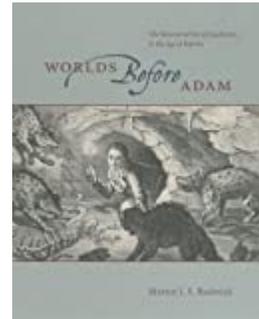




Martin J. S. Rudwick. *Worlds before Adam: The Reconstruction of Geohistory in the Age of Reform.* Chicago: University of Chicago Press, 2008. Plates. xxii + 614 pp. \$49.00 (cloth), ISBN 978-0-226-73128-5.



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Revelations and Revolutions in Nineteenth-Century Earth Science

At the turn of the nineteenth century, the intellectual center of the world—at least as far as it concerned paleontology, geohistory, and the emergent science of geology—was the Muséum d'Histoire Naturelle in Paris. There, George Cuvier, one of the most famous savants in the world, oversaw a network of intellectual exchange in which fossils, mineral samples, and travelers' eyewitness reports from across the globe were brought together in an effort to reconstruct the history of the earth and to explain the mechanisms of its development (p. 11). From this scholarly hub, a Latourian center of calculation, Cuvier pioneered the science of stratigraphy, and, based on his comprehensive analysis of fossil records, expounded a catastrophist interpretation of earth history that provided the baseline to those savants engaged in geohistorical reconstruction (p. 22). Within twenty years of the publication of Cuvier's four-volume, agenda-setting *Recherches sur les Ossements Fossiles* (1812), however, the explanatory framework of geology had altered almost entirely—the consequence of the rise to dominance of the uniformitarian doctrine propounded by

the lawyer-turned-geologist Charles Lyell and the emergence of Louis Agassiz's revelatory glacial theory. In tracing the occasionally halting, often rapid developments that shaped the character of earth science in the first half of the nineteenth century, Martin J. S. Rudwick's masterful volume provides a detailed account of the contrasting fortunes of fluvialists and diluvialists, uniformitarians and catastrophists, while also affording valuable insights into the nature of scientific thought; the role of communication, travel, and fieldwork in the making of knowledge; and the importance of culture and religion in conditioning the reception and repudiation of scientific ideas.

Worlds before Adam is an erudite and insightful sequel to Rudwick's 2005 volume *Bursting the Limits of Time*. It narrates practical scientific work and theoretical speculation, which, in the quarter century between 1820 and 1845, saw geohistory refined by an increasingly sophisticated understanding of the causal mechanisms of geology. During this period, a closer integration of empirical study and theoretical conjecture allowed geologists

to reconstruct a consistent outline of geohistory ... congruent with ... what geologists in the twenty-first century accept as valid (p. 7). Revealed by this claim is the overtly presentist and progressivist character of Rudwick's account—a quality that, he fears, may give my fellow historians the impression that I am irredeemably Whiggish in my interpretation (p. 560). Although the notion of progress toward a more complete understanding of geological processes is central to Rudwick's narrative (reflecting, as it does, the imperatives of the community of savants he describes), the book is concerned less with the idea of an ultimate Truth than it is with documenting quite how science works—its impasses and revelations, its disputes and moments of consensus (p. 561). Rudwick is, in this respect, as attentive to charting the lines of scholarly inquiry that later were refuted as he is in tracing those that can be seen to have prefigured the current state of geological knowledge. The implication of *Worlds before Adam* is, in fact, that scientific knowledge is endlessly corrigible, and that it is, therefore, unwise to equate the current state of scientific knowledge with ultimate Truth (p. 561). Despite the volume's particular disciplinary focus, Rudwick makes a broader (although implicit) contribution to the history of science by providing an account of "progress" in science which complements and extends that outlined by Thomas Kuhn in *The Structure of Scientific Revolutions* (1962).

Rudwick's thirty-six chapters, divided equally between four parts, offer a narrative that is both thematic and prosopographical. Like its preceding volume, *Worlds before Adam* is a monument of logical arrangement—clearly articulated and usefully supplemented by more than 160 instructive plates. Rather than present a strictly chronological account—something that the profuse and multiple character of geological investigation during the period of Rudwick's study renders somewhat impractical—the book traces a series of parallel and overlapping accounts that reveal the history of earth science through the lives of its central protagonists: William Buckland, Alexandre Brongniart, Henry De la Beche, and George Greenough, among others. This Dickensian rendition (Rudwick cites *Bleak House* [1852-1853] as a stylistic interpretation for his parallel narratives) vividly captures the thrill of a science that was developing at almost breakneck speed, while also documenting and contextualizing the intellectual uncertainties, theological quan-

daries, and personal rivalries that were engendered by the efflorescence of innovation and revelation during this quarter century (p. 8). Rudwick shows that, at base, this period was defined by the efforts of savants to understand the causal mechanisms of geomorphology, and to determine whether the characteristics of the earth's surface could be accounted for purely by the gradual work of currently observable fluvial and tectonic processes, or if they depended on a revolutionary event, such as a global deluge, having occurred in the earth's distant past. Although the data and observations that informed these explanatory schemes were largely the same, the interpretation placed on them was radically different. Again, Rudwick is not interested in judging the inherent validity of the uniformitarian or catastrophist perspectives; rather, he seeks to understand why their proponents believed what they did, and to explain how the conceptual incommensurability that these contrary positions engendered was negotiated and resolved. Rudwick makes an important contribution, in this way, to our understanding of the theory dependence of observation and the role of uncertainty and conflict in scientific "progress" (however that problematic term is defined).

Taken together, *Bursting the Limits of Time* and *Worlds before Adam* represent close to two million words of intelligent and scholarly commentary on the history of earth science. More than that, however, Rudwick's volumes afford significant insights into the nature of scientific activity and the production and reception of knowledge. It is only, however, in the brief concluding postscript to *Worlds before Adam* that Rudwick makes explicit the implications of his work in respect to the history of ideas. It is perhaps to be regretted, then, that this postscript did not instead form the preface to his first volume, since Rudwick's broader contributions—which will be apparent to, and valued by, historians and geographers of science—are only ever stated implicitly. It is Rudwick's hope, however, that despite the omniscient scope of his twin volumes, they should not be regarded as the last word on their subject but as one of the first (p. xxi). *Worlds before Adam*, and its predecessor, have value not only in their comprehensive and fascinating content, but also in providing empirical and intellectual grist to those historians and geographers for whom the production of scientific knowledge, its circulation and reception, its warranting and contestation, are important concerns.

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