the most nuanced and comprehensive account of the initiatives by such professional leaders as Robert Yerkes and Lewis Terman to use the US army mental testing programme as a catalyst for bringing mass intelligence testing into all levels of the education system. This self-conscious attempt to build a national meritocracy upon a deterministic version of intelligence met fierce resistance, but the Galtonian testers succeeded in associating merit with success on their tests, while their critics managed to preserve some less deterministic approaches to the rationing of educational opportunity. The First World War provided no opening for French mental testers because France maintained a large army and an officer corps familiar with their conscripts. There was simply no perceived need for new technologies to sort out men. Mental tests remained part of a range of diagnostic tools that physicians and educators might use to test troubled individuals who could not function in school or society. High courts in both France and the United States would rule in 2003 that their respective educational meritocracies needed 'affirmative action' to redress the claims of groups that had grievances against these two very different, but also surprisingly similar, establishments.

Historians have not neglected the history of meritocracy and intelligence testing in either the United States or France. Carson provides an excellent account of this literature without letting other scholars shape his comparative perspective. For anyone new to this topic, I would recommend *The Measure of Merit* and one work of fiction, Michael Young's *The Rise of the Meritocracy* (London, 1958) before turning to Carson's sources. But, as Carson observes in his excellent epilogue on the renewed IQ controversy that continued into the twenty-first century, 'There has not been, and likely never will be, any firm resolution of these issues, either in popular or scientific discourse' (p. 279). Carson's book merits a long shelf-life.

James W. Reed
Rutgers University

Ralph O'Connor, **The Earth on Show: Fossils and the Poetics of Popular Science, 1802–1856**. Chicago and London: University of Chicago Press, 2007. Pp. xiii + 541. ISBN 978-0-226-61668-1. £23.50 (hardback).
doi:10.1017/S0007087408001702

During the heyday of the two-cultures discourse, historians of science contributed to bridging the gap between science and the arts by teaching courses on science as literature, discussing parts of classic scientific texts not just for their content but for their literary form. By and large, however, this approach never amounted to much and certainly never caught on in professional circles of the history of science. Of course, science *in* literature, as opposed to science *as* literature, has been a popular topic, with fine studies of, for example, geology in the works of Romantic poets such as Coleridge or in those of Victorians such as Tennyson. Moreover, among scholars of English literature, the influence of Darwin on George Eliot, Conrad, Hardy and other novelists has been a not uncommon topic of study. Gillian Beer, in a classic of the kind, *Darwin's Plots* (Cambridge, 1983), included Darwin's own writing in an analysis of evolutionary narrative in nineteenth-century fiction. More comprehensively, another scholar of English, David Locke, in *Science as Writing* (New Haven, CT, 1992), also looked with the eyes of a literary critic at the writings of Galileo, Newton, Darwin, Einstein and other scientists, arguing that attention to the literary qualities of scientific texts adds to understanding of how science operates. One modus operandi, stressed by several authors, is the use of rhetoric by scientists in arguing their stances.

Now another scholar of language and literature joins the field by examining *as* literature the science of geology from the first half of the nineteenth century, when a new imagination of the past was formed to compete with the Book of Genesis and with Milton's *Paradise Lost*. Ralph

https://doi.org/10.1017/S0007087408001702 Published online by Cambridge University Press

O'Connor's account of the emergence and spread of the new perspective on the past in Britain is, by and large, a familiar one to historians of science, yet in going over known ground he blazes a new trail. What concerns him is not so much the facts of earth history – the discovery of deep time with its succession of different worlds and its changing inhabitants of unfamiliar forms – but the contemporary representational construction of these as a means of persuading an incredulous public.

The star of O'Connor's story is the idiosyncratic Oxford geologist William Buckland, but many others, in particular Charles Lyell, Gideon Mantell and Hugh Miller, figure prominently. Oddly, Richard Owen, who, partly alongside Buckland and partly in succession to him, acted as chief British necromancer of the palaeontological past, gets short shrift. To cast Buckland in the starring role is a felicitous choice, given his histrionic style and talent, and O'Connor makes the most of him in analysing his lectures and publications as a form of entertaining self-enactment. 'Buckland enlivened his lectures with an eccentric sense of humour. He was renowned for his disconcerting swerves between the sublime and the ridiculous, a tension characteristic of Regency show-culture' (p. 80). Buckland's greatest claim to fame, his hyena-den theory of Kirkdale Cave, serves O'Connor ideally in making his point. By means of poems and cartoons that use the fantasy of time travel, Buckland was placed amidst the ancient cave animals, evoking the reality of that past.

The book consists of two parts, the first centring on 1800 to 1830, when the new visions of former worlds were made available to narrowly circumscribed audiences, for example Oxbridge students; the second 1830 to 1860, when, from the time Lyell's *Principles of Geology* appeared, the literary market became flooded with popularizing works that captured a broad middle-class readership by means of various techniques of representation. 'Thanks not only to what he said, but more importantly to the way he said it, Lyell transformed the public profile of geology and its genteel practitioners at a critical stage in the science's development' (p. 164). Also, the second part opens with Buckland, who during the 1832 BAAS meeting at Oxford gave a famous talk on the megatherium, the extinct giant sloth from the South American pampas.

O'Connor emphasizes the importance of textual, verbal representation, but also pays considerable attention to visualization. The coryphée of the pictorial representation of early nineteenth-century geology was the painter John Martin, whose awe-inspiring apocalyptic scenes were matched by 'grotesque' reconstructions of monster scenes from the geological past. The range of visual communication was dramatically expanded for the urban public by museum exhibits, dioramas and panoramas. 'Here virtual tourism began in earnest' (p. 265). The book offers a smorgasbord of insightful approaches. Rather than restrict himself to any one of these, O'Connor follows them all and in places the book gives the impression of a somewhat inchoate, not yet fully digested mass of research materials. Yet this abundance can also be seen as one of its attractive features.

Given the multiplicity of approaches, it may seem churlish to point to an absence; but in a study of science as literature one might have expected the author to provide a self-reflexive moment, in the form of some thoughts on the author's own literary strategy and adopted style or at least on that of the secondary literature he uses. This, however, is missing from the book and, probably related to this, also missing is a reference to William Clark's paper on 'Narratology and the history of science' (*Studies in History and Philosophy of Science* (1995), **26**, 1–71). Clark shifted the searching light beam of literary scrutiny from the scientists to the historians of science, taking his cue from Northrop Frye and Hayden White in arguing that historical narratives can be understood in terms of four universal plot lines: romance, tragedy, comedy and satire. It would stretch this review well beyond its limited scope to analyse in those terms *The Earth on Show* – and, even more, to take my own medicine and self-reflect on the narrative structure of this very review. But tragedy my review is not, given that I can end on a positive note, warmly

https://doi.org/10.1017/S0007087408001702 Published online by Cambridge University Press

recommending this book as a significant contribution to our understanding of how the new science of early nineteenth-century geology became so successfully established.

Nicolaas A. Rupke
Göttingen University

Bernard Lightman, **Victorian Popularizers of Science: Designing Nature for New Audiences**. Chicago and London: University of Chicago Press, 2007. Pp. xvi + 545. ISBN 978-0-226-48118-0. $37.50, £23.50 (hardback).
doi:10.1017/S0007087408001726

Victorian Popularizers rescues worthy clergymen, schoolmasters, devout women and failed aspirants to scientific employment from the condescension of history by analysing their work in the same terms as that of the famous T. H. Huxley. Bernard Lightman's aim is 'to revise the topography' of Victorian science by demonstrating the extent of popularizing activity by those who were not practitioners of science, and showing how different were the frameworks of interpretation that they offered from the secularizing, naturalistic vision which has received so much scholarly attention. Seven case studies shape the book. Lightman focuses on four different groups who wrote for popular audiences – Anglican clergy, women, practitioner–experts, and contributors to the new journalism of the 1890s – and three genres or techniques of popularization (the use of spectacle, the evolutionary epic, the science journal). The emphasis is on books, although other modes of popularization such as lecturing and journalism are represented. The 'new audiences' of the title are the mass reading audiences produced by the industrialization of printing and the growth of literacy in the nineteenth century.

Victorian Popularizers is based on fifteen years of extensive research. In addition to reading hundreds of popular books (by thirty authors), Lightman has searched archives of authors, publishers and the Royal Literary Fund, to which needy nineteenth-century authors appealed for financial aid. The book is a mine of information on prices, print runs, editions, author incomes and publisher preferences. Yet the data on prices and numbers is difficult to analyse and raises certain questions. Did lower-priced books have higher sales? Did illustrations, especially colour illustrations, increase sales, or was that tendency countered by higher price? Publishers often gave long-term support to authors with whom they shared commitments, such as Anglicanism or Freemasonry. But why did they pay so much more to illustrators than to authors?

Two difficult historiographical issues are addressed. Lightman does not deal systematically with the difficult arena of audience response, but aptly notes that the popularizers were themselves an audience who were responding to the views of other scientific writers. Also, he has collected some examples of twentieth-century scientists who were stimulated by his Victorian popularizers. Another historiographical issue is how to apply the labels of amateur and professional. Lightman uses 'practitioner' rather than professional for those who made an income from science, but he maintains the interpretation of Huxley as an elitist 'professionalizer' who sought to exclude clergymen and women from science.

Whatever Huxley's wishes, Anglican clergymen and women were conspicuous among popularizers, as Lightman shows. From about 1830 to 1910 educated women in financial hardship, and women and clergymen with interests in science, wrote popular books for children, for students and for adults who wanted to cross the 'threshold of knowledge'. Lightman identifies techniques which appealed to a mass audience: common objects were chosen as starting points for discussion, descriptions were framed by narratives of travel, woodcuts and colour made books attractive and readable. Lightman also pays close attention to these authors' interpretations of nature, which, he emphasizes, differed from those of the elite (represented by Huxley). Lightman's authors in these chapters saw design everywhere, emphasized the wonders of nature and

https://doi.org/10.1017/S0007087408001702 Published online by Cambridge University Press