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(b. Aberdeen, Scotland, 3 June 1659; d. Maidenhead, Berkshire, England, 10 October 1708)

mathematics, astronomy, optics.

The eldest surviving son of the laird (also called David) of Kinnairdie in Banffshire, and nephew of James Gregory, David graduated from Marischal College, Aberdeen, and went on to Edinburgh University, where in October 1683—a month before taking his M. A.—he was elected to the chair of mathematics, vacant since his uncle's death in 1675, delivering an inaugural lecture “De analyseos geometricae progressu et incrementis.” Staunchly supported by Archibald Pitcairne, an old friend from undergraduate days, he sought conscientiously in his professorial lectures (on elementary optics, astronomy, and mechanics) to impart to his students basic insights into the “new” science of Descartes, [John Wallis](#) and, after 1687 (if we are to believe [William Whiston](#)) Isaac Newton. Attempts by Gregory in 1684 and 1687 to start a correspondence with Newton failed, but an indirect link with Cambridge was formed in 1685 after a visit to Newton by a mutual acquaintance, [John Craig](#)(e).

Increasingly under attack by his fellow professors at Edinburgh for his radical views, Gregory jeopardized his position in 1690 by refusing to swear the required oath of loyalty to the English throne before a visiting parliamentary commission. The retirement of Edward Bernard from the Savilian professorship of astronomy at Oxford in 1691 offered an outlet. Backed by Newton's recommendation of him as “very well skilled in Analysis & Geometry both new & old. ... understands Astronomy very well ... & is respected the greatest Mathematician in Scotland,” and with Flamsteed's support, Gregory was elected to “the chair in face of strong opposition from [Edmond Halley](#) (later, after Wallis' death in 1703, to become his companion professor of geometry). In November 1692 he was elected fellow of the [Royal Society](#), but he never took an active part in its affairs except for submitting several papers to its *Transactions*.

During his early years at Oxford, Gregory traveled widely to keep abreast of current developments in science, visiting Johann Hudde and Christian Huygens in Holland in May-June 1693 and Newton at Cambridge in May 1694 and on numerous later occasions in London. His extant Savilian lectures (from 1692) are for the most part a rehash of his Edinburgh *lections*, suitably updated; as he told [Samuel Pepys](#), he was concerned to see that his students “should study some Euclid, trigonometry, mechanics, catoptrics and dioptrics, ... the theory of planets and navigation.” His appointment in 1699 as mathematical tutor to the young duke of Gloucester was thwarted by the latter's sudden death; his relations with Flamsteed, a competitor for the post, thereafter rapidly deteriorated, particularly after he joined Newton's committee set up to publish Flamsteed's *Historia coelestis*, Gregory's election in 1705 to the Royal College of Physicians at Edinburgh was purely honorary, but he took a more active role in the Act of Union between England and Scotland in 1707. He married in 1695 and was en route to London to visit his children, sick with smallpox, when he died.

No definitive assessment of Gregory's scientific achievement is possible until a detailed examination of his extant memoranda is made. Doubtless this will reinforce the impression gained from his printed work that a modicum of talent, effectively lacking originality, was stretched a long way. His earliest publication, *Exercitatio geometrica de dimensione figurarum* (1684), was a presentation of a number of manuscript *adversaria* bequeathed to him by his uncle James, interlarded with worked examples from RenéFrançois de Sluse's *Miscellanea*, Nicolaus Mercator's *Logarithmotechnia*, and James Gregory's *Geometriae pars universalis* and *Exercitationes* (all 1668) and a citation of Newton's series for the general circle zone communicated to [John Collins](#) in 1670 and passed forthwith to Scotland. Ignorant of the general binomial theorem which had been found independently by Newton and his uncle James, Gregory resorted to a brute-force development of the series expansion of the binomial square root by which he accomplished the “dimension” (quadrature and rectification) of various conics, conchoids, the cissoid, the Slusian pearl, and other algebraic curves, while the subtleties of his uncle's use of a Taylor expansion to invert Kepler's equation as an infinite series (first published here, but without any proof) clearly passed him by.

