

support of scientific theories and practices – in this case, the corpuscular theory of light and Continental calculus. Through Brewster's 1831 and 1855 biographies and his controversy with Bailey, Higgitt provides convincing evidence of how the hagiographic defence of Newton from perceived attacks against his reputation could serve various religious, political and moral purposes. It could also contribute to the debate on the future of science in Britain, and on the status of the emerging professional figure of the scientist. The religious positioning of those involved in these debates seems to be particularly relevant here, with reformists and radicals engaging in a process of demythologization that was a critique of the religious establishment and its long-lasting alliance with Oxbridge, best expressed by the British tradition of natural theology.

The book also deals explicitly with a number of related themes, such as the emergence, in the first half of the nineteenth century, of a new, scientific approach to historical sources, especially archival and manuscript. While the subversive use of philology had a long and illustrious tradition, the new impartiality and disinterestedness advocated by authors such as De Morgan clearly mirrored the new criteria for scientific objectivity that were being institutionalized in the first half of the century. In other words, the story of the new uses of archival materials to construct a supposedly impartial image of Newton cannot be torn apart from that of the contemporary emergence of a new notion of objectivity in the natural sciences. Another interesting historiographical point is discussed towards the end of the book, where Higgitt uses the famous case of Michel Chasles's forged letters to illustrate how, well into the second half of the nineteenth century, the public image of Newton had remained virtually unaffected by the specialist controversies about his character, morals and religious inclinations.

Higgitt has produced a well-researched and carefully crafted book which will be of interest to historians of science, literature, religion and Victorian culture. It is indeed an excellent example of the truly interdisciplinary nature of much current research in the history of science.

MASSIMO MAZZOTTI
University of California, Berkeley

JIM ENDERSBY, **Imperial Nature: Joseph Hooker and the Practices of Victorian Science**. Chicago and London: University of Chicago Press, 2008. Pp. x + 429. ISBN 978-0-226-20-791-9. £20.50 (hardback).

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Travelling, Collecting, Corresponding, Seeing, Classifying, Settling, Publishing, Charting, Associating, Governing. Those Victorians sure were busy. So too are recent historians of science. Flaggging the turn to 'practice' after the 1980s, the gerund has now replaced 'structure' or 'anatomy' as the word of choice in history-of-science book and article titles. We now have lots of performances.

One of the most satisfying performances of the last few years has got to be Jim Endersby's remarkable new study of the practices and institutions of Victorian botany. Endersby follows the career and context of the premier Victorian botanist, Joseph Hooker (1817–1911). Where previous generations were attracted to the collective biographies of those 'Hookers of Kew', Joseph and his father William, Endersby's work is much more than mere biography. It greatly expands our notion of what it is to be science, to be imperial and to enrol nature in the modern period.

Hooker, of course, is perfectly suited for a study of Victorian practices of natural history. He started by voyaging, as second fiddle to naturalist Robert McCormick, on the Antarctic expedition of Clarke Ross. He collected with the best of them in the Himalayas, Wales, Morocco and the United States, honing his techniques of spotting, collecting and marshalling the natural world. He participated in replacing the Linnaean edifice with the strategically named 'natural system'. 'Inheriting' the headship of the Royal Botanic Gardens from his father in 1865, Hooker rode high as Kew solidified itself as a premier institution of the life of imperial Britain. With his

army of collectors and correspondents, Hooker stood in the middle of much of what was happening in Victorian science, and surely botanical science. And for those thinking of anniversaries, Hooker was also best pals with Charles Darwin, both before and after the publication of *On the Origin of Species*. Indeed, Hooker is famous for shepherding Darwin through the thorny potential accusations of plagiarism when he received the famous ‘scoop’ from Alfred Russel Wallace in 1858. Pointedly, Wallace and the controversy do not even get a mention in the index of Endersby’s book. Quite so. As recent historians of science have revealed, the real intricacies of Victorian (and hence, modern) science lay not in these grand theories of life, but in the tangled rhizomes surrounding them: collecting, naming and classifying.

Earlier historians of science, one generation removed from the poor maligned positivists, would find at best much theory-ladenness in these processes. The issue of ‘essentialism’ was the supposed spectre haunting the life sciences (reinforcing the idea, happily promulgated by Carl Hempel, that classification and natural history were merely ‘pre’-science.) Yet Endersby beautifully shows that the so-called ‘species question’ of the nineteenth century was anything but theory. It was really one of stability, authority and naming – not fixity, transmutation and the great chains of being. By following Hooker closely through his day-to-day exchanges, agonies, skills and contingencies, Endersby carefully examines the vicissitudes of pulling together a large imperial collection, establishing it as an authority and, most importantly, replicating that authority – all of which required more than mere theory, and certainly a lot of energy and networking. For example, while *Imperial Nature* highlights the obvious imperial nature of Hooker’s enterprise – Kew and the botanists were, after all, engaged in a colonial enterprise – Endersby resists the temptation to see this as one straight arrow of domination: the hegemony of the centre over the periphery, the utilitarian reduction of the gardens. Drawing on a mitigated actor-network model, and a huge amount of detail, he notes that to make an authority central requires a long chain of local peripheries, all breathlessly mobilizing and all centres in their own right. There is nothing *a priori* about this. Imperial nature does not fall from the sky, but only appears so as the result of its own success.

