

Francis Hutcheson: an Irish-born philosopher with mathematical interests

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Robert Steell's *Treatise of conic sections*

Robert Steell's *A treatise of conic sections*, printed in Dublin (1723) by George Grierson, is one of the earliest mathematical works to be written and published in Ireland.

It is perhaps the earliest Irish book devoted to an advanced mathematical topic (there are earlier works, for instance, on arithmetic).

I have tried to investigate Steell and the history of his book, but the man remains shrouded in mystery.

The book seems to have been better known and held in higher esteem than might be expected, given the obscurity of its author.

Robert Simson

One line of enquiry we pursued was to see which libraries held copies of Steell's treatise.

I recalled that Robert Simson (1687-1768), professor of mathematics at Glasgow University from 1711 until 1761, had owned a large library which he bequeathed to the university.

Simson was a specialist in geometry and had written a book on conic sections, *Sectionum conicarum libri quinque* (Glasgow, 1735), among other important geometric works.

I searched for the name Steell in the GUL catalogue but found no record of him or his work.

A search for the title *Treatise of conic sections* did reveal the 1723 work in Simson's library. The catalogue entry has misspelled the author's name as Robert Steel.

An inscription

The bibliographic information in the catalogue entry tells us that there is the following inscription on the flyleaf:

*Ex dono Amici Conjunctissimi Francisci Hutcheson. Rob. Simson
Octris Xo MDCCXXIII.*

We take *Octris* most likely to be an incorrect reading of *Octobris* (or perhaps an abbreviation).

Then the inscription seems to mean: *By the gift of an assured friend, Francis Hutcheson. Rob. Simson, 10th October 1723.*

Francis Hutcheson

Thus it seems that Simson received his copy as a gift from Francis Hutcheson on 10 October 1723, the year of publication.

Francis Hutcheson (1694-1746) was a famous moral philosopher, born in Co. Down. He studied for a year at Glasgow University, graduating in 1712.

Hutcheson then spent the years until 1717 at the university in preparation for the presbyterian ministry.

We do not know if Hutcheson received any tuition from Simson: his undergraduate year coincided with Simson's first year as professor

Francis Hutcheson in Dublin and Glasgow

From 1719 until 1730, Hutcheson ran a presbyterian academy in Drumcondra Lane in Dublin.

It is just possible that Hutcheson knew Steell as a fellow teacher in Dublin (Steell was a teacher of mathematics).

Hutcheson became professor of moral philosophy at Glasgow University in 1730 and held the chair until his death, which occurred in Dublin, August 1746.

Hutcheson is seen as a forerunner of the so-called Scottish Enlightenment, exercising a strong influence on such thinkers as Adam Smith.

It is said that Hutcheson's negative opinion of David Hume prevented this famous philosopher from obtaining a chair at Edinburgh.

Hutcheson as a colleague of Simson

As a colleague of Simson's at Glasgow, Hutcheson got to know Simson's work well and discussed it with him.

In March 1735, Hutcheson took it upon himself to give a critical preview of Simson's then forthcoming book on conic sections.

This took the form of a long letter to the editor, George Smith, of the (Dutch) journal *Bibliothèque raisonnée des ouvrages des savans de l'Europe*.

The letter was originally written in English but translated into French and is preserved in Glasgow with Simson's surviving documents.

The discussion in the letter of Simson's original research on conics, especially as it relates to similar work by Maclaurin, gives evidence of an excellent mathematical knowledge on Hutcheson's part.

Correspondence with Thomas Drennan

There is interesting correspondence between Hutcheson and Thomas Drennan.

Drennan was born in Ireland in 1696 and had been a student with Hutcheson at Glasgow.

He then taught at Hutcheson's Dublin academy before becoming a presbyterian minister in Belfast.

The correspondence gives us a few valuable insights into Simson's work and character.

Opinions of Simson

In a letter of 17 April 1738, Hutcheson wrote to Drennan:

Robt. Simson, if he were not indolent beyond imagination, could in a fortnights application finish another book which would surprise the connoisseurs.

This confirms an opinion of Colin Maclaurin, expressed in a letter to the mathematician James Stirling, that Simson was lazy.

In a further letter of Hutcheson to Drennan of 5 August 1743, we learn more of Simson's work.

