



1752

Part of a Letter from Mr. Professor Euler to the Reverend Mr. Wetstein, Chaplain to his Royal Highness the Prince, concerning the Contraction of the Orbits of the Planets

Leonhard Euler

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Step we take in investigating the Operation of Nature.

The electrifying a Man in polished Armour, with several Globes, must exhibit a very beautiful Phænomenon, by the Electricity running off from several of the Points; but I cannot but say, it must fall greatly short of the general Radiation promised and expected from the preceding Accounts.

This, Gentlemen, is the Information I have been able to procure, concerning these two Experiments, of which we have heard so much, and which I apprehended would not be unacceptable to be laid before you. I am glad of every Opportunity of testifying the Regard, wherewith I am

Your most Obedient

March 1. 1749.

Humble Servant,

W. WATSON.

XVI. *Part of a Letter from Mr. Professor Euler to the Reverend Mr. Wetstein, Chaplain to his Royal Highness the Prince, concerning the Contraction of the Orbits of the Planets. Translated from the French by T. S. M. D. and F. R. S.*

Berlin, Dec. 20. 1749.

Read March 1. 1749. **Y**OU have done me much Honour in communicating an Extract of my last Letter* to the illustrious *Royal Society*, No-

* See *Philos. Transf.* No. 493. p. 203.

ember 2. 1749. I am still thoroughly convinced of the Truth of what I advanced therein, that the Orbs of the Planets continue to be contracted, and consequently their periodical Times grow shorter. But in order to put this Fact out of Doubt, we ought to be furnished with good ancient Observations, and also to be very sure of the Time elapsed, since those Observations, to this Day: Which we are not, with regard to the Observations that *Ptolemy* has left us. For Chronologists, in fixing the Moments of those Observations, run into a Mistake, by supposing the Sun's mean Motion to be known; which ought rather itself to be determined by these same Observations. Now, if we reduce the Days marked by *Ptolemy* to the *Julian* Kalendar, we run the Risque of committing an Error of a Day or two, in the whole Number of Days elapsed, from that to our Time; because the Course of the *Julian* Years, according to which every fourth ought to have been *Bissextile*, has been frequently interrupted by the *Pontifices*; of which we find some sure Marks in *Censorinus* and *Dion Cassius*. Wherefore it might well happen, since the Times mark'd by *Ptolemy*, that there has really been a Day or two more than we reckon, and consequently, that *Ptolemy's* Equinoxes, ought to be put a Day or two back; which would lengthen the Years of those Times. I was in hopes, that the *Arabian* Observations would not be liable to this Inconvenience; because the *Julian* Kalendar has not been interrupted for these last past twelve hundred Years. The late Dr. *Halley* had also remark'd, that the Revolutions of the Moon are quicker at present than they were

in the Time of the ancient *Chaldeans*, who have left us some Observations of Eclipses. But as we measure the Length of Years by the Number of Days, and Parts of a Day, which are contained in each of them; it is a new Question, Whether the Days, or the Revolutions of the Earth round its Axis, have always been of the same Length. This is unanimously supposed, without our being able to produce the least Proof of it: Nor indeed do I see, how it could be possible to perceive such an Inequality, in case it had really existed. At present we measure the Duration of a Day by the Number of Oscillations, which a Pendulum of a given Length makes in this Space of Time: But the Ancients were not acquainted with these Experiments, whereby we might have been informed, whether a Pendulum of the same Length made as many Vibrations in a Day formerly as now. But even tho' the Ancients had actually made such Experiments, we could draw no Inferences from them, without supposing, that Gravity, on which the Time of an Oscillation depends, has always been of the same Force: But who will ever be in a Condition to prove this Invariability in Gravity? Thus, even supposing that the Days had suffered considerable Changes; and that Gravity had been altered suitably thereto, so that the same Pendulum had always completed the same Number of Vibrations in a Day; it would nevertheless be still impossible for us to perceive this Inequality, were it ever so great. And yet I have some Reasons, deduced from *Jupiter's* Action on the Earth, to think, that the Earth's Revolution round its Axis continually becomes more and more rapid. For the Force of

Jupiter

Jupiter so accelerates the Earth's Motion in its Orbit round the Sun, that the Diminution of the Years would be too sensible, if the diurnal Motion had not been accelerated nearly in the same Proportion. Wherefore, since we hardly at all remark this considerable Diminution in the Years, from thence I conclude, that the Days suffer much the same Diminution; so that the same Number will answer nearly to a Year.

XVII. *A Catalogue of the fifty Plants from Chelsea Garden, presented to the Royal Society, by the worshipful Company of Apothecaries for the Year 1748, pursuant to the Direction of Sir Hans Sloane, Bart. Med. Reg. et Societat. Reg. nuper Præs. by John Wilmer, M. D. Clariss. Societat. Pharmaceut. Lond. Soc. Hort. Chelsean. Præfect. et Prælect. Botan.*

- Read March 8. 1301 **A** Butilon, Lavateræ flore, fructu
1749 cristato. *Hort. Elt.*
- 1302 *Acetosa rotundifolia repens Eboracensis, folio in medio deliquium patiente.*
- 1303 *Agrimonoïdes Column. Ec. 1. 145.*
- 1304 *Alyssum fruticosum incanum. Turnfort.*
- 1305 *Ananthocyclus, coronopi folio. Vail.*
- 1306 *Anonis purpurea, spicata, alopecuroïdes major Boerb.*