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(*b*. Scotland, second half of seventeenth century; *d*. London, England, 1731)

mathematics.

Little is known of Craig's early life; even the place of his birth is not known with certainty. He was a pupil of David Gregory, who in 1683 had succeeded his uncle, James Gregory, as professor of mathematics at Edinburgh. Most of his life, however, was spent in Cambridge, where he attracted the notice of Newton. He maintained an extensive correspondence with many Scottish mathematicians, including Gregory, the noted mathematician and astronomer Colin Campbell, and later Colin Maclaurin.

Craig lived in an age that was witnessing spectacular advances in the development of mathematics. The Royal Society, of which Craig was elected a fellow in 1711, had already, under the guidance of Newton, established itself as one of the foremost scientific societies in Europe; and its members included many who were to leave their mark upon the progress of mathematics. Living in an age of such intellectual giants, Craig was rarely able to tower above his contemporaries; this is scarcely to be wondered at when it is recalled that they included Leibniz, Johann I and Jakob I Bernoulli, Halley, Moivre, Hooke, and Cotes.

Nevertheless, Craig was unusually gifted, and his writings covered a wide range. He had been received into holy orders, becoming in 1708 prebendary of Salisbury; and he made contributions of value to his adopted profession. It is, however, for his contributions to mathematics that he deserves to be remembered.

Of the vast fields that were thrown open to mathematicians at the close of the seventeenth century, none proved richer than the newly invented calculus; and it was to the extension and application of this that the mathematicians of the period directed their attention. Newton had outlined his discovery in three tracts, the first of which, *De analysi per aequationes numero infinitas*, although it did not appear until 1711, was compiled as early as 1669, and was already known to a number of his contemporaries. Meanwhile, Leibniz had contributed to the *Acta eruditorum* for October 1684 his famous paper "Nova methods pro maximiset minimis, itemque tangentibus… et singulare proillis calculi genus." For a time the new methods appear to have made surprisingly little impact upon English mathematicians, possibly because when Newton's monumental *Principia* first appeared (1687), there was scarcely any mention of the calculus in its pages; thus, it might well be thought that the calculus was not really necessary. On the Continent, however, Leibniz' great friends, the Bernoullis, lost no opportunity of exploring the new methods. Of the few Englishmen who realized the vast possibilities of the tool that had been placed in their hands, none showed greater zeal than did Craig.

Apart from a number of contributions to the *Philosophical Transactions of the Royal Society*, Craig compiled three major works (the titles are translated):

(1) "Method of Determining the Quadratures of Figures Bounded by Curves and Straight Lines" (1685). In this work Craig paid tribute to the work of Barrow, Newton, and Leibniz. Of great importance is the fact that its pages contain the earliest examples in England of the Leibnizian notation, *dy* and *dx*, in place of the "dot" notation of Newton.

(2)"Mathematical Treatise on the Quadratures of Curvilinear Figures" (1693). Here the symbol of integration ∫appears.

(3)"On the Calculus of Fluents" (1718), with a supplement, "De optica analytica." Apart from its importance, this work is particularly interesting because on the first page of its preface Craig gives an account of the steps that led to his interest in the fluxional calculus. Translated, it reads:

You have here, kindly reader, my thoughts about the calculus of fluents. About the year 1685, when I was a young man I pondered over the first elements of this. I was then living in Cambridge, and I asked the celebrated Mr. Newton if he would kindly look over them before I committed them to the press. This he willingly did, and to corroborate some objections raised in my pages against **D. D. T.** [Tschirnhausen] he offered me of his own accord the quadratures of two figures; these were the curves whose equations were $m^2y^2=x^4+a^2x^2$, and $my^2=x^3+ax^2$. He also informed me that he could exhibit innumerable curves of this kind, which, by breaking off under given conditions, afforded a geometrical squaring of the figures proposed. Later, on returning to my fatherland I became very friendly with Mr. Pitcairne, the celebrated physician, and with Mr. Gregory, to whom I signified that Mr. Newton had a series of such a kind for quadratures, and each of them admitted it to be quite new.

In addition to the above works, Craig contributed a number of papers to the *Philosophical Transactions of the Royal Society*. The titles of the most important of these, translated into English, are (1) “The Quadrature of the Logarithmic Curve” (1698), (2) “On the Curve of Quickest Descent” (1700), (3) “On the Solid of Least Resistance” (1700), (4) “General Method of Determining the Quadrature of Figures” (1703), (5) “Solution of Bernoulli’s Problem on Curvature” (1704), (6) “On the Length of Curved Lines” (1708), and (7) “Method of Making Logarithms” (1710).

This is an impressive list and one that bears eloquent testimony to the range and variety of Craig’s interests. Nevertheless, he has fared ill at the hands of the historians of mathematics—particularly in his own country—few of whom even mention him and still fewer of whom make any attempt to assess the value of his contributions. French and German historians have treated him more generously.

BIBLIOGRAPHY

An exhaustive account of Craig’s contributions to mathematics can be found in Moritz Cantor, *Vorlesungen über Geschichte der Mathematik*, **III** (Leipzig, 1896), *passim*, esp. pp. 52, 188; and J. P. Montucla, *Histoire des mathematiques*, II (Paris, 1799), 162.

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