

theological difficulties that mechanistic matter theory created for transubstantiation had somehow lost their urgency by the 1760s, although Hellyer cannot really explain why. On his account, by the time that the order was suppressed in 1773, Jesuits were professing natural philosophy that differed very little from that found in other European venues. The Jesuit Bosovich, together with Isaac Newton, had supplanted Aristotle and St Thomas, and the importance of Jesuit teaching and publication in the sciences had held its significant and influential place over the course of two centuries.

Hellyer's book is the product of superb and indefatigable research, both primary and secondary. Its author has organized and interpreted an enormous amount of archival work into a lucid picture of Jesuit scientific pedagogy and scholarship over a wide area and a considerable period of time. Future claims about the character and development of Jesuit natural philosophy in early modern Europe will need to engage seriously with Hellyer.

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DORINDA OUTRAM, *The Enlightenment*. Second edition. New Approaches to European History. Cambridge: Cambridge University Press, 2005. Pp. xiii + 165. ISBN 0-521-546681-8. £14.99, \$24.99 (paperback).

WILLIAM E. BURNS, *Science in the Enlightenment: An Encyclopedia*. Santa Barbara: ABC-CLIO, 2003. Pp. xcvi + 165. ISBN 1-57607-887-6. \$65.00 (hardback).
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Dorinda Outram's *The Enlightenment*, a university-level textbook, is now available in a second, revised edition. Like its predecessor, this version broaches prominent issues in recent scholarly debates on the Enlightenment, while also addressing such traditional topics as religion, science, the relationship between the two, and political thought and practice. Five of the original chapters, on the role of coffee houses, religion, science, gender and government, have been retained, while a completely new chapter on slavery has been added. The chapter on the exotic has been transformed into one on exploration and cross-cultural contact, though preserving much of the original material on the 'exotic'.

A major theme of both the old and new versions of Outram's book is cross-cultural contact and its effects on both European and Other; this theme is now announced prominently on the book's front cover, showing Joshua Reynolds's famous *Portrait of Omai* (1776). Depicted in garb resembling that of antiquity, Omai was the Tahitian whom Joseph Banks brought back to England in 1772 at the conclusion of Cook's first *Endeavour* voyage in 1771. Omai lived in England from 1774 to 1776, and was returned to his homeland in 1777, where he was murdered while still in his twenties. The cover illustration thus testifies to the problematic character of the European mission not only to discover but also to transform the world. Although Cook himself took the rather Rousseauian view that civilization spoils rather than improves (pp. 53–4), others were disappointed by so-called savages' refusal to live out their days as token exotics. While pertinent to important themes of Outram's text, the new cover illustration replaces an equally provocative image, Joseph Wright of Derby's *Experiment on a Bird in an Air Pump* (1768), a graphic depiction of the empirical spirit of Enlightenment science, including its willingness to sacrifice animal life in the service of knowledge, and to harden children to this practice.

In coverage and use of sources, the new and revised chapters are rather uneven in quality. The chapter on exploration contains a rich selection of quotations from primary sources such as Georg Forster and Cook's accounts of the first *Endeavour* voyage (1768–71, not 1769–71, p. 48). Yet the new chapter on slavery contains only a few quotations – especially unfortunate, since

more well-chosen extracts from the original sources could have alleviated the superficial treatment of the topic. Consider that the reader is not made aware that influential thinkers such as Locke and Rousseau expressed explicit views on slavery: Locke's *Second Treatise on Government* (1688) argues for criminals' self-inflicted enslavement, while Rousseau's *On the Social Contract* (1762) unequivocally condemns the institution. Such an important disagreement deserves better than: 'This was an age in which many thinkers, such as Jean-Jacques Rousseau in his *Discourse on the Origins of Inequality* (1754), centrally concerned themselves with equality, freedom, and with controls on arbitrary power' (p. 61). Is Rousseau's *Discourse* really concerned 'with controls on arbitrary power'? We find this concern addressed not there, but in *On the Social Contract*. These points are not hair-splitting; it is important that texts set for history students make careful and exemplary use of source material.

The Enlightenment is supposed to be a university-level textbook survey; we should therefore ask if Outram's new version of the book is actually more valuable to students and teachers than a traditional text such as Norman Hampson's *The Enlightenment: An Evaluation of its Assumptions, Attitudes and Values* (London, 1968). Areas of concern that are central to Outram's work – separate chapters treat slavery, exploration, the exotic and gender – hardly figure in Hampson's account (there is only one reference to slavery in the text). Yet, in this reviewer's opinion, Outram's *Enlightenment* is not that well suited to the task it sets for itself. Hampson's strength lies in his solid and accessible treatment of fundamental Enlightenment ideas and thinkers. The writing in Outram's book, by contrast, is often overly general or vague, as in the treatment of Rousseau cited above, and in many important cases connections with original texts and major thinkers are only loosely established. While Outram sometimes offers her readers interesting historical analysis – for instance, in her discussion of the economics of, and vested interests in, slavery (p. 63ff.) – her book is only moderately successful in balancing historiography against historical narrative and analysis.

