Facts and fables

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Isaac Newton: Adventurer in Thought.
By A. Rupert Hall. Blackwell: 1992.
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"FORTUNATE Newton, happy childhood of science . . . Nature to him was an open book whose letters he could read without effort", wrote Einstein in the foreword to a 1931 edition of the *Opticks* (1704). Newton's account of his discovery of the true nature of light and colour has, however, as Professor Hall comments in his new biography, "misled posterity down to recent times". The crucial experiment on which he placed so much weight was "largely fictitious, newly invented for its present purpose". Hall guides us through the far more tortuous path that led Newton to his discoveries and explains why not all his many critics can be dismissed simply as benighted traditionalists.

The story of the falling apple, which Newton himself loved to tell in his old age, would place his discovery of the law of universal gravitation in the *anni mirabili* of the plague years of 1665–66 "when I was in the prime of my age for invention". That, too, is unlikely. Newton seems at that time to have accepted a variant of the ethereal vortices that Descartes had set rotating around the Sun to carry the Earth and the planets in orbital motion. Only after he had set to work, at Halley's urging, on the tract that eventually became the first book of the *Principia* did Newton abandon vortices and envisage attractive — and repulsive — forces in central bodies. It was Newton himself, again, who, during his priority dispute with Leibniz, encouraged the notion that the conclusions presented in a classical geometrical garb in the *Principia* were originally derived by him through his fluxional calculus — one more 'fable'. It is now clear that "the published state of the *Principia*. . . is exactly that in which it was written."

These radical revisions of the conventional account by no means diminish our awe at what Newton achieved in mechanics, mathematics and optics. Hall skilfully weaves the historical research of the 'Newton industry' over the past three decades into the biography. Only occasionally does the account seem like a patchwork of notes left over from his editorship of the last three volumes of Newton's *Correspondence*. Sir David Brewster's Victorian biography, first published in 1855, remained the standard account for a long time. It was not wholly superseded until the publication of Richard Westfall's *Never at Rest* in 1980 (a condensed, updated version of

this biography is soon to be published by Cambridge University Press as *The Life of Isaac Newton*). Hall's substantial biography is about half the length of Westfall's and takes account of much of the more recent historical research.

Brewster was provoked by French suggestions that Newton's surprisingly voluminous theological studies indicated the extent to which his nervous breakdown of 1692 had left him mentally crippled. Brewster demonstrated that Newton had been a "searcher in the scriptures" throughout his life. He rejoiced in this

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Roubilliac's bust of Newton. (Courtesy of Trinity College, Cambridge.)

confirmation of the essential harmony of science and religion. Brewster was troubled, nevertheless, by another side of Newton: an alchemical passion that had left behind a hoard of manuscripts, consisting largely of transcripts from alchemical works. The Sotheby sale in 1936 made the contents of Newton's Portsmouth papers much better known and gave rise to Lord Keynes's famous description of Newton as the "last of the magicians". Those papers, too, have been extensively quarried by a number of historians in recent years. What significance does Hall attach to them?

While conceding that "thirty years of study and the writing of one million words must have left their mark on Newton's mind", Hall is inclined, on the whole, to reaffirm his verdict, published in a joint paper in 1958, that Newton attempted to retrieve useful chemical facts from the enigmatic and mysterious terms employed by alchemists to conceal them. It would be quite rash, therefore, to conclude that Newton in any way accepted the truth or validity of the larger claims advanced by the

alchemists. Hall criticizes the flimsy evidence on which, for example, Newton has been depicted as a member of an active alchemical coterie at Cambridge, supposedly including Barrow, the Lucasian professor whom he was to succeed, and Henry More, the Platonist philosopher. With scrupulous fairness Hall also reproduces in an appendix a report by Karin Figala of Munich, who provided him with a summary of her own research on Newton's alchemical studies.

But Figala's conclusions have devastating implications for any portrait of Newton which, like that provided by Hall, is still largely cast in the conventional mould, even if at great pains to depict Newton 'warts and all'. Figala asserts that Newton was no exception to the seventeenth-century tendency to "search for a combination of the exact sciences with magical thought". She believes that in Newton's alchemy we can catch a glimpse of "at least a small part of his attempt to reconcile magic and science". Acceptance of such a reading of Newton's work would move the alchemical (and prophetic) studies of Newton from the periphery towards the centre of his lifelong endeavours. Many of the documents whose recovery we owe to Hall's industry (notably the 'Chemical' notebook and the tract known as *De gravitatione*), and much other evidence that finds a place in his own narrative (the Cambridge Platonist attitude to the mechanical philosophy, for example), would then form part of a different story. Westfall's biography attempted to integrate the theology and the alchemy with what we now see as the genuinely 'scientific' activities of Newton. Here they still appear as regrettable or puzzling distractions.

With its many virtues, this biography is of a piece with Hall's two other recent books — the revised and enlarged edition of *The Scientific Revolution* (Longman, 1983) and the biography *Henry More* (Blackwell, 1990). It is tempting to see these works as belonging to a formidable and sustained effort to return the history of science to where it was before it was invaded by what Hall may see as sociologizing and 'hermeticizing' interlopers. All these books have strengths that justify their place on the library shelf and on every reading list on the history of seventeenth-century science. But whether it is worthwhile — or even possible — to return to the older project, to which Hall himself made so many pioneering contributions, is a different matter. □

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