Reassessing the Wider Aspects of Newton's Thought – A Symposium

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Jed Z. Buchwald and Mordechai Feingold, *Newton and the Origin of Civilization* (Princeton, NJ: Princeton University Press, 2013), 528 pp., \$60.00 (cloth), ISBN 978 0 6911 5478 7.

Rob Iliffe, *Priest of Nature: The Religious Worlds of Isaac Newton* (New York: Oxford University Press, 2017), xi + 522 pp., £25.49 (cloth), ISBN 978 0 1999 9535 6.

William R. Newman, *Newton the Alchemist: Science, Enigma, and the Quest for Nature's "Secret Fire"* (Princeton, NJ: Princeton University Press, 2019), xx + 537 pp., \$39.95 (cloth), ISBN 978 0 6911 7487 7.

Abstract

After a brief introduction, this “symposium” presents four essay reviews of three recent major studies of Newton's life and works beyond the mathematics, physics and natural philosophy for which he is principally known: Jed Buchwald's and Mordechai Feingold's *Newton and the Origin of Civilization* (2013), Rob Iliffe's *Priest of Nature: The Religious Worlds of Isaac Newton* (2017), and William R. Newman's *Newton the Alchemist* (2019); and they address Newton's work on history, chronology, theology and alchemy. The four reviewers are leading Newton scholars in their own right, and assess how these three studies advance our understanding of Newton the “scientist”, as well as Newton the man in his times. Niccolò Guicciardini considers their relevance to our understanding of Newton's mathematics; Scott Mandelbrote assesses how they advance our understanding of Newton's local and historical context; Steffen Ducheyne focuses on what we can learn about Newton's methodological concerns and working practices; while Stephen Snobelen considers how these studies can help us understand the place of religion in Newton's life and work. We conclude with responses from

each of the reviewed authors: Feingold (representing also his co-author Jed Buchwald), Iliffe, and Newman. New insights into key questions are afforded throughout. Should Newton's work in these different areas be considered continuous with his more "scientific" works, or compartmentalized according to his rigorous disciplinary procedures?

Keywords

alchemy – Robert Boyle – chronology – colour theory – experimental philosophy – heresy (Newtonian) – Gottfried Wilhelm Leibniz – methodology – natural theology – Isaac Newton – prophecy – secular studies – theism

1 Introduction

The recent appearance of William R. Newman's *Newton the Alchemist* can be seen as completing a trilogy of major works devoted to those aspects of Newton's work beyond the mathematics and physics for which he is principally known. Jed Buchwald and Mordechai Feingold superseded Frank Manuel's *Isaac Newton Historian* with their rich and magisterial study of Newton's attempts to establish a new chronology of the world and an account of the early history of mankind; more recently, Rob Iliffe has superseded Frank Manuel's *The Religion of Isaac Newton*, the only previous book-length study of Newton's religious and theological views, with his own authoritative account of this undeniably important aspect of the fabric of Newton's work. Finally, Newman has provided a commanding, and convincing account of Newton's alchemy which should entirely displace the earlier book-length treatments of Betty Jo Teeter Dobbs.¹ All three volumes are impressively comprehensive in their coverage and thoroughly detailed in their execution.

It is the satisfying sense of completion provided by these three works – the sense that all the "non-scientific" aspects of Newton's work have now been comprehensively covered – which has led to this "symposium". It seems like a good time to begin to take stock of the implications and significance of these studies for our understanding not only of Newton, the man, as Geoffrey Keynes might have wanted, but also, and perhaps more importantly for the

1 Frank E. Manuel, *Isaac Newton Historian* (Cambridge, MA, 1963); idem, *The Religion of Isaac Newton* (Oxford, 1974); Betty Jo Teeter Dobbs, *The Foundations of Newton's Alchemy, or "The Hunting of the Greene Lyon"* (Cambridge, 1975); and eadem, *The Janus Faces of Genius: The Role of Alchemy in Newton's Thought* (Cambridge, 1991).

history of science, of Newton the “scientist”. After all, Newton is known first and foremost, and always will be, as Rob Iliffe says in his contribution below, as at least arguably “the greatest scientist that ever lived”. Accordingly, we might amend R.S. Westfall’s comment on Newton’s theological papers, quoted here by Feingold, and declare that “Had he not been a great scientist it seems wholly unlikely that anyone would bother to study any of his non-scientific manuscripts.”²

The fact that virtually all of Newton’s extant original manuscripts are now freely available online, and therefore easily searchable, is due in large part to the authors of these books, especially Iliffe and Newman, both of whom have unsurpassed knowledge of Newton’s manuscripts thanks to their positions as directors, respectively of *The Newton Project* and *The Chymistry of Isaac Newton*.³ It is legitimate to ask, however, to what extent the availability of all of these papers and of these comprehensive guides to Newton’s extra-scientific works will contribute to the future of Newton studies. It is legitimate to ask this, not least because, as these essays show, the leading experts continue to disagree, not just about minutiae and niceties, but also about fundamental issues.

