Philosophical Transactions

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A LETTER.

Written by Dr. John Wallis *to the* Publisher, *concerning the Variety of the* Annual *High-Tydes, as to several places ; with respect to his own* Hypothesis, *deliver'd* N°. 16, *touching the* Flux *and* Reflux *of the Sea.*

SIR, In my *Hypothesis* for Tydes, you may remember, that I cast the *Annual* High-Tydes not on the *Two Æquinoxes*, about the 11. of *March* and *September* ; nor yet on the *Apogæum* and *Pegæum* of the *Sun*, about the middle of *June* and *December* ; but (as proceeding from a Complication of those two Causes) on a Midle time between the *Perigæum* and the *two Æquinoxes*, (like as is the greatest Inequality of the *Natural daies*, proceeding from a Complication of the same Causes.) And particularly, for the Coast of *Kent* (and consequently the Rivers of *Thames* and *Medway*) about the beginning of *November* and *February :* which agrees with Observations on those *Coasts*, and particularly with that of yours of *Febr.* 5. this year.

The last year, when I was present in the *R. Society*, I remember, an account was brought us of the *Annual* High-Tydes on the *Severn*, and at *Chepstow-bridge*, to be about the *beginning* of *March*, and the *end* of *September*. Which though they agree not with the particular times on the coast of *Kent*, yet in the general they agree thus far, That the one is about as much *before* the *one* Æquinox, as the other is *after* the *other* Æquinox. You now acquaint me with High-Tides about *February* 22. about the coast of *Plimouth*, which is later than that of the coast of *Kent*, but sooner than that on the *Severn*. And I doubt not but in other parts of the world will be found other Varieties.

The reasons of these Varieties are (as I have formerly signified) to be attributed to the particular Position of those parts, rather than to the *general* Hypothesis. Of which this, in brief, may serve for some account at present. The *General* Hypothesis of the Earths *diurnal* Motion from West to East, would cast *that* of the Waters, not following so fast, from East to West; which causeth the constant Current *within* the *Tropicks*, where the Circles are greatest, west-ward from the Coast of

Africa

Africa to that of *America*, (which is also the Cause of the constant *Eastern Brize* blowing in those parts.) But the Sea thus beating on the Coast of *America*, is cast back as with an *Eddy* on either hand, and consequently returns from the *American* shore East-ward towards the Coast of *Europe*; where, the Parallel Circles to the *Æquator* being less, and consequently the *Diurnal* Motion slower, doth not cast the waters so strongly West-wards, as between the *Tropicks*, and so not strong enough to overcome the *Eddy*, which it meets with from the other Motion, which gives the Sea a North-Easterly Motion (on these Coasts) as to its usuall course. The Current therefore of our Seas being *North-Easterly*, we are next to consider, at what times it runs more to the *North*, and at what more to the *East*. When it runs most *Northerly*, it runs up the *Irish* Sea, and so up the *Severn* : When most *Easterly*, it runs streight up the *Channel*, and so to the Coast of *Kent* : When *between* these, it beats against *Devonshire* and *Cornwall*, and those parts. We are therefore to consider (as to the *Annuall* periods) that the *Annuall* Motion of the Earth in the *Zodiack*, and the *Diurnal* in the *Æquator*, are not precisely in the same direction, but make an *Angle* of $23\frac{1}{2}$ deg. at the *Æquinoxes* ; but run, as it were, parallel at the *Solstices* : And as they be nearer, or farther from these points, so is the Inclination varied. Which several directions of Motion, do cause the *Compound* Motion of both to vary from the *East* and *West* more or less, according as the *Sun*'s Position is farther or nearer the *Solstices*. And therefore, *nearer* to the *Æquinoxes*, this Inclination doth cast the Constant current of our Seas more to the *North* and *South*; and *further* from it, more to the *East* and *West*. Which is the reason why the Current up the *Irish* Sea is nearer to the *Æquinoxes* (at the beginning of *March* and end of *September*) and up the Channel or Narrow Seas, farther from it (at the beginning of *February* and of *November* :) and against the Coasts of *Devonshire* and thereabout, at some intermediate time. And thus much I thought fit to signifie upon this occasion. Dat. *Oxford* the 7. of *March An.* $166\frac{7}{8}$.

