Topic	Historical Anecdotes
Sub Topic	Text Book Notes – Cotes
Summary	A brief history on Cotes
Authors	Autar Kaw
Date	August 27, 2002
Web Site	http://numericalmethods.eng.usf.edu

Roger Cotes (1682-1716) accomplishments and life can be summed up as a great case of might have been. Cotes contributions to modern computational methods, lie heavily in the fields of astronomy and mathematics. Cotes began his professional educational career with a particular focus on astronomy. He became a Fellow of the Trinity College of Cambridge in 1707 and at age 26 he became the first Plumian Professor of Astronomy and Experimental Philosophy. On his appointment to professor, he opened a subscription list in an effort to provide an observatory for Trinity. Unfortunately, the observatory was never finished in Cotes lifetime and was demolished in 1797. Astronomy continued to fascinate Cotes, driving him to, in correspondence with Isaac Newton, to design a heliostat telescope with a mirror revolving by clockwork. He recomputed the solar and planetary tables of J.D. Cassini and Flamsteed, and he intended to create tables of the moon's motion, based on Newtonian principles. Finally, in 1707 he formed a school of physical sciences at Trinity in partnership with William Whiston.

From 1709 to 1713, Cotes became heavily involved with the second edition of Newton's Pricipia, a book that explained Newton's theories on universal gravitation. Newton's first edition of Pricipia had only a few copies printed and was in need of updating and revision to include Newton's works and principles of lunar and planetary theory. Newton at first had a casual approach to the revision, since he had all but gave up scientific work. However, through the vigorous passion displayed by Cotes efforts, Newton's scientific hunger was once again reignited. The two spent nearly three and half years collaborating on the work, in which they fully deduce, through Newton's principles, the theory of the moon and the equinoxes, as well as, the theory of comets and their orbits. The total number of works printed for this addition was limited to 750 copies. However, a pirate copy from Amsterdam

met all other demand. As reward to Cotes, he was given a share of the profits and 12 copies of his own. Cotes' original contribution to the work involve a preface with supported the scientific superiority of Newton's principles over the then popular idea of vortices presented by Descartes. Cotes concluded that the Newton's law of gravitation was confirmed by observation of celestial phenomenon and did not depend on unexplained occult forces which Cartesian critics alleged.

Cotes' major original work was in mathematics, especially in the fields of integration calculus methods, logarithms, and numerical methods. Cotes' published only one paper in his lifetime, entitled Logometrica, in which he successfully constructs the logarithmic curve. After his death, many of Cotes' mathematical papers were hastily edited by Robert Smith and published in Harmonia mensurarum. Cotes additional works were later published in Thomas Simpson's The Doctrine and Application of Fluxions. Although, Cotes' style was somewhat obscure, Cotes' systematic approach to integration and mathematical theory was highly regarded by his peers. Cotes had discovered an important theorem on the nth roots of unity, foresaw the method of least squares, and he discovered a method for integrating rational fractions with binomial denominators. Furthermore, Cotes was praised for his efforts in numerical methods, especially in interpolation methods and his table construction techniques.

Cotes untimely death from a violent fever, coupled with the added decline in British mathematics as the time, have lead many to remember Cotes as one of the few British mathematicians capable of following the powerful work of Sir Isaac Newton. Cotes' drive and intuition lead Newton to say, “If he had lived we would have known something.”