Gregory's *Treatise of Practical Geometry* and *Catoptricae et dioptricae sphaericae elementa* (1695) are printed versions of elementary lectures given at Edinburgh in the 1680's; the latter is often singled out for its appended remark (p. 98) suggesting, on the analogy of the crystalline and vitreous humours “in the Fabrick of the Eye,” that an achromatic compound lens might be formed by combining simple lenses of different media, but this insight he might well have had from Newton. His thick folio text on foundations of astronomy, *Astronomiae...elementa* (1702) is a well-documented but unimaginative attempt to graft the gravitational synthesis propounded in the first book and especially the third book of Newton's *Principia* onto the findings of traditional astronomy. While respected as a source book it is now chiefly remembered for the remarks by Newton on the *prisca sapientia* of the ancients and their “knowledge” of the inverse-square law of universal gravitation and for the Latin version of Newton's short paper on lunar theory which it reproduces.

Gregory's first collected edition, following Bernard's wish, of *Euclidis quae supersunt omnia* (1703) is a competent gathering of the mathematical and physical writings attributed to Euclid of Alexandria (*Elements, Data, Introductio harmonica, Sectio canonis, Phaenomena, Optica, Catoptrica, Dioptrica, Divisions of figures, De levi et ponderoso*), but the one exciting passage in the preface (on the *Data* especially 86) again stems from Newton. Of Gregory's articles in the *Philosophical Transactions of the Royal Society* that (1693) on Vincenzo Viviani's "testudo veliformis quadrabilis" is an elegant solution of a tricky but essentially elementary problem; that on the catenary (1697) erroneously derives the correct differential equation of the freely hanging uniform chain (he failed to see the necessity of compounding the tensions at both ends of the curve) and therefrom draws its logarithmic construction and main properties; that (1704) on the Cassini oval or cassinoid briefly sketches its main forms, determining, since it is not convex when its eccentricity is greater than its inacceptability as a planetary orbit. The poverty of Gregory's astronomical observations merits Flamsteed's jibe of "closet astronomer".

In retrospect, Gregory's true role in the development of seventeenth-century science is not that of original innovator but that of custodian of certain precious papers and verbal communications passed to him by his uncle James and, as privileged information, by Newton.

BIBLIOGRAPHY

I. Original Works. The brief "Index Chartarum," now in Edinburgh University Library, made by Gregory's son David after his father's death, outlines the content of some 400 MSS and memoranda on mathematical, physical, and astronomical topics gathered in four "M.S." (A–D), of which D is "plerumque Jacobi Gregorii." Those (the greater part) still extant are now scattered in the libraries of Edinburgh and St. Andrews universities and the Royal Society, London. Further memoranda are interleaved in "M.S." E (now Christ Church, Oxford, MS 346), essentially a journal of Gregory's scientific activities at Oxford between March 1696 and September 1708. No concordance to these papers is published, but I have in my possession a rough list of the location of the mathematical items made *ca.* 1950 by H. W. Turnbull. Selected extracts, only a small fraction of the total, are reproduced in W. G. Hiscock, *David Gregory, Isaac Newton and Their Circle* (Oxford, 1937) and in Turnbull's ed. of *The Correspondence of Isaac Newton*, III–IV (Cambridge, 1961–1967).

The MS (A57, Edinburgh) of Gregory's first published work, *Exercitatio geometrica de dimensione figurarum sive specimen methodi generalis dimetiendi quasuis figuras* (Edinburgh, 1684)— reviewed by Wallis in *Philosophical Transactions of the Royal Society*, **14**, no. 163 (20 Sept. 1684), 730–732—contains few variants. His "Lectiones opticae ad Acad. Edinburg. 1683" (B11, Edinburgh DC. 1.75) remain unprinted, as does his "Geometria de motu: par[te]s [1–5] lect. ad Acad. Edinburg. [1684–1687]" (B12, B15, B16, Edinburgh DC.1.75: incomplete autographs are in the Royal Society and Christ Church; a complete contemporary copy is in Aberdeen University [MS 2171]) except for an Englished fragment "never printed till now" inserted by John Eames and John Martyn in their *Philosophical Transactions Abridged*, VI (London, 1734), 275–276.

