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Book reviews

science, society and politics in the years of Bonaparte's rise. Readers patient enough to plough through the more than five hundred pages of close print – unfortunately, French doctoral dissertations below four pounds in weight are not taken seriously by the system – will be amply rewarded by this important, innovative and excellent study.

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ROBERT J. RICHARDS, **The Romantic Conception of Life: Science and Philosophy in the Age of Goethe**. Chicago and London: University of Chicago Press, 2002. Pp. xix + 587. ISBN 0-226-71210-9. £24.00, $35.00 (hardback).
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Forty years ago history and philosophy of science was a package, but fashions have changed and it brings the shock of surprise, in which Romantics delighted, to meet again with science treated as applied logic. Because Richards's focus is closely upon Germany, especially Jena, where *Naturphilosophie* was born in a small and intense group of thinkers and experimenters, this approach is highly appropriate. His book is very learned, with footnotes in nineteenth-century fashion sometimes taking up almost half the page; his style is sometimes a bit sticky – he likes words like 'limn' and 'bosket' – and Germanic, but especially when biographical it gets livelier. 'My effort', he writes (p. 5), 'is first to observe the leading ideas of these individuals as they emerged from the interstices of personal interactions and then more carefully to explore those conceptions in order to reveal their inner logic and external relations'. Thought, that is, cannot be divorced from lives and lifestyles, especially in this case, and because the lives are intertwined, with women playing crucial roles, the story coheres and illuminates at least a central part of the elusive 'Romantic movement'.

For Liebig, *Naturphilosophie* was the Black Death of the nineteenth century, and despite Helmholtz's partial rehabilitation of Goethe's science, it seemed implausible to place this romantic science in any mainstream, especially when philosophy of science was closely linked to versions of positivism. To see polar forces everywhere was not exactly to anticipate the electrochemistry of Davy and Berzelius, or the laws of thermodynamics, and urplants and other archetypes seemed a long way from the close study of taxonomy, distribution and the fossil record that lay behind Charles Darwin's evolutionary theory, with its connections to Paley and Malthus. Richards seeks to show that this is wrong. Members of his cast of characters were doing serious science, genuinely proposing evolution. They not only made Darwinian evolution readily acceptable in Germany, but were part of its prehistory; Charles Darwin is for him a romantic biologist, bringing from Alexander von Humboldt not merely an aesthetic enthusiasm for tropical fecundity but an organic and value-laden vision of nature. Not the glum naturalism that many perceived, but good coming from evil, altruism from the struggle for existence, teleology and progress rather than mechanism, are what Richards sees in the *Origin of Species* and *Descent of Man*.

Richards conveys the excitement of Jena, a blissful dawn, and the particular importance of Schelling; but one-third of the book is concerned with Goethe and his 'scientific revolution'. Here we meet 'the erotic authority of nature': fine art, science, nature and women all coming together in the hands of genius – a term we find being applied to men of science, as Wordsworth did in response to Davy, in recognition that they too were creative. This macho worship of the goddess Nature, philosophically grounded in Spinoza's 'natura naturata', was very different from sober 'Newtonian' analysis of clockwork. Goethe's botanical and anatomical study led into morphology, to the vertebral theory of the skull, to the archetypes that became central to understanding life and its variety in Owen's less exuberant hands, and then to Darwin and Haeckel.

We might notice that Darwin had an evolutionary shrub where Haeckel had a tree, and wonder about their affinity. Jena was a small place, and Weimar nearby, so informal and immediate contact was the key. But as Alexander von Humboldt recognized, Paris was really the centre of things in science. There, making a career, one specialized, published in journals, taught in institutions and sought to establish laboratories and research schools in the new world of 'professional' science that was opening up. It was not to be long, and Wilhelm von Humboldt's University of Berlin was a leader, before this kind of science spread to Germany, Britain and beyond, and these aspects are what historians of science have mostly looked at since their ties with philosophers have weakened. They went with empiricism, or even positivism, while fine writing was left to travellers and popularizers. But reading Richards, one cannot doubt that despite Charles Darwin's distaste for Oersted's *Soul in Nature* (1852), and the row in the Ray Society that attended the publication of Oken's *Principles of Physiophilosophy* (1847), romantic ideas about the nature of life cannot be sidelined. They were an important part of the cultural dimension of science. Richards reminds us of people and events that historians of science must take note of; it is therefore a pity that he does not cite English translations of his primary sources where these are available.

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Hugh Torrens, **The Practice of British Geology, 1750–1850**. Variorum Collected Studies Series, CS736. Aldershot: Ashgate, 2002. Pp. 372. ISBN 0-86078-876-8. £59.50 (hardback).
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To those familiar with the history of the earth sciences, the name of Hugh Torrens will be quite familiar. Over the past few decades he has remained committed to excavating the life and work of forgotten personalities who had a notable effect upon how the Earth's subterranean composition was viewed in Georgian, Regency and Victorian Britain. For the most part his research has intentionally avoided many of the grand-scale theories written by armchair philosophers. Instead, he has focused less on the 'thinkers' and more on the 'doers' who shaped the practice of collecting minerals, drafting stratigraphic maps, fashioning drills and extracting extraneous fossils. In pursuing these topics, he has delved deep into previously untapped and often remote archival collections and he has gone to great lengths to locate defunct material objects often missed by historians enamoured of paperwork and published sources.

Because of the specific nature of Torrens's research, he has often chosen to publish his articles in journals and edited books that are not mainstream sources for most historians of science. *The Practice of British Geology* is a collection of such works and its publication makes it easier for Torrens's research to be housed on the shelves of university libraries. The book's chapters are previously printed articles, most of which came out during the 1990s. On the whole, Torrens interprets the word 'geology' quite liberally and this allows him to address a plethora of episodes in the history of the earth sciences, including events that are sometimes narrow-mindedly included under the history of chemistry, mineralogy, palaeontology and even the social construction of scientific societies and periodicals. Additionally, though most of the book's chapters focus upon Britain, there are sections devoted to America, Italy and Australia. In every essay the reader will encounter the names of miners, surveyors, cartographers, prospectors, lapidaries, conchologists, engineers and travellers that have received scant attention elsewhere. Indeed, the book's index is itself an invaluable reference resource and its breadth points to Torrens's impressive forty-six geologically relevant entries in the new *Oxford Dictionary of National Biography*.

Throughout the book, the careers of the following 'practical geologists' receive close attention: John Williams (1732–95), William Smith (1769–1839), John Farey (1766–1826), James Ryan