A a a a   *Anoher*

Another Letter

Written by the same Hand, concerning some Miftakes, to be found in a Book lately publifh'd under the Title of SPECIMINA MATHEMATICA *Francifci Du Laurens*, efpeci lly touching a certain *Probleme*, affirm'd to have been propofed by *Dr. Wallis*, to the Mathematicians of all *Europe*, to folve it.

ACcepi *(V. C.) ante quatriduum, quem mihi mififti* Franfifci Du Laurens *Tractatum, cui titulus*, SPECIMINA MATHEMATICA, *&c. eumq; mox evolvi, quo Tibi pofsim (quod petis) quid de eo fentiam, paucis oftendere.* Videtur autem plus fronte polliceri, quam opere abfolvit. Prioris *libri pars magna, ex* Oughtredi *meifque fcriptis (utut neutrius ibi meminerit) videtur defumpta, idque tam manifefte, ut non modo peculiares loquendi formulas, fed & ipfa fymbola Notafque pafsim retineat.* Pofterioris, *non parum ex* Vieta, Schotenio, *aliifque ab eo editis (quorum & fubinde meminit) defumptum. Occurrunt inibi aliqua parum fana, &, minime accurata multo plura. Quænam autem fint illa* Genuina Principia, Veræque Geometriæ Elementa, hucufque nondum tradita, *quæ Titulus pollicetur, non reperio : Longeque diverfimode Hic & Ego fentimus, dum* pag. 141. Neminem effe, *opinatur*, qui hæc fua non præferat ingenti Euclideorum Elementorum Multitudini.

In calce, manifeftam mihi facit injuriam, ea de me affirmans, quæ vera utique non funt. Appendicem quippe fubjungit, cui fpeciofum hunc fecit Titulum, Solutio Problematis, à *D. Wallifio* totius *Europæ* Mathematicis propofiti, fed prius ad generale revocati, A. MDCLIII. eodem tempore, quo propofitum erat.

Poft Titulum, hæc fequuntur. Problema D. Wallifii, Datis Ellypfeos * maximis Diametris, tum puncto in tranfverfa ejus Diametro affignato, reperire in numeris fegmenta lineæ
Pro, Ellipfeos, errore Typographi, fine dubio intra Ellypfim terminatæ, & per datum punctum tranfeuntis, atque datum angulum cum dicta diametro facientis.

Verum quia propofitæ Quæftionis folutio æque facilis eft in numeris, ac in line's (ut poftea apparebit) melius facturum me judicavi, fi prius demonftrationem Analyticam hic afferrem, ex qua tum Numerica, tum Geometrica fequeretur, ad problematis folutionem pertinens, effectio. Atque ut hæc folutio cum fænore detur, fpeciale D. *Wallifii* problema ad generale fic revoco.

(Poftque hanc Præfationem Problema fequitur tanquam fuis verbis expofitum cum fua ejufdem folutione per feptem continuas paginas.)
Ad quæ hæc dicenda nunc habeo.

1. *Totius* Europæ *Mathematicus. ob rem hujufmodi, in arenam vocare, jactantiæ genus eft, cujus ego hact nus reus non fui, (credo) nec futurus.*
2. *Si libuiffet (oftentandi gratia) fic feciffe, legiffem certe quod vel majoris effet difficultatis, vel majoris momenti, Problema, quam hoc effe videtur,*
utpote

utpote quod mediocris Algebrista, primo intuitu, semihora spacio facile sol-
veret.

