Roger Cotes Encyclopedia Article

Roger Cotes

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Roger Cotes

1682-1716

English Mathematician and Astronomer

An English mathematician who worked closely with Sir Isaac Newton (1642-1727) on the second edition of Newton's *Principia,* Roger Cotes is also remembered for advancing understanding of trigonometric functions. In his entire career, he produced just one full mathematical paper, which served as ample evidence of his genius.

Cotes was born in Burbage, England, in 1682, son of the Reverend Robert and Grace Cotes. Cotes's uncle John Smith, also a minister, took an interest in the precocious boy, and encouraged him to obtain a higher education. First at Leicester School, and later at St. Paul's School in London, Cotes carried on a correspondence with his uncle, discussing the latest advances in science and mathematics.

In 1699, Cotes entered Trinity College at Cambridge, where he earned his undergraduate degree in 1702. Three years later, he was named a fellow of Trinity College, and in 1706 earned his master's degree. At that point, 24-year-old Cotes was appointed as Cambridge's first Plumian professor of astronomy and natural philosophy. He then solicited funds for the construction of an observatory over King's Gate, and lived in the uncompleted building with his cousin, Robert Smith (1689-1768).

Cotes became friends with Newton, and the two men corresponded on subjects such as telescopes, clocks, and the movement of heavenly bodies. Beginning in 1709, Cotes worked with Newton for three years on the second edition of *Philosophae naturalis principia mathematica,* in which the great physicist refined his theory of universal gravitation. Cotes, who received no financial remuneration for his years of labor on the project, wrote a preface in which he defended Newton's ideas on empirical grounds.

Cotes established a school of physical sciences at Trinity, where he and fellow scientist William Whiston conducted a number of experiments. The experiments were published posthumously as *Hydrostatical and Pneumatical Lectures by Roger Cotes* (1738). Robert Smith also published a collection of Cotes's papers as *Harmonia mensurarum* (1722).

In 1714, Cotes published his sole mathematical paper, "Logometria," which presented innovative methods for calculating logarithms and for evaluating the surface area of an ellipsoid of revolution. In 1715, he made detailed notes on a complete eclipse of the Sun. He died of a fever during the following year, before having reached his 34th birthday. "Had Cotes lived," wrote Newton, a man 40 years his senior who nonetheless outlived him by nearly a decade, "we might have known something."