The authors of the following essay reviews were asked to consider how these three books have caused them to reassess their own studies, and to anticipate how they might shape their own work and the work of other Newton scholars in the future. We then asked the authors of the books in question to respond. It is an indication of the power of these monographs that the resulting exchange in the pieces below is not confined to discussing what has been presented in the books, but has brought out new material which the reviewers and the responders felt was necessary to make their points. Excellent as all three of these studies are, none of them are likely to prove to be the last words on their subjects.

One of the most remarkable revelations of Newman’s book, followed up here by Niccolò Guicciardini and Scott Mandelbrote, is that Newton seldom, if ever, voyaged through strange seas of thought alone, but collaborated eagerly with other alchemists. Guicciardini reminds us that the same is true with regard to his mathematics, while Mandelbrote uses the diary of the little-known Andreas Hochstetter to indicate that Newton used to freely discuss his ideas, not just with a select few trusted friends, but even with previously unknown visitors. Newman himself adds valuable new evidence here of Newton’s collaboration with Nicolas Fatio de Duillier, and with his mysterious friend, Captain de

² See Westfall’s original quotation, and the reference, below in Feingold’s response, at note 22.

³ These can be found at: <www.newtonproject.ox.ac.uk> and <www.chymistry.org>.

Tegny. There are valuable additions here too, by Guicciardini and Iliffe, to our understanding of the dispute between Leibniz and Newton and the wider personnel involved. This not only locates Newton more immediately in the social and political history of his own time, as Iliffe says, but also supports Iliffe's claims that Newton had a strong tendency, as Guicciardini puts it, to read "the troubled present of the Restoration and the Glorious Revolution through the lens offered by a biased narrative of the past history of the early Church."

There is valuable material here about Newton's methodology too. Picking up on Iliffe's account, Steffen Ducheyne alerts us to the importance for Newton of the distinction between human understanding and the human imagination. This leads to Newton's rejection of testimony in natural philosophy, and his later scepticism with regard to texts, as highlighted by Iliffe as well as Buchwald and Feingold. This scepticism led, in turn, to the development of Newton's technique for arriving at acceptable data out of a discordant set by successive approximation. Ducheyne also draws attention to Newman's persuasive claims (reinforced here by Newman in his response) that Newton drew upon Boyle's chemical experiments in composition and decomposition as a way to present his new theory of white light as a composition of the spectral colours. Buchwald and Feingold note that Joseph Scaliger complained that mathematicians saw the subject of chronology as "their province exclusively," but it is clear that Newton saw it as essentially mathematical too.⁴ As Guicciardini points out, chronology was an important element in Newton's mathematical work, and "should have been included in the eight green volumes of Whiteside's edition of the mathematical papers."⁵

The three books under discussion are, of course, based largely on Newton's manuscripts. The nature of the extant original manuscripts themselves, and what they reveal about Newton's working methods, feature importantly in the "symposium". Iliffe and Mandelbrote remind us that the history of Newton's papers have an impact on our attempts to understand them, not least because earlier commentators, as Mandelbrote points out, have bestowed a spurious coherence and identity on clusters of manuscripts, even giving some loosely related manuscripts a single title as though they constituted a single work. It is also abundantly clear from the discussions below that the precise dating of Newton's papers continues to generate controversy. Dates do matter, as Mandelbrote says, and although it would be an "absurd claim that we cannot know what Newton thought or when he thought it," it emerges here that

4 Buchwald and Feingold, *Newton and the Origin of Civilization*, 433.

5 Referring to Isaac Newton, *The Mathematical Papers of Isaac Newton*, ed. D.T. Whiteside, 8 vols. (Cambridge, 1967–1981).

reaching certainty in our conclusions about these matters is never easy. It is crucially important, of course, as Iliffe points out, to avoid imposing on the texts an interpretation of them based on preconceived assumptions about what Newton must have thought. But Buchwald and Feingold are no less sceptical than Iliffe in their approach to the manuscripts, and yet they vigorously disagree with him on when Newton began to develop a serious interest in religious matters, over and above the interest in “philosophical treatments of God’s nature” which had already engaged him as an undergraduate. Stephen Snobelen distinguishes Newton’s “higher-order theism of various kinds of philosophical theology” from “the lower-order theism of religious revelation and its interpretation”. There can be no doubt that higher-order theism captivated him from the start, but the question of just when he became enthralled by the academic study of lower-order theism continues to divide our contributors.

These considerations might seem largely irrelevant to attempts to understand the development of Newton’s scientific work, but as this discussion clearly demonstrates, such an assessment must depend upon whether Newton pursued his different interests separately – alchemy, chronology, theology, and natural philosophy – or only ever considered each with an eye on the others. This is a major aspect of the discussion below, brought out by all of the contributors. Although a number of earlier Newton scholars insisted upon the “unity” of Newton’s thought, and have tried to establish that his work in various different domains was in fact ‘all of a piece,’ the contributors here want to insist either upon a more nuanced approach, or to insist on the contrary upon a more compartmentalized view of his thinking.⁶ William Newman rightly points out that none of the books under review accept earlier claims that there is an “undifferentiated unity” in Newton’s thought. Newman’s meticulous and entirely convincing study of Newton’s alchemy tends towards a separation of Newton’s alchemy from his other pursuits, as his response to Snobelen’s review indicates. But, of course, the vitalist theory of matter to which Newton the alchemist was committed, according to one of the most striking revelations of Newman’s study, must be taken into account in future by those working on the *Principia* and the *Opticks*. Nobody could seriously uphold the view that the alchemy which Newton pursued for so much of his life was not fully compatible with his published pronouncements on the nature of matter and its active principles. Indeed, as Newman himself points out, and as Ducheyne reiterates,

6 The major representatives of the view that Newton’s works should be seen as essentially parts of a unified enterprise are R.S. Westfall, and especially Betty Jo Dobbs, but others include Richard H. Popkin and James E. Force. Readers must make up their own minds about the respective positions of the various contributors below.

“Newton’s alchemy does also reveal new insights into Newton’s science as a whole.”

It is easier, however, as Feingold’s response suggests, to claim that Newton’s religious interests are disconnected from what can be regarded as his more secular pursuits. Feingold, speaking also for Buchwald, contrasts “the secular Newton ... found in our book” with Iliffe’s image of Newton as a priest of nature. Feingold insists here that “one must resist the temptation to ascribe to Newton an all-encompassing motivation, or to force Newton’s distinct projects into a single grand narrative”; and yet in their book Buchwald and Feingold admit that

Newton’s initial forays into remote antiquity around 1685 intended to establish the Ancients’ comprehension of the principles of heliocentric cosmology and atomistic natural philosophy as well as to argue that their grasp of the “true frame of nature” derived from its being an integral part of the “true” primitive religion.⁷

Given that Newton originally intended to include a discussion of these reconstructed historical matters in the first edition of the *Principia*, it seems hard to disagree with their suggestion in the introduction of their book, that Newton’s “way of working reveals a mode of thought and practice which underpins both his efforts to unravel the workings of a deity in history and to grasp the innermost mysteries of mechanical nature.”⁸ As Ducheyne points out, the upshot of all this is that there is what can be called “a singular commonality” among his chronology, theology, and natural philosophy.⁹ Perhaps we should see Feingold as seeking to take the same balanced view, called for by Iliffe and Snobelen, of the links between the different areas of Newton’s thought, although he clearly chooses to place the emphasis differently.

Snobelen quotes an unused draft intended for the *Opticks* in which Newton declared God to be “One principle in Philosophy,” thereby reinforcing the famous comment in the General Scholium added to the second edition of the *Principia* (1713), where Newton provocatively insisted that “to treat of God from phenomena is certainly a part of ‘experimental’ philosophy.”¹⁰

7 Buchwald and Feingold, *Newton and the Origin of Civilization*, 424.

8 Ibid., 3. Newton’s reconstruction of Ancient natural philosophical wisdom was intended for the third book of the *Principia* but appeared instead in his *A Treatise of the System of the World* (London, 1728).

9 Ibid., 4.

10 Newton, *The Principia: Mathematical Principles of Natural Philosophy*, translated by I.B. Cohen and Anne Whitman (Berkeley, CA, 1999), 943.

Furthermore, as Guicciardini points out, “The historian of early-modern mathematics is on the wrong track if he attempts to pursue his research by confining his analysis to ‘mathematics proper.’” It seems, therefore, that the Newton writings which form the focus of the three books under discussion here should not be regarded as merely of incidental interest to those who want to understand Newton’s scientific works. As Iliffe says in his response, “the Isaac Newton who authored these writings should not be cast adrift from the great natural philosopher and mathematician of the same name.”