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The Cambridge Companion to Newton (2nd edition)

Edited by Robert Iliffe and George E. Smith
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It feels slightly odd receiving a new edition of a recent book on a long-dead scientist, but, in fact, the past 15 years have seen a number of developments in the study of Newton's thought. Newton left an enormous number of manuscripts, letters and notes when he died, many of which have never been printed. About four million words from these are now available on *The Newton Project* website (www.newtonproject.ox.ac.uk), but there are still more to be excavated. When dealing with the papers of a thinker from the pre-photocopying age, there is always the problem of separating his own notes and opinions from items that he merely copied or made a precis of for the purposes of comparative study. Nevertheless, a rather broader picture of Isaac Newton is now open to us than was available 15 years ago when the first edition was issued.

This book has therefore been substantially rewritten. There are new chapters, particularly a welcome study of Newton's theology, one on his efforts in trying to calculate a historical chronology and one on the effort he devoted to alchemy and chemistry. To fit these into the standard size of the *Cambridge Companions* series, some of the previous chapters have had to be dropped, notably the study on Newton versus Leibnitz and the chapter focussing on prophecy and the apocalypse.

The subseries of *Cambridge Companions* into which this volume fits comprises studies of philosophers and philosophies. As an overall picture of Newton's life and work, this book is therefore somewhat unbalanced. More than anything, it lacks even a single chapter on Newton's public life. Newton was a Member of Parliament at what Macaulay thought of as the crucial point in British political history – the flight into exile of King James II and his Parliament authorised replacement by William & Mary. As Master of the Mint, Newton was responsible for replacing the debased Carolingian currency with a new coinage which provided a stable base for the eighteenth-century British commercial expansion, including coining and setting the value of the guinea – thus putting Britain on the gold standard for the next couple of centuries. A chapter on this half of his life would have rounded the book off nicely.

Nevertheless, the editors have packed a lot into their designated space. Newton is now regarded as an extraordinary polymath. I am not sure that he would have thought of himself in the same way. He would not have seen philosophy, theology, history and physics as being separate disciplines, the way we do. He certainly did not see a sharp distinction between alchemy and chemistry – he merely regarded chemistry as the more vulgar aspect of the esoteric science. His theological writings were historical and scientific attempts to clarify the religion which Noah had followed. This led him to a hatred of the concept of the Holy Trinity (a peculiar attitude for a fellow of Trinity College!) as being the original debasement of the true monotheistic religion. His chronological writings similarly were aimed at linking ancient religious beliefs with his new concepts of the workings of the cosmos, and incorporated a scientific analysis of historical mentions of positions of the constellations at various times. The publication of his heterodox religious views would undoubtedly have been extremely dangerous at the time, so they remained in manuscript.

The main work published in his lifetime was, of course, the *Principia Mathematica.* This was published by the Royal Society, using borrowed money because, so I am told, the President at the time, one Samuel Pepys, had spent all of the Society's publishing funds on the production of an extremely ornate book about fish. This snippet of gossip is, of course, not mentioned here. This is a serious book for students of the history and philosophy of science: the editors have no time to spare for chit-chat about the vagaries of diarists, or silly stories about apples.

Newton is primarily known as a scientist and mathematician. His writings on physics

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and mathematics are the only ones taken seriously now, and form the main focus of this book. The editors say that "Isaac Newton was *the* giant of science in the seventeenth and eighteenth centuries, just as James Clerk Maxwell was *the* giant of science during the later nineteenth century". I must admit that I disagree with this rating of Maxwell. *The* giant of nineteenth century science was Darwin. Newton invented physics. Maxwell worked out applications of it. Newtonian physics have, of course, been overtaken by Einstein, but his ideas still underlie most general concepts of science. It is intriguing to think what Newton would have made of modern physics and mathematics. His theological and chronological writing was, after all, an attempt to bring scientific certainty into those fields. Modern mathematics and physics have, instead, adopted uncertainty, and are much closer to Zen Buddhism than to Newton's monotheistic certainty.

Libraries catering for academic work in the history and philosophy of science will most certainly want this book. It supplements and develops the chapters in the previous edition rather than superseding them, so it might be worth retaining a copy of the first edition for the sake of the chapters which had to be excluded from this one. There are, of course an enormous number of other reference books broadly relevant to Newton. We have recommended books like the *Encyclopedia of the Scientific Revolution* (Applebaum, 2001) (*RR* 2001/032) and *Science and the Enlightenment: An Encyclopedia* (Burns, 2003) (*RR* 2004/272). There are also plenty of smaller texts, such as the Oxford University Press *Isaac Newton* in their *Lives and Legacies* series (Christianson, 2005). However, when reviewing the first edition of this *Companion*, our reviewer said that "all-in-all this is probably the most accessible guide to Newton and his writings currently available" (*RR* 2002/330). I would largely confirm his view, so public libraries may also wish to acquire this volume. Although it discusses Newton's mathematical ideas, it should not be beyond the grasp of a well-educated general reader.

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A Dictionary of Computer Science (7th edition)

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Part of Oxford University Press's *Oxford Quick Reference* series, the seventh edition of *A Dictionary of Computer Science* provides easy access to explanations and definitions of common computer science terms and concepts, and contains approximately 150 new terms not in the previous edition (2008). Significantly, this edition brings a title change that is not discussed as part of the preface. In fact, the table of contents in the paperback edition still lists the body as being *A Dictionary of Computing*. Title choice aside, this updated edition brings readers into the era of Android, SaaS (Software as a Service) and social media – elements that were just emerging at the time the previous edition was published.

The dictionary's brief entries appear in alphabetical order, with clear, bold headings, and definitions also include terms in bold type to indicate major cross-references. Some entries end with additional cross-references (see also), while others offer suggestions for comparison. For example, the entry for Hidden Terminal Problem (p. 252) recommends that the reader also review the entry for Exposed Terminal Problem. This feature is particularly useful for a novice who may not already know of the other related concept or term. Terms generally appearing elsewhere in the *Dictionary* are indicated as such with an asterisk at the beginning; however, this convention is not explained in the Guide to the Dictionary.

Six topics have additional information included in a series of two-page spreads. The first, The Anatomy of an Internet Address,

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