

(2005)

An Account of some Books.

I. *MECHANICA, sive De MOTU Tractatus Geometricus; PARS SECUNDA; in qua, De CENTRO GRAVITATIS Ejusque CALCULO: Auth. Johanne Wallis, SS. Th. D. Geometriæ Profess. Savigliano in Celeberr. Acad. Oxoniensi; Regalis Societ. Sodali, & Regiæ Majestati à Sacris. Londini, Impensis Mosis Pitt in Vico vocato Little Britain, 1670. in 4°.*

IN this *second Part* (amongst many other things, in this and the foregoing Part, *Demonstrated*, which are wont to be *Postulated*, but should be Proved;) the Excellent Author *demonstrates* the Center of Gravity *to be* (which hath not been done formerly, that we know of, by any;) and that, as to all *Ponderation*, the *whole weight* may justly be reputed There *to be*, where is its *Center of Gravity*; and so much to be mov'd: with other general *Affections* thereof. He shews also, from General Principles, How, by Calculation, to determine, as well the *Magnitude*, as the *Center of Gravity*, in innumerable sorts of *Lines*, *Surfaces*, and *Solids*, (and the *Aggregates* or *Differences* of such.) As, in all *Right-lined Figures* whatsoever; in all *Solids bounded by Plains*; in *Cones* also and *Cylinders*: And in *Curve-lined Figures* innumerable; not only (with *Archimedes*) in the *Parabolar Figure*, but likewise in all *Parabolooids* whatever (and the *parts* of such;) together with their *Ungular Solids* insisting on them; and their *Conooids* or other Solids made by the *Conversion* (perfect, or imperfect,) of those Plains (or their Parts) about any *Axe* in the same Plain assigned; and the *Center of Gravity* of all these *Solids*. And the like also in other Figures *Reciprocal* to these *Parabolooids*, infinitely continued between such Curves and their *Asymptotes*: Shewing, which of those Figures (*infinitely Long*) are of *Finit* magnitude, (and what that is;) which, of *Infinit*: and, which of them have, which have not, *Centers of Gravity*; and, in those which have, how to Assign them: And the like of the *Unguls* appertaining to them,

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them, and the *Solids* made by their *Conversion* about an *Axe* : In many of which, the Magnitude of the *Ungle* or *Solid* is shew'd to be but *Finit*, where the Magnitude of the respective *Plain* (on which they stand, or by whose conversion they be made) is *Infinit*: and (contrary-wise) in Others, the Magnitude of the *Ungle* or *Solid* to be *Infinit*, where that of the *Plain* is but *Finit*.

He gives also *General Methods*, How, from the *Center of Gravity* of a *Plain* (or of *Lines* described in a *Plain*) whose Magnitude is also known; to find the Magnitude of the *Ungles*, and *Solids* made by *Conversion* thereof about assigned *Axes*; and, from *These*, to find *That* : with other like *Processes*, from *Plains* to *Solids*, and so onward. He shews not only (with *Archimedes*) the *Solidity* and *Surface* of the *Sphere* and *Cylinder*; but of their *Segments* and *Portions*, cut off by a *Plain*, or any number of *Plains*, in what manner soever; and the *Center of Gravity* of the same: most of which (as to the *Solidity* and *Center of Gravity*) is in like manner applicable to the *Spheroid*; useful in *Guaging* Vessels, and otherwise. He shews particularly, that the *Scalene Cylindrick Surface*, is to the *Erect*, as the *Perimeter of an Ellipse* to that of a *Circle*.

He shews the *Center of Gravity* of all *Arches* of *Circles*, with their *Superficial Unguls*, and the *Surfaces* made by the *Conversion* of such *Arches* about assigned *Axes*. And the like, of the *Sectors*, *Segments*, and other *Portions of Circles*, (which are applicable also to those of *Ellipses*;) with the *Unguls*, and *Solids* made by such *Conversion*; and their *Centers of Gravity*. He doth the like in the *Cycloid*, shewing the length of the *Curve*, and of the *Portions* thereof, with their *Centers of Gravity*, and their several *Superficial Unguls*, and *Surfaces*, made by *Conversion*, and the *Centers of Gravity* of all these. As likewise the Magnitude of the *Plain*, as well of the *Primary Cycloid*, as of the *Secondary*, whether *Contracted* or *Protracted*; with their several *Tangents*: and of the *Segments* and *Portions* of those *Plains*; with their several *Unguls*, and *Solids* made by their *Conversion* (*Perfect*, or *Imperfect*,) and the *Centers of Gravity* of all these: Where-

in he prosecutes at large, what was deliver d in his Book *De Cycloide*, formerly publish't; continuing his *Calculations* (which were there begun) to a great number of Particular Cases, which (for reasons then assign'd) were there omitted, and which have not by any hitherto been computed.

