tide after listening to a short description of how to do the doggy-paddle. Additionally, in that preface, Haraway mentions her sense that she has 'written the same paper twenty times' (p. 2). I disagree, but it is unfortunate that in at least one place sentences and paragraphs are reproduced almost word for word from earlier chapters. Closer editing would have eradicated this defect. Taken as a whole, however, the papers selected succeed in representing the breadth and scale of Haraway's ambitious project, and as such will provide an extremely useful reference and teaching tool.

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Peter J. Bowler and Iwan Rhys Morus, **Making Modern Science: A Historical Survey.** Chicago and London: University of Chicago Press, 2005. Pp. viii + 464. ISBN 0-226-0681-7. £17.50, $25.00 (paperback).
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Peter Bowler and Iwan Morus have had the bad luck to publish their textbook just after a really good one appeared. It is *Historia de la Ciencia* (Madrid, 2005) by Carlos Solís and Manuel Sellés, professors at the Spanish equivalent of the Open University. The Spanish history is exact in dates and concepts, keys illustrations to the text, employs apt equations and diagrams, develops interesting points and prospects in sidebars, and exploits and deploys a deep historiography. By unhappy contrast, the English history is sloppy in details and occasionally wondrously wrong, treats illustrations mainly as decorations, avoids equations, separates its information into 'Episodes' and 'Themes', and insists on a historiography not much older than *Leviathan and the Air-Pump* (Princeton, 1985). *Historia de la Ciencia* is old-fashioned in privileging theory (although it does not ignore questions of patronage and connections with technology), whereas *Making Modern Science* is infused with the postmodern fetish of the local and contingent.

The following examples suggest that Bowler and Morus's book is not a reliable guide to the science it analyses. *Item*: 'This was how [Bohr] solved the problem of atomic stability. The electrons orbiting the nucleus were not radiating continuously, they only did so at particular frequencies … . They only released energy when they changed from one [stationary] state to another, and the energy they released in that process was a multiple of h and their change of frequency' (pp. 259–60). Electrons do not radiate at all in a stationary state; the frequency they emit in their quantum jumps is h times the difference in energy between their initial and final states. *Item*: 'In his *Mysterium cosmographicum* of 1596, [Kepler] showed that … the spacing of the six planetary orbits can be explained by showing that the spheres defined by the orbits are separated by the six regular Platonic solids (tetrahedron, cube, etc. – these are the five solids that can be constructed with all the faces of identical shape)' (p. 351). Five or six? In fact, with Bowler and Morus's definition, as many as you please. The faces of a Platonic solid must not only be identical, they must be the same regular polygon, and the faces must come together at the same solid angle. Then there are only five.

Let us turn to pictures. Figure 2.1 depicts three heavens beyond the sphere of the fixed stars; its caption reads, 'The sphere of fixed stars marks the outer boundary of the universe.' Figure 2.3 presents Thomas Digges's famous diagram with stars strewn through space. Caption: 'Note that the universe is still bounded by the sphere of the fixed stars.' Figure 2.4, Tycho's mural quadrant, has the label, 'From Tycho Brahe, *Astronomiae instauraiae* [*sic* – '*instauratae*'] *mechanica* (1587 [*recte* 1598]).' Newton does not rate a picture. A reproduction of the title page of the *Principia* would have been useful, for then anyone could have seen that it does not 'announc[e] to the world that he had uncovered the secrets of nature' (p. 46), as Bowler and Morus claim, but reads, in its entirety, *Philosophiae naturalis principia mathematica*.

Much of Bowler and Morus's presentation turns on the notion of scientific revolution. Thus we have, among the 'Episodes', chapters on the scientific, chemical and Darwinian revolutions, and one on revolutionary cosmology. That is an acceptable, although old-fashioned, way to indicate that important changes occurred in certain subjects at certain times. Bowler and Morus want more, however: did these revolutions in fact occur? They continually pester readers with this question, although their test – that a revolution must be big, sharp, short and significant enough to be revolutionary – can hardly support a reasoned answer. With the additional constraint that the scientific revolution must be 'a unique set of events without parallel elsewhere in history' (p. 51), Bowler and Morus decide that none of their revolutions pass their test. And so they organize their book around a historiographical concept that does not meet their historiographical standards. That may be the reason that they imposed the awkward division between 'Episodes in the development of science' (the revolutions plus the emergence of new biology, genetics, ecology and environment sciences, continental-drift geology, twentieth-century physics, and the human sciences) and 'Themes in the history of science' (organization of science, science and religion and technology and medicine and war and gender, popular science, and biology and ideology).

The fundamental problem with *Making Modern Science* is that its authors are caught up in the tight, re-entrant, Anglo-American whirlpool of 'modern historians' of science. These anonymous wizards have exposed as naive or disingenuous scientists' core belief that science pursues true factual knowledge about the world. 'Modern historians' have discovered that scientists do not always agree, that they choose topics in accordance with interests that often are neither pure nor scientific, and that, 'therefore', their conclusions, as scientists, are always controversial and vulnerable (pp. 1–3). Bowler and Morus direct this message to scientists whom they hope to interest in the history of science. It is an odd way of wooing. Even a scientist should be able to spot the postmodern non sequitur hidden in the 'therefore' three sentences back.

Was it the narrowness of their reading or a desire to conceal the greater world of scholarship from their students that made Bowler and Morus write that until 'recently' all historians believed that the seventeenth century saw an unprecedented, unparalleled, 'cataclysmic' transformation in the content of natural knowledge and the manner of pursuing it (pp. 24, 51)? Can they be ignorant of the work of Pierre Duhem, Annaliese Maier, Alistair Crombie, Marshall Clagett and William Wallace, who, long before 'recently', argued forcefully, knowledgeably and sometimes persuasively that modern ideas about the natural world arose gradually from medieval ones? Bowler and Morus not only do not share this knowledge, they also withhold the titles of the major relevant historiographical analyses, H. Floris Cohen's magisterial *The Scientific Revolution* (Chicago, 1994) and I. Bernard Cohen's *Revolution in Science* (Cambridge, MA, 1985). Is it because these books make clear that much of 'recent' history of science is weak and undisciplined?

Making Modern Science has its virtues. These include a wide topical coverage, restriction to the modern period (from *ca.* 1550), occasional insights, reliable information for those who can identify it, a résumé of the senior author's well-known work on Darwin, warnings against triumphalism, problematizing of historical concepts, and perhaps much more. I have not attempted to strike a balance. It would be fair to the authors, but not to the discipline. Bowler and Morus hold up a looking glass. Some, like the ecstatic camp-follower writing in *Science*, 309 (30 September 2005), pp. 2167–8 ('a timely, informative, challenging, and very welcome achievement'), and the breathless blurbist Michael Ruse ('the book for which we have all been waiting … [i]t will define the history of science'), admire what they see. That makes it the more urgent for those who value clear thinking and accurate scholarship to challenge and correct the image of our discipline that *Making Modern Science* might propagate.

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