More on Simson

We expect immediately from Robt. Simson a piece of amazing geometry, reinventing 2 books of Appollonius [sic] and he has a third almost ready.

He is the best geometer in the world, reinventing old books, of which Pappus preserves only a general account of the subjects.

The two books of Apollonius that Hutcheson was describing appeared as *Apollonii Pergaei locorum planorum libri ii* in 1749, after much delay in the writing and printing.

The third book of Apollonius only appeared in 1776, after Simson's death.

Correspondence with Colin Maclaurin

Hutcheson knew Colin Maclaurin (1698-1746), probably from his student days in Glasgow, and there is surviving correspondence between them.

In a letter of Maclaurin to Hutcheson, 22 October 1728, Maclaurin expressed surprise on seeing a communication from Hutcheson after a gap of several years.

It seems that Hutcheson recommended Irish students to Maclaurin who might come to Edinburgh to study at the university there.

In December 1743, Maclaurin sent a copy of his recent book *A treatise of fluxions* to Hutcheson.

Opinions of Bishop Berkeley

A letter of Hutcheson to Maclaurin, 21 April 1737, has more interesting content relating to Maclaurin's work in progress.

I have constant accounts of the impatience of our virtuosi in Dublin about your Fluxions. Your friends are angry at the delay and Bp Berkelys are triumphing already.

If he should have some silly answer ready before yours be well published, I think you deserve it for your excessive complaisance to a man bursting almost with vanity long ago.

Maclaurin's *Treatise of fluxions* was intended to address issues about the logical rigour and foundations of Newton's differential calculus, which Berkeley had called into question in some of his publications in the 1730's.

Hutcheson's philosophical work of 1725

Hutcheson's first major publication on philosophy, and a work that established his European reputation, is:

An inquiry into the original of our ideas of beauty and virtue; in two treatises.

The final sentence of the long title is *With an attempt to introduce a mathematical calculation in subjects of morality.*

This sentence, with its use of the word *mathematical*, was omitted from all subsequent editions of the work (and there were several).

It seems that the notion of utilizing mathematical ideas in aesthetic and philosophical contexts did not appeal to many readers.

Mathematical ideas in the *Inquiry*

We do not have the time or expertise to undertake a survey of all the mathematical ideas employed in the *Inquiry* but we will give a few indications.

In Section 2, there is an analysis of beauty from a mathematical point of view, with regular solids and polygons providing examples.

So in solids, the eicosiedron surpasses the dodecaedron, and this the octaedron, which is still more beautiful than the cube; and this again surpasses the regular pyramid.

Similarly, So the regular solids vastly surpass all other solids of equal number of plain surfaces: and the same is observable not only in the five perfectly regular solids but in all those which have any considerable uniformity, such as cylinders, prisms, pyramids, obelisks.

Of the beauty of theorems

Section 3 is entitled *Of the beauty of theorems*.

There is mention of the theorems of elementary geometry, such as that of Pythagoras.

Reference is also made to the calculus, Newton's theory of gravitation, and so on.

All this illustrates Hutcheson's familiarity with advanced mathematical ideas.

Computing the morality of actions

Later in the book, Hutcheson has a section on how to compute the morality of actions.

The method rests on five axioms that he introduces.

The axioms are mainly expressed in algebraic notation of the form $A = B \times C$, where A , B and C are moral quantities.

The system he proposed has been called *moral algebra*.

Possible reservations

Hutcheson must have been aware that his attempt to mathematize aspects of morality would meet resistance among philosophers, many of whom would have thought mathematics to be an unnecessary intrusion.

Anticipating criticism, Hutcheson wrote:

The applying of a mathematical calculation to moral subjects, will appear at first extravagant and wild; but some corollaries, . . . , may show the conveniency of this attempt, if it could be further pursu'd.

Further reading

Hutcheson's concept of a moral algebra has attracted the attention of more recent scholars.

For example, Aalto and Brooks, *The rise and fall of moral algebra: Francis Hutcheson and the mathematization of psychology*, *J. History of Behavioural Science* **17** (1981), 343-356.

For more about Hutcheson, see Michael Brown, *Francis Hutcheson in Dublin, 1719-30: the crucible of his thought*, Four Courts Press, Dublin, 2002.