He doth the like, in the *Figure of Right-Sines*, in the *Figure of Versed Sines*; and of *Arches*; assign'ing the *Magnitude* of those *Figures*, and of their *Segments* and *Portions*; with their *Unguls*, and *Solids* by *Conversion*; and the *Centers of Gravity* of all these. Whence (amongst many other things) are deduced the *sums* of the *Right-Sines*, *Versed Sines*, and *Arches*, appertaining to any assign'd *Portion* of a *Circle*; and the *Sums* of their *Squares*, *Cubes*, or other *Powers*:

He doth the like in *Spiral Figures*, as well that of *Archimedes*, as an infinit number of *other Spirals*; shewing the *Magnitude* of the several *Parts* or *Sectors*; with their *Centers of Gravity*; (all applicable also to their respective *Scalar Solids*;) and the respective *Paraboloids* with which they *Symbolize*, and by whose *Convolution* they are made; their *Tangents* also, with much more concerning them. He prosecutes the same in part, but more briefly, in the *Cissoeid*, and *Conchoeid*, and the *Figure of Tangents*; as to the *Magnitude* of those *Figures*, and the *Parts* thereof; their *Unguls*, *Solids*, and *Centers of Gravity*. He shews particularly as to the *Cissoeid*, how it doth *symbolize* with the *Cycloeid*, the parts of the one figure being equal to the respective parts of the other: And, as to the *Conchoeid*, That its *Plain* is in *Magnitude* (as well as *Longitude*) *Infinite*; yet a *Solid* made by its *Conversion*, equal to a *finite Cylinder*.

He shews also the *Quadrature* of the *Hyperbola*, and *parts* thereof; their *Unguls*, *Solids*, and *Centers of Gravity*: As also, an *Hyperbotical Solid*, made by the *Conversion* of a *Streight Line* about an *Axis* not in the same *Plain*; shewing the *Magnitude* of that *Solid*, and of its *Parts*, and their *Centers of Gravity*; and the several *Sections* of that *Solid* made by *Plains* in any assign'd position; being *Parabola's*, *Hyperbola's*, *Ellipses*, *Circles*, *Parallelograms*, and *Triangles*; according to the different *Positions* of the *Cutting Plains*: With
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many other particulars, too many to be here rehearsed.

In short, you have here well nigh All or the Greatest part of the most abstruse and intricate Speculations, as well of the Antient as the Moderns Geometers, hitherto discover'd, (with many new Additional;) briefly and clearly deduced from Peculiar Principles and Methods of his own; (especially those of his *Arithmetica Infinitorum*;) which are also in like manner applicable to Innumerable other Cases, as occasion shall require. And his Method (in this and the former part) deducing all from the first principles, doth scarce depend upon any other Treatises as necessary to the understanding; save only the knowledge of some very ordinary things in common Geometry, and some few Propositions out of his own *Arithmetick of Infinites*, with some skill in the practice of *Numerous* and *Specious* Arithmetick.

II. *EXERCITATIONES MECHANICÆ*, Alexandri Marchetti. *Pisæ*, 1669. in 4°. To be found at Mr. Starky's near Temple Bar.

THis Author declareth, that though many Eminent men have already treated of the Subject of this his Book, as *Aristotle*, *Archimedes*, *Lucas Valerius*, *Guldinus*, *Galileus* and others; yet hath he not been deterred from writing of the same Argument, esteeming, that he hath handled it more largely, more distinctly, and more clearly and easily: which, how he does actually perform, we leave to Mathematical Mechanicians to Judge.

III. *The Natural History of NITER, or, a Philosophical Discourse of the Nature, Generation, Place, and Artificial Extraction of NITER, with its Vertues and Uses*, by WILLIAM CLARKE. London, 1670. in 8°.

The Author of this Tract, esteeming, that most, who have known this Mineral Body, seem to have had but a *partial* knowledge of it, undertaketh to deliver here its *Compleat* History; And therefore

First, describeth *Niter* by its properties, *Figure* (like that of *Needles*,) *Taste* (salt, sharp and cooling,) and *Inflammability*,

mability, having this peculiar, that it burns *downwards*.

Secondly, giveth some Chymical Analysis of *Niter*, both by *calcination*, in which he saith that it burns almost all away if refined; and by *Destillation in a Retort*, which maketh it yield a little Flegme, then a Spirit, first in the form of a white, and soon after in that of a red vapour, corrosive and fetid, leaving a *Caput mortuum* behind. Where the Author giveth us his opinion, that this Body being thus analysed is rendered incapable of Redintegration; (concerning which the Reader may consult that Noble and Experienced Philosopher Mr. *Boyle*, in his *Essay* containing an Experiment with some Considerations touching the differing parts and Redintegration of *Salt-petre*; Printed 1661.)

Thirdly, examines the Question; whether *this* *Niter* is the same with the *Niter* of the *Antients*; and resolveth it in the *Affirmative*.

Fourthly, enquireth into the Generation and Place of *Niter*; Where he discusseth that *Inquiry*, whether in Houses, or Walls, Earthen-floors, &c. *Niter* be *generated*, or *separated* and drawn from the Air by the heat and dryness of the Places; observing, that the dryer the places, where *Niter* is, are kept, there is more *Niter*. Whereupon he discourseth largely of the *Niter* in the *Air*, and making it not only a *Meteor* it self, and particularly a cause of lightning and thunder, but a *general* cause of *Meteors*, joyntly with *Sulphur*.

Fifthly, he declareth the *Use* of *Niter* to *Animals* and *Vegetables*; affirming *first*, that the life of *Animals*, being a burning *Sulphur*, is, as't were, kindled by the *Nitrous Air* received into the Lungs and communicated to the Heart; and adding that as without Air, which is the life of Fire, the innate animal-heat would extinguish; so that Air, being *Nitrous*, not only inflames it, but from its Coolness so allays the same, that it doth not too much prey upon our Radical moisture, and keeps our life in its due Fermentation; and moreover, by its dissolving nature renders the humors of the Body more fluid, and so more apt to perform their Circular motions, for the entertaining of life. *Secondly*, that without this *Nitrosity* the *Sulphur* of Seeds would lye dormant in the

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the Earth, be scorched up and wither'd, nor pass into the pores of Plants:

Sixthly, he delivers the Artificial manner of Extracting and Refining of Niter; after he had first inform'd his Reader, How it may be known, whether a place be impregnated with Niter or no?

Seventhly, he giveth the *Vertues and Uses* of Niter; *first* in *Physick*; where he affirms it to be not only *Cooling*, at least by removing hot humors, whereby the Body may become cooler; but also *Resolving, Purgative* and *Diuretical*: Upon the score of all which properties 'tis used not only in *Burning Feavers*, in the form of the *Lapis prunella*, (the preparation of which he describeth;) but also in those Diseases, in which are to be discharged by *siege* and *Urine*, hot, sharp, choleric and obstructive humors. Having dispatched this Medicinal use, he proceeds *next* to the use of Niter in *Chymistry*; where he observeth that by it may be made a pleasant and cooling Acid; or a hot and burning Corrosive: that sometimes it revives the Vomitive and Purgative vertue of *Antimony*, sometimes it kills the Vomitive, and reviveth only the Purgative, and sometimes it destroyes both, and quickens neither the Diuretick or Diaphoretick, &c. besides that it Calcineth, Sublimeth and Dissolveth *Minerals* and *Metals*. *Thirdly*, he adds the Use of Niter in *Artillery*; where he discourses of the reason of the Composition and Force of *Gun-powder*, together with the Use and Office of every Ingredient of the same. *Fourthly* and lastly, he sets down the Uses of Niter for *Refiners, Dyers* and *Cooks*.

ADVERTISEMENT.

THe Author of the Discourse concerning *Mineral waters*, in Numb. 60. beginning p. 1074, desireth, that these lines may be inserted p. 1081. after the word *Dysenteries*, l. 19. *viz.* Neither do I think this water any thing the worse because of the *Alome*, but much the better for it in *Hypochondriack* maladies: For by its adstringency it defends the *Tone* of the *Liver* and the other natural parts, which otherwise are apt to be debilitated by purging and penetrating medicines; it being, according to *Galen's* advice, ever necessary to intermix some Adstringents with *Hepatick remedies*; in *Art. Med.* c. 95. to which agree very good writers, antient and modern.

Errat. p. 1096. l. 2. r. *if he hit.*

L O N D O N,

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