A wide-ranging and useful book that does not even try to strike that balance is William E. Burns's *Science in the Enlightenment: An Encyclopedia*. It brings together widely dispersed information in a reasonably sized volume containing 192 entries (not 'hundreds', as the cover blurb claims). Burns covers well-known figures, concepts and institutions across the physical and life sciences as well as lesser-known figures and concepts. Some entries – such as 'Colonial science', 'Exploration, discovery and colonization', and 'Women' – fill in obvious gaps in traditional reference works. In addition, Burns includes not-so-obvious, but nonetheless relevant, entries on 'Literature', 'Masturbation', 'War' and various universities. He likewise discusses important figures who are not particularly well known, for example the chemist Joseph-Louis Gay-Lussac (1778–1850), and includes independent entries on women savants such as the physicists Laure Bassi and Mme du Châtelet, as well as the midwife Angelique Coudray. Other prominent women appear in collective entries; Caroline Herschel for example appears under 'Herschel family'. The volume also includes a number of useful aids to the reader: a preface introducing each of the major sciences of the period, a topic finder, a brief bibliography and cross-references at the end of each entry, as well as a chronology and comprehensive bibliography at the end of the volume.

The coverage is necessarily selective, and some arguably important figures do not have their own entries, including important members of the Jussieu botanical dynasty, notably Bernard de Jussieu (1699–1777), who developed the natural family system of plant classification at the Jardin du Trianon and the Jardin du roi, Paris, and his nephew, Antoine-Laurent de Jussieu (1748–1836), who finally published the system in 1789. Refined by Candolle, the Jussieux's system replaced the artificial sexual system of Linnaeus. While the Jussieux appear in the entry on 'Botany', only Antoine-Laurent merits inclusion in the index. Carolus Linnaeus (1707–78), on the other hand, has his own entry.

Titles of works originally written in foreign languages are translated, which is not necessarily useful, especially where the work in question has no English translation. It would have been preferable to provide titles in both the original language and English.

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C. U. M. SMITH and ROBERT ARNOTT (eds.), *The Genius of Erasmus Darwin*. Aldershot: Ashgate, 2005. Pp. xvii + 416. ISBN 0-7546-3671-2. £60.00 (hardback).
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Historiographically, Erasmus Darwin is the Joseph Banks of the Midlands. During the nineteenth century the reputations of these two Enlightenment *bon viveurs* – one a provincial poetic physician dominating Lichfield and the Lunar Society, his younger contemporary a botanical imperialist (and occasional poet) presiding over Lincoln and London – were eclipsed by scientific campaigners searching for heroic ancestors. But now they are flourishing: historians have discovered that since both men had wide interests transcending modern disciplinary boundaries, they can be conveniently and repeatedly reinterpreted. Australians converted Banks into a national scientific icon, and for almost fifty years the eminent scientist Desmond King-Hele has been generating British interest in Darwin. Formerly passed over as the misguided grandfather of Charles, Darwin has been variously reconfigured as the true forefather of evolutionary theory, an exploitative industrial capitalist, a major influence on Romantic literature and a prescient inventor whose insights included the steering system used in modern cars.

Tellingly entitled *The Genius of Erasmus Darwin*, this commemorative volume is designed to stimulate further enthusiasm for Darwin's diverse abilities. Although many publishers try to disguise a book's conference origins, here the scholarly papers are sandwiched between personal accounts of the 2002 celebrations organized in Lichfield to mark the bicentenary of Darwin's death. Contributed mainly by scientists, the short and accessible articles are divided into six sections – medicine, biology, education, technology, environment and literature – and mostly view Darwin's achievements from a modern vantage point. For example, as an expert on speech processing, Philip Jackson is well placed to appraise Darwin's discussions of the alphabet and his mechanical speaking machine, a device made from leather and wood that could pronounce four consonants and one vowel. Jackson articulates the aim clearly shared by other authors, 'to decipher the works of Darwin, so as to bring them to life in the context of a modern understanding [and highlight] the way in which key components of our present science were known and developed by Darwin' (p. 236). The achievements these varied authors credit to Darwin include influencing photography, predicting air travel and launching Australian literature.

Nevertheless, it appears that Darwin did not always successfully foresee later developments or even behave with appropriately scientific demeanour. In a comparative case study, the psychologist Nicholas Wade examines in some detail Darwin's conflict over the cause of vertigo with a London physician, who although more obscure has been judged by posterity to have been nearer the right answer. This example of Darwinian error, concludes Wade, reflects 'the reluctance of Erasmus to accept experimental evidence that questioned his medical speculations' (p. 97). Tim Carter, a specialist in occupational medicine, asks why Darwin, despite being renowned as a sympathetic doctor, failed to comment that work can have adverse effects on health. Carter presents a range of evidence about Darwin's familiarity with industrial processes, although he skims over Maureen McNeil's influential insistence on the eloquence of Darwin's silence about the labouring classes (an analytical approach also used by Janet Browne in her discussions of Darwin and gender), amiably opining that in Darwin's view, 'society and its progress depend on cheerful acquiescence to one's station in life' (p. 300).