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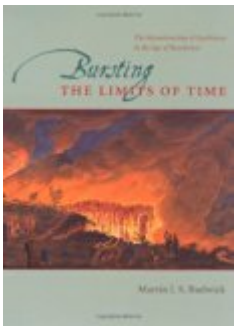
Martin J. S. Rudwick. *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution.* Chicago: University of Chicago Press, 2005. xxiv + 708 pp. $45.00, cloth, ISBN 978-0-226-73111-7.



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When, on 3 August 1787, the Swiss savant Horace-Bénédict de Saussure crested the summit of Mont Blanc, he was afforded a unique perspective on the Alpine massif--an effectively cartographical gaze which took in the mysterious network of peaks and glaciers. For Saussure and fellow savants in pre-Revolutionary France, the mountains eluded explanation: their age and the mechanics of their formation were enigmatic. Saussure's ascent of Mont Blanc forms the narrative baseline, the "golden spike," in Martin Rudwick's masterly and erudite account of European geohistory (p. 639). Beginning quite literally at the top, ***Bursting the Limits of Time*** seeks to explain how the Alpine massif, and the earth itself, came under empirical scrutiny during the Age of Revolution, and how the international scholarly community--through work on geotheory, geognosy, mineralogy, physical geography, and the infant science of geology--contributed to debates about the formation, age, and structure of the world.

Rudwick's project is not principally an attempt to trace the origins of disciplinary geology; rather it is a more welcome, although he fears "deeply unfashionable," effort to describe the development of the practical elements of earth science. In so doing, he shows how the disparate skills of naturalists, philosophers, mineralogists, colliers, and quarry men informed the development of particular ideas about the history of the earth (p. 4). This attention to practitioners and practices affords an important opportunity to consider "the ways in which specific concrete claims to reliable knowledge were formulated, argued over, and consolidated or rejected" (p. 4). Rudwick's volume speaks, therefore, to an audience beyond those immediately concerned with the history of earth science--addressing, as it does, the reasons why specific ideas in science come to be accepted or repudiated. In this respect, ***Bursting the Limits of Time*** can be seen not only to complement existing work on the history of geology and earth science, but also to contribute more broadly to work in the history of science concerned with truth, credibility, and the communication of knowledge.

Rudwick's ten chapters are divided between two equally sized parts. The first part outlines, in

considerable detail, the scholarly life of Europe in the closing decades of the eighteenth century. This discussion provides an important intellectual context to Rudwick's examination, in the book's second section, of the development of the sciences of the earth, and the emergence of various theories explaining the earth's origin and physical processes. In line with the intellectual topography of the period in question, and in his desire to redress the Anglocentrism of certain histories of geology, much of Rudwick's focus is upon the practice of earth science in France. This continental orientation allows Rudwick to emphasize the important contribution of savants such as George Cuvier, Jean-André de Luc, and Abraham Werner, and to demythologize James Hutton's paternal role in the development of geology. In detailing the complex intellectual environment of Europe at the close of the eighteenth century, and in charting the rich efflorescence of geotheory, Rudwick's volume covers significant territory. In contrast to its physical heft, