common. I know not whether *a Compaſs* (or any word like it) be ſo uſed, for *a Circle*, in any other Language; (but rather *Cercle* in French; *Cerchio* in Italian; *Circulo* in Spaniſh; or ſome other word derived from the Latin *Circulus*.) And from hence, the *Circulus Nauticus* may come to be called the *Mariners Compaſs*, which name, being given it by the firſt Inventers, might give occaſion for like Names in other Languages; (*compas*, *compaſſo*, *zee-kompas*, &c.) I do not deny but that the *Circinus*, or Inſtrument by which we deſcribe *a Circle* (called by us *a pair of Compaſſes*) may have ſome like name in other languages. But, how anciently, I do not know; nor that *a Circle* abſolutely conſider'd (other than this *Circulus nauticus*) is ſo called. Howfar this conjecture, from the *Name*, may give us a Title to the Invention, (till a better do appear;) I ſhall not determine; but only ſuggeſt to Conſideration.

I think it is now agreed on all hands, That (what we call) *the Variation of the Variation*, is an *Engliſh Diſcovery*, (of Mr *Gellibrand*, if I miſtake not, one of Sir *Thomas Greſham*'s Profeſſors at *Greſham* Colledge;) about the the year 1635. That is, That the *Magnetick Needle* (in its Horrizontal Poſition) doth not retain the ſame *Declination* or *Variation* from the true North, (in the ſame place, at all times, but doth (ſucceſſively) *vary* (that Declination) from time to time. Which though it were, about that time, a *New Diſcovery*; is Now admitted as an Undoubted Truth.

And (what we call) *the Dipping Needle*; is admitted alſo to be an *Engliſh Diſcovery*, ſomewhat Elder than that former. (I cannot ſay at preſent, whether by Mr *Blagrave*, or ſome other *Greſhamite*.) That is, That the *Magnetick Needle*, (beſides its Direction toward the North

North, in its Horizontal Poſition,) hath alſo a Direction of Altitude above the Horizon. And (if duly poiſed about an Horrizontal Axis) will point to a determinate degree of Altitude or Elevation above the Horizon, in this or that place reſpectively. Of which Diſcovery (though made ſo long ago,) I do not find that much Uſe hath hitherto been made: that, of its Horizontal Declination, being more ſerviceable.

'Tis alſo an *Engliſh Obſervation*, That not only a *Magnetick Needle*, but any Piece of *Iron* (if kept long in the ſame Poſture,) ſhall of it ſelf contract a *Polarity*. As, for inſtance, an Erect Bar in a Window, (after long continuance in that Poſition, will (if duly poiſed) be found, with its upper end, to point toward the North; (and Southward with the other end.) And, if afterwards it be continued long in a contrary Poſition, it will attain a contrary Polarity.

And Mr *Gilbert*'s Notion, (of the Earths whole Body, being but one Great Magnet; and, leſſer Magnets being ſo many *Terrella's*, ſympathizing with the whole,) is *Engliſh* alſo.

It hath been obſerved alſo, That a Magnetick Needle, if heated Red-hot, will loſe its Polarity: And, if then cooled in a contrary Poſition, will acquire a contrary Polarity.

It hath alſo been obſerved (if I have not been miſ-informed) by our *Engliſh* Mariners, (and, I think, more than once,) that, upon a great Flaſh of *Lightening* (at Sea) their Magnetick Needle hath loſt its former Polarity; and contracted the contrary; (pointing the wrong way, and directing the Mariner to a wrong Courſe.)

And (in General) the Doctrine of *Magnetiſm* hath been more improved by our *Engliſh* Naturaliſts, than (for ought I know) by any other Nation. And, if ſome of our *Greſ-hamites* would take the pains to give us a true Hiſtory of theſe (and the like) improvements; it would

be

be an acceptable ſervice, for the Honour of the *Nation*, and of that *Colledge* in particular, and of the *Royal Society*.

But I muſt beg your Pardon for this long Digreſſion: And ſubſcribe my ſelf, an Humble Servant of the Royal Society; And

Yours to ſerve you,

John Wallis.

IV. *Account of a Book*, viz. Aloyſi Ferdinandi Comit. Marſigli Danubialis operis Prodromus. Ad Regiam Societatem Anglicanam. Fol. 1700.

THE Author of this *Prodromus* hath given ſeveral proofs of his great Abilities in this part of Learning, as in his *Oſſervazioni entorno al Bosforo Tracio, Printed at Rome in 4to.* 1681. In his *Diſſertatione Epiſtolare del Fosforo minerale, o Sia della Pietra illuminabile Bologneſe, at Leipſick in 4to cum fig.* 1698.

The Piece now before us is only a Plan or Model of a great Work, which *Signor Marſigli* is carrying on in ſix large Volumes in Fol. Imperial Paper, which he deſigns to dedicate to the preſent *Emperor of Germany*, by whoſe Favour he was employed many years in the Turkiſh Wars, and continues to receive a noble Salary from the ſame hand.

The firſt Tome is to contain the Geographical Part, illuſtrated with many Charts and actual Surveys of the Banks of the *Danube*, from its riſe to its *exit* into the *Euxine* Sea, deſcribing all along the Channels, Whirlpools,