3. *Nec sane hoc Problema, nec quod huic aquipollcat, unquam Ego (quod*
memini) ulli mortalium, nedum totius Europæ Mathematicis, *proposui, (ne-*
scio an ulli unquam propositurus:) nec quicquam hujus, quod de me persuaderi
sibi passus est, verum est.

4. *Erat quidem aliquando Problema huic non prorsus absimile* mihi *pro-*
positum (cujus & solutionem protinus expediebam) sed à me *propositum ne-*
mini, quod quatenus me spectare possit, videas in Epistola *quadam mea, ad*
Nobiliss. Vice-Comitem Brounker *data Maij* 11. 1658. *(quem annum in-*
nuit D. Dulaurens) *eoque anno in meo* Commercio Epistolico p. 171. *typis*
vulgata, in hæc verba ;

Sub initium Februarii jam proxime elapsi, amicorum non-nemo, cui for-
te occurrebam sero vesperi, quæstionem sequentem mihi porrexit in scriptis,
quam jam nuperrime intelligo typis vulgatam esse cum hac Epigraphe ;
" Spectatissimos viros, Mathefeos Professores, & alios præclaros in Anglia
" Mathematicos, ut Problema solvere dignentur, *Jean de Montfort* maxi-
" me desiderat.

" Extremis Ellipseos Diametris, distantiâ centri ab aliquo puncto in Axi
" transverso, ubi linea eundem secet sub angulo dato, in numeris datis ;
" segmenta ejusdem lineæ (si opus est) productæ,& intra transversum Axem
" & Ellipsin terminata, in numeris invenire.

Hanc Ego quæstionem, suam ratus (neque enim vel innuebat Ille, vel
Ego tum sciscitabar cujus erat,) paulo adhuc universalius expositam, sub ea
fere, quæ subest, forma (neque enim ipsissima verba memini) postero ma-
ne solvebam : Nec eram de illa ultra solicitus (quippe quæ nec magnæ vi-
debatur difficultatis, nec momenti,) quam etiam, ut nunc audio, varii
variis modis solvebant, ut ut eorum solutiones nondum viderim.

(Ac deinde sequitur mea istius Problematis, *universalius adhuc propositi,*
solutio, cum annexa demonstratione, brevis & perspicua ; saltem si excipias
præli sphalmata ; quæ tamen qui hæc intelligit, facile restituet.)

Atque hoc omne illud est, quod Ego de hoc Problemate *fecerim, quo id ul-*
latenus ad me spectare videatur. Num autem hoc sit (quod vult D. Dulau-
rens) Problema *illud totius* Europæ Mathematicis, *a Me* propositum *esse ;*
Ego cuilibet judicandum permitto, qui Latina intelligit, utcunque fuerit Ma-
thefeos ignarus.

Qui illud mihi monstrabat Problema (scriptum primò, postea typis impressum) est
Dr. Richardus Rawlison. *Quis autem fuerit ille* Jean de Montfort *qui proposuit, ignoro.*
Hujus autem impressa Chartula Londini *tum temporis satis p.obabat, pluribusque Ma-*
thefeos peritis proposita, cca Problema *exhibens ex* Galia *delatam, quod & ex nostris*
aliquot Londini *solvebant : Quorum unus (Dr.* Christoph. *W ren, tunc quidem in* Col-
legio Greshamensi London., *nunc,* Oxonii *Astronomiæ Professor) solutionem suam typis*
editam publici juris fecit : simulque (in eadem charta) reposuit Problema *aliud,*
quod ipse præstantissimis in Gallia *Mathematicis (uti illud inde nobis in* Anglia) *sol-*
vendum proposuit; quod illorum nemo (quod sciam) hactenus solutam dedit. Sua verò
istius solutio extat in meo de Cycloide *Tractatu. p. 72. 73.*

Cum itaque sint hæc omnia (quod dicitur) publica & notoria, non possum non mirari,
quo animo D. Dulaurens *palàm & in publicum edere rem tam ab omni veritate aliena.*