

## Book Reviews

(and, as significantly, so far ignored by historians).

Historians of science and medicine who are not interested in the minutiae of the chemistry of life will, nevertheless, find the volume an extremely useful reference source. There are helpful names and subject indices and a generous 184 pages of bibliography. Such readers will particularly enjoy the three introductory chapters, partly drawn from the author's *A skeptical biochemist* (1992), that are new to this edition. Here Fruton offers helpful distinctions between the "research disciplines" created autonomously by the interplay of practising and publishing biologists and chemists, and "academic disciplines" that are promoted (or otherwise) by institutional, administrative or government policies. He also provides a wonderful worldwide survey and guide to the institutional settings in which the interplay of biology and chemistry has taken place, and an intriguing series of reflections on the way that biological and chemical issues (such as vitalism, teleology, reductionism and organization) have continued to fascinate philosophers, even if biochemists themselves have ceased to be directly influenced by philosophy. Fruton emerges as a happy-go-lucky realist and empiricist. To Paul Feyerabend's quip that scientists do not solve problems because they have a method or theory of rationality but "because they have studied it a long time", he forcibly adds "and by putting more women and men on the job".

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**Martin J S Rudwick,** *Georges Cuvier, fossil bones, and geological catastrophes: new translations & interpretations of the primary texts*, University of Chicago Press, 1997, pp. xvi, 301, illus., £27.95, \$34.95 (0-226-73106-5).

Georges Cuvier, pioneer of vertebrate palaeontology and comparative anatomist at the Muséum national d'histoire naturelle in Paris from 1795 until his death in 1832, was arguably the leading scientist of France—and the most brilliant naturalist in Europe—during the first quarter of the nineteenth century. Modern biographers have produced excellent analyses of his careers as zoologist and scientific administrator, but his place in the history of geology has not been well preserved. Anglophone geologists of the later nineteenth century stressed his leadership of the losing side in two crucial debates: uniformitarianism versus catastrophism in the history of the earth, and evolutionism versus species fixity in the history of life. To make the victors' history as clear and simple as possible, Cuvier the catastrophist was cast as a miracle-monger anxious to find support for the Bible in the record of the rocks, and thus an obstructionist to proper geological theory. Twentieth-century geological textbooks perpetuated this flawed, positivist interpretation.

During the past three decades, however, Cuvier's geological beliefs and accomplishments have undergone re-examination by historians of science such as Reijer Hooykaas, Roy Porter, Stephen J Gould and, most importantly, Martin Rudwick. The rereading of Cuvier's publications has re-established his rigorously literal empiricism in analysing the Paris basin's discontinuous strata and their discontinuous fossil contents. Moreover, no one was more critical than Cuvier of the uncontrolled speculation that had typified the "theories of the earth" of his predecessors, speculation that produced only "a fruitless web of hypotheses and conjectures" (p. 103).

In the present volume, Rudwick completes this revision of Cuvierian science by presenting new translations of nineteen of Cuvier's most important geological writings and elaborating the details of their contexts. The writings span the period

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1791–1812 and range in length and fame from fragmentary notes of popular lectures on geology at the Athenaeum, to the 70-page ‘Preliminary discourse’ to the *Recherches on fossil bones*—his most celebrated geological treatise. They also document the phenomenal rise of Cuvier’s career, from serving as tutor to a noble family in Normandy at the age of 22, to dominance of the natural history community in Paris, in just over twenty years.

The opening gambit in Cuvier’s carefully orchestrated elevation was his demonstration of the reality of species extinction—to a world that had long believed the loss of species to be impossible in God’s wise and providential scheme of Nature. Extinction, an assumption central to later nineteenth-century geology and evolutionary theory, makes repeated appearances in these translations—from the initial ‘Memoir on the species of elephants, both living and fossil’ (1796), to the fuller argument presented in the ‘Preliminary discourse’—which help document, if not explain, this important revolution in biological thought. Sadly, surviving records apparently do not tell us precisely how (and in whose company) Cuvier arrived at his conviction in extinction or his decision to risk his infant career on its explication.

Rudwick’s selection does display many other events and trends central to Cuvier’s geological development. Among them are his articulation of the anatomical rules necessary for reconstructing the skeletons and inferring the habits of fossil mammals; his dependence upon colleagues and workmen for field observations to supply and confirm conclusions he reached largely in his workspaces at the museum; his reliance on the histories of many traditional cultures, as well as the intermittent record of the rocks, to support his catastrophism; the gradual growth of his confidence in venturing modest speculations beyond the revered “positive facts”; and the challenges of making sense of strata in the decades

when stratigraphic science was just being born. All this provides ample justification for why Cuvier was a catastrophist, and explanation of just what sort of catastrophist he was.

Rudwick has given us the keys to understanding the thought of nineteenth-century France’s most brilliant geological innovator. The next steps should be to document in detail how Cuvier’s innovations spread beyond France to influence the natural history traditions of the rest of Europe, and to rewrite the geology textbooks.

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**Leonard Warren, *Joseph Leidy: the last man who knew everything*, New Haven and London, Yale University Press, 1998, pp. xvi, 303, £25.00 (hardback 0-300-07359-3).**

This biography of Joseph Leidy takes us into the heart of nineteenth-century medical Philadelphia. Leidy is little known in Europe today but was then, for more than thirty years, one of the most noted men of Philadelphia, renowned for his anatomical skill, his scientific learning, his versatility, public philanthropy, and personal charm. Professor of Anatomy at the University of Pennsylvania 1853–71, and a founding member of the National Academy of Sciences, he played a key role in reforming American medical education. He was an introverted man, however, much preferring microscopical researches into parasitology and protozoology than dealing with either patients or medical students. Nevertheless, he introduced a course on the new physiology in the medical school at Philadelphia, which he opened to women (and their Papas), ensured that histology became a significant part of the curriculum,