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REVIEW
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Peter Harman and Simon Mitton (Eds.). *Cambridge Scientific Minds*. Cambridge: Cambridge University Press, 2002.

Kevin C. Knox and Richard Noakes (Eds.). *From Newton to Hawking: A History of Cambridge University's Lucasian Professors of Mathematics*. Cambridge: Cambridge University Press, 2003.

Isaac Newton's tomb at Westminster Abbey bears an inscription extolling the triumphs of his "strength of mind almost divine." Alexander Pope quipped, "God said Let Newton be! and all was light." This notion that knowledge of nature is a product of inspired revelation is arguably as prevalent in popular conceptions of scientific progress in the age of Stephen Hawking as it was in Newton's day. However, two recent collections of essays about several centuries' worth of scientific research and teaching at Cambridge University, where both Newton and Hawking were employed as Lucasian professor of mathematics, stand as a testament to the enduring role of human institutions in the production of scientific knowledge. The title of *Cambridge Scientific Minds,* edited by Peter Harman and Simon Mitton, provokes the question of just what it might have meant, at any given time, to have a mind characteristic of the university. Perhaps in part because the volume is aimed toward a general readership, however, the issue is addressed only obliquely. Readers with a deeper curiosity for this query will find it taken up by the contributors to *From Newton to Hawking,* a volume on the history of the Lucasian chair edited by Kevin Knox and Richard Noakes.

Cambridge Scientific Minds is a collection of twenty-three "scientific portraits." These are mostly short biographical pieces, the bulk of which are written by professional historians, along with personal reflections by the molecular biologist Max Perutz and radio astronomer Antony Hewish. The great men (and one woman, the mathematician Mary Cartwright) of Cambridge science are front and center—rather than attempting comprehensive coverage, this book is a tribute to high achievements and well known personalities. Harman acknowledges, in his thoughtful but brief introduction, that such a format means the book can well "illustrate the diversity of Cambridge associations," but may less readily address whether "there [is] indeed a specifically Cantabrigian scientific

culture." Although the volume is handsomely produced and each chapter contains a handy abstract, it is a shame that by the omission of an index the book is rendered less useful to those whose interest in Cambridge science might be thematic rather than biographical.

The book is most satisfying when it highlights a lesser-known Cambridge luminary whose entire career was spent at the university, as in the case of Harmke Kamminga's chapter on Frederick Gowland Hopkins. He was the father of Cambridge biochemistry, and in ways both administrative and pedagogical he helped to establish what would be distinctive about the young discipline as practiced in Cambridge. Likewise, it is most rewarding when other contributors choose to augment their biographies with healthy emphasis on the university. In writing about Darwin, for example, Peter Bowler enhances what might otherwise be routine summary of a now very familiar life (just four years of which was actually spent in Cambridge) by showing the significance of Darwin's time there for his intellectual development and professional networking. Richard Yeo and David Oldroyd use chapters on William Whewell and Adam Sedgwick, respectively, to show how these two long-tenured professors administrated Cambridge science amidst the great reforms of the mid-nineteenth century. David B. Wilson and Simon Schaffer neatly illustrate both the strengths and the limitations of the scientific ethos of late-Victorian Cambridge by following the successful but divergent careers of three elite graduates of the honors exam known as the mathematical tripos: G.G. Stokes, who never left Cambridge; William Thomson (later Lord Kelvin) who did; and James Clerk Maxwell, who returned from a successful career elsewhere to become the first head of the Cavendish Laboratory.

From Newton to Hawking shares the biographical presentation of *Cambridge Scientific Minds* and revisits several of its characters besides the eponymous pair, but the sum of its parts is a much more coherent story. This is a hefty book that stands as a detailed social history of the mathematics chair endowed by Henry Lucas in 1663. It will reward close study, from the editors' substantial introduction, which signals, for example, how the professors' status and responsibilities shifted with the ever-fluctuating relationship between the university and its colleges, all the way to the appendix containing Ian Stewart's translation of the original Lucasian statutes.

The first Lucasian professor was not Newton, but his immediate predecessor Isaac Barrow. Mordechai Feingold recounts how Barrow accepted the chair only to ensure that Cambridge would have mathematics institutionalized at the university level, for he believed that his real calling was theology and considered himself a caretaker until a well-qualified successor could be found. Barrow stepped aside for Newton, but Rob Iliffe shows that like Barrow, Newton judged "theology to be the most significant part of his vocation as a don." Iliffe casts his net wide over Newton's work, arguing that his alchemy and biblical scholarship were of a piece with his natural philosophy, all of which were attempts to recover the pure knowledge of the ancients. The third Lucasian professor, William Whiston, shared Newton's distaste for the doctrine of the trinity and his desire to rescue primitive Christianity, but Whiston's public zeal was such that he found himself removed from the chair and banished from Cambridge for heresy in 1710.

Perhaps partly as a result, the tenures of the rest of Newton's eighteenth century successors were spent striving to establish and popularize a canonical version of Newtonianism that upheld Anglican orthodoxy and resisted radical change at the university.

The nineteenth century at Cambridge saw the development of an extraordinarily distinctive and strenuous tradition of training for the mathematical tripos, of which nearly all the era's Lucasians were themselves top graduates (or "wranglers"). These incumbents grappled with the ambivalences of incorporating the machine systems of industrial society into the university curriculum. Simon Schaffer writes of the backlash to the contentious decade-long tenure of the mechanists' champion Charles Babbage, "By 1839 the dons had uncompromisingly ruled out any radical attempt to treat the properties of mind as outputs of a mechanical system. Yet they succeeded in reinforcing an academic regime which turned wranglers into something rather like calculating engines." G.G. Stokes' long run in the chair lasted for the last half-century of Victoria's reign, and David B. Wilson shows how he thrived while weathering the transformation of science into a professional enterprise, with all its implications for the content and style of undergraduate instruction. Andrew Warwick explains why Joseph Larmor considered the concept of an electromagnetic aether too valuable to abandon from physical theory, showing the many senses in which he was a transitional figure bridging the tenures of Stokes and the quantum pioneer Paul Dirac.

While the mysterious powers of Newton's mind cast a long shadow over the history of the Lucasian chair, none of his eighteenth or nineteenth century successors was deemed to be inspired with divine intelligence. Nevertheless, many of the Lucasians were considered to possess exemplary minds, and the volume's contributors pay close attention to historical conceptions of the relation of the mind to the material world. In perhaps the most striking case, John Gascoigne explains how the blind Nicholas Saunderson, who was Lucasian professor from 1711 to 1739, was a test case for the Lockean view that ideas were the outcome of experience. Diderot discussed Saunderson in his "Letter on the Blind," and Edmund Burke and Samuel Johnson were fascinated by the question of how Saunderson could understand color and teach optics.

Broadly speaking, a reputation for indifference to the corporeal has marked chairholders from Barrow and Newton to Larmor and Dirac. This theme is nowhere more evident, of course, than in the marveling and mythologizing that surrounds the present Lucasian professor, Stephen Hawking. Hélène Mialet's chapter takes up these ideas with gusto, but she too readily accepts the notion that Hawking's is an "intellect liberated from the body." Though she offers a fascinating thesis arguing that "the body of Stephen Hawking…has transcended its own limits," gaining one form of immortality by defying ALS and another by embodying the "timeless" corporate succession of the Lucasian chair, she might have drawn quite the opposite conclusion from his unique circumstances. When Mialet briefly describes the veritable industry of graduate students, assistants, and inscription devices that enable Hawking to continue working, we have the clearest glimpse yet of the physical and cultural apparatus that are also at work whenever the products of his, or any, Cambridge mind appear to float free.