Of course, Hooker could indeed be a centralizing, often driven, tyrant. Hooker, as Endersby puts it, was a hybrid character of aristocrat and new ‘professional’ scientist – echoing Kew’s own hybrid character as recreational gardens and scientific utilitarian instrument. And what Hooker did at Kew, the zoologists did at the British Museum (one only hopes that the next ‘practical’ biography of Victorian naturalism will concentrate on that indefatigable keeper of the British Museum, John Edward Gray – and be done with our fascination with his superior at the museum, Richard Owen).

Here the very entities of Victorian botany and science are located and given affect. Endersby’s central chapters on the various strategies of naming and necessity – and exchange of species, types and boundary objects – easily provide the very best account of powerful new views of biological kinds and meanings being produced by the ‘practical turn’. I have no hesitation recommending them to my philosopher friends who are still bogged down in scholastic debates about the meaning of meaning and natural kinds. Yet Endersby’s book is much more than this. He also tells us definitively about the vexed meaning of ‘professionalization’ in the Victorian period, the place of experiment and observation in natural history, the role of mapping and publishing and publicizing – all supported by astonishing detail from published and archival material. A short review cannot come close to doing *Imperial Nature* justice.

But what is all this busy-ness, this classifying, collecting, naming: of what? The recent methodological turn to ‘practices’ is itself, ironically, a very modernist, late Victorian concern (‘all that is solid melts into air’). In the midst we face a slight danger of losing some things along the way, things that are not reducible to practices. Social constructivists of a previous generation came very close to doing that. Now that practices are well covered – and Endersby’s book is the

zenith of methodological sophistication on that score – we are slowly turning our attention to objects, to things, giving them a chance and following them around a bit. They are not always reduced to practices. *Imperial Nature*, to its credit, contains lots of things too. Taking such things seriously, Endersby's other fine book is *A Guinea Pig's History of Biology* (London, 2007). Gerundheit!

GORDON MCOUAT
University of King's College

MARK FRANCIS, *Herbert Spencer and the Invention of Modern Life*. Stocksfield: Acumen Publishing, 2007. Pp. xiv + 434. ISBN 978-1-84465-086-6. £25.00 (hardback). doi:10.1017/S0007087409001964

Ever since the 1890s, when his reputation as Britain's – if not the world's – foremost authority on evolution was dramatically undermined by the intellectual and institutional developments that created modern science and philosophy, Herbert Spencer has frequently been invoked as an example of how not to do things. According to his critics, Spencer not only confused facts and values, but did so in the service of an elaborate system that was little more than an attempt to use science to justify the cruellest aspects of the age's social and political thought. Yet Spencer was a very important figure in late nineteenth-century science, whose writings were a source of inspiration for many of his contemporaries. Indeed, it is largely thanks to Spencer that we now talk about 'evolution' – a word that Charles Darwin at first tried to avoid. Since the 2003 centenary of Spencer's death, a number of new studies have illuminated Spencer's work and its impact, but the whole of his wide-ranging synthesis has remained a daunting prospect. The publication of Mark Francis's volume – the first book-length intellectual biography of Spencer since J. D. Y. Peel's *Herbert Spencer: The Evolution of a Sociologist* in 1971 – thus marks a significant moment not just for Spencer scholarship but for all historians of late nineteenth-century science.

Divided into four parts – on Spencer's personality and the intellectual culture of which he was a part; the often obscure metaphysics that framed his work; his biology and philosophy of science; and the entwining of his sociology, ethics and political thought – *Herbert Spencer and the Invention of Modern Life* attempts to establish two interrelated points about Spencer's life and work. The first is that the writings Spencer produced from the early 1850s through to his death were all contributions to a complex philosophical whole in which the individual parts, such as his biology and sociology, existed – to use a Spencerian phrase – in a 'dynamic equilibrium'. Whilst Francis is far from being the first scholar to make this point, it is refreshing, especially when so much contemporary history-of-science writing has become ever more narrowly focused, to see someone grappling with Spencer as a holistic thinker who was constantly adjusting seemingly minor aspects of his work to suit the grander needs of his overall argument about evolution and progress. In so doing, Francis addresses his second concern – uncovering the ways in which Spencer's work was closely bound to events in his life. The upshot is a new and deeper sense of Spencer the person, and of how the directions that his ideas took were as much due to his struggles with his own emotional life as they were to the structure he had set out for his synthetic philosophy during the late 1850s.

Through these entangled strands, Francis makes two important contributions to Spencer studies and the history of late nineteenth-century science. The first, which reinforces and elaborates on points that scholars such as Thomas Dixon and Naomi Beck have recently made, is that Spencer is someone whose politics have largely been misunderstood. As the final part of Francis's book makes clear, Spencer, despite his well-known coining of the phrase 'survival of the fittest', did not attach great importance to natural selection and chose instead to emphasize altruism and cooperative behaviour in evolution. Whilst this fact alone is enough to challenge much of what we think we know about Spencer, Francis also shows us how, armed with these ideas, Spencer