Gregory's "Institutionum astronomicarum libri 1 et 2 in usum Academicorum Edinburgensium scripti 1685" (B7, Edinburgh) was later absorbed into his *Astronomia*; the parallel "Geometria practica...conscripta 1685" (B6, Edinburgh DC.1.75/DC.5.57; contemporary copy in Aberdeen MS 2171) was subsequently rendered into English (Aberdeen MS 672) by an unknown student and later published by [Colin Maclaurin](#) as *A treatise of Practical Geometry...Translated from the Latin With Additions* (Edinburgh, 1745; 9th ed. 1780). His astronomical and medical lectures at Oxford during 1692 to 1697 are preserved in Aberdeen (MS 2206/8). His *Catoptricae et dioptricae sphaericae elementa* (B18) was published by him at Oxford in 1695 (2nd ed., Edinburgh, 1713); with addenda by William Brown it appeared in English as *Dr. Gregory's Elements of Catoptrics and Dioptrics* (London, 1715; e nl. ed. by J. T. Desaguliers, London, 1735). The 1694 calculus compendium "Isaaci Newtoni methodus fluxionum ubi calculus differentialis Leibnitij et methodus tangentium Barrovij explicantur et exemplis plurimis omnis generis illustrantur"— variant autographs in St. Andrews (QA33G8D12) and Christ Church; contemporary copies by John Keill in the University Library, Cambridge, Lucasian Papers, and by William Jones, Shirburn 180.H.33—is unprinted.

Gregory's "Notae in Isaaci Newtoni *Principia philosophiae*...in anno 1693 conscripta"— original in the Royal Society, amanuensis copy in Christ Church; contemporary transcripts in Edinburgh and Aberdeen (MS Gy)— was proposed for publication at Cambridge in 1714, but Nicholas Saunderson could find "nobody that can give me any account of it" (to Jones, February 1714); see S. P. Rigaud, *Correspondence of Scientific Men of the Seventeenth Century*, I (Oxford, 1841),* 264. His weighty *Astronomiae physicae & geometricae elementa* (Oxford, 1702; 2nd ed., Geneva, 1726) was "done into English" as *The Elements of Physical and Geometrical Astronomy* (London, 1715; 2nd ed., 1726); influential reviews appeared in *Philosophical Transactions of the Royal Society*, **23** no 283 (Jan–Feb. 1703), 1312–1320; and *Acta eruditorum* (Oct. 1703), 452–462. Gregory's Latin (pp. 332–336) of Newton's "Theory of the Moon" (Cambridge, Add. 3966. 10.82r–83v published in *Correspondence*, IV [1967], 327–329; Gregory's copy [C121₂] (is now in the Royal Society) appeared soon after in English as *A New and Most Accurate Theory of the Moon's Motion; Whereby All Her Irregularities May Be Solved ...* (London, 1702). His supervised edition of ΕΥΚΛΕΙΔΟΥ ΤΑ ΣΩΖΟΜΕΝΑ. *Euclidis quae supersunt omnia. Ex recensione Davidis Gregorii* was published at Oxford in 1703. Gregory's abridgment of Newton's 1671 tract, his "Tractatus de seriebus infinitis et convergentibus" (A56, Edinburgh), is printed in *The Mathematical Papers of Isaac Newton*, III (Cambridge, 1969), 354–372.

In the *Philosophical Transactions of the Royal Society* Gregory published a solution of Viviani's Florentine problem (**18**, no. 207 [Jan. 1694], 25–29); two defenses of his uncle James against Jean Gallois's charges of plagiarism from Roberval (**18**, no.214[Nov.–Dec. 1694], 233–236; and **25**, no. 308 [autumn 1706], 2336–2341); a study of the "Catenaria" and a reply to Leibniz's "animadversion" (*Acta eruditorum* [Feb. 1699], 87–91) upon it (**19**, no.231 [Aug. 1697], 637–652; and **21**, no. 259

[Dec. 1699], 419- 426); his observations of the solar eclipse of 13 Sept. 1698 (**21** , no. 256 [Sept. 1699], 320–321); a remark on John Perk’s quadrature of a circle lunule (**21** , no. 259 [Dec. 1699] 414–417); and a discourse “De orbita Cassiniana,” refuting its claim to be a realistic planetary path (**24** , no. 293 [Sept. 1704], 1704–1706).

II. Secondary Literature. The documented assessment in *Biographia Britannica*, IV (London, 1757), 2365–2372, is still unreplaced. Some biographical complements are given in Agnes M. Stewart, *The Academic Gregories* (Edinburgh, 1901), 52–76. Gregory’s Savilian “Oratio inauguralis” on 21 April 1692 is printed, with commentary, by P. D. Lawrence and A. G. Mollond in *Notes and Records. Royal Society of London*, **25** (1970), 143–178; see esp. 159–165; the only modern study in depth of any aspect of Gregory’s mathematical and scientific output is C. Truesdell’s examination of Gregory’s spurious derivation of the catenary’s differential equation: “The Rational Mechanics of Flexible or Elastic Bodies, 1638–1788,” vol. II of *Eleri opera omnia*, 2nd ser. (Zurich, 1960), pt. 2; see esp. 85–86.

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