

Quarrels: Newton, Hooke, & Leibniz

Personalities

Isaac Newton (1642-1727): Brilliant mathematician; outstanding experimentalist; astonishing powers of concentration; secretive; suspicious; reluctant publisher

Robert Hooke (1635-1703): Outstanding experimentalist; richly imaginative; boasting, grasping for recognition; irascible; unpleasant

Gottfried Wilhelm von Leibniz (1646-1716): Philosopher, mathematician, political advisor, diplomat. Sought harmony of ideas, religions, and institutions.; affable

Patrons

Boyle & Cutler for Hooke; Cambridge U. for Newton; Elector of Hanover for Leibniz

Contexts

Turbulent times.

Major wars on the continent.

Two revolutions and a counter-revolution in England

Dutch Golden Age

Innovations

Conversion of geometry into algebra -- Calculus is in the air

Creation of modern science: Experiment dictates theory

Setting up of The Royal Society of London for Improving Natural Knowledge

Evolution of Publication

Priority Quarrels: Who Did It First?

Newton vs. Leibniz: Who invented the calculus?

Newton ca. 1666; published bits and pieces in letters; full publication 1686

Leibniz ca. 1674; published in 1684

Was there plagiarism? Probably not, although some of what Newton had done was known to Leibniz before he formulated his version of calculus.

Newton's abuse of power

Newton vs. Hooke: Whose idea was the inverse square law?

Hooke claimed he gave Newton the idea. But the idea was around. And Newton, not Hooke, showed that $1/r^2$ implies Kepler's three laws of planetary motion; that it explains the Moon's orbit and the tides; that the gravitational attraction of a spherical shell of matter is the same as the attraction of the same amount of mass concentrated at the center of the shell.

Newton vs. Huygens: Is light a wave or corpuscles?

Newton thought on the whole it was likely to be corpuscles but he knew the evidence was ambiguous. Huygens tended to think light was a wave but knew that this was uncertain.

They also disagreed about the nature of inertia, of the cause of circular motion, and the nature of motion.

But the two men respected each other, and they did not quarrel.

Where to Learn More

Big Picture

- For a sense of the sweep and scope of the Newtonian era read Neal Stephenson's vast fictional trilogy, *Quicksilver*, *Confusion*, and *The System of the World*.

Newton

- "Newton the Man" by John Maynard Keynes. A brief but acute biographical essay online at https://www-history.mcs.st-and.ac.uk/Extras/Keynes_Newton.html
- *Never at Rest* by Richard Westfall. Lengthy and difficult, but the best biography of Newton.

Hooke

- *The Forgotten Genius: The Biography of Robert Hooke 1635-1703* by Stephen Inwood, MacAdam/Cage, 2003
- *The Curious Life of Robert Hooke: The Man Who Measured London*, by Lisa Jardine, Harper/Collins, 2004.

Leibniz

- *Leibniz: An Intellectual Biography* by Maria Rosa Antognazza, Cambridge University Press, 2008
- *Leibniz: A Biography*, by E. J. Aiton, Adam Hilger Ltd., 1985

Remarkable Works On Line

- *Micrographia: Or Some Physiological Descriptions of Minute Bodies Made by Magnifying Glasses with Observations and Inquiries thereupon*, by Robert Hooke, London, 1660. <https://www.gutenberg.org/files/15491/15491-h/15491-h.htm>
- *Opticks: or, a Treatise of the Reflections, Refractions, Inflections and Colours of Light* by Sir Isaac Newton, Knt., 1730 edition at <https://www.gutenberg.org/files/33504/33504-h/33504-h.htm>
- *Calculus Made Easy* by Silvanus Thompson, MacMillan & Co., 1914 at <http://www.gutenberg.org/files/33283/33283-pdf.pdf>
- *La Geometrie* by René Descartes 1637, In French with English translation on facing page. <https://archive.org/details/geometryofrene00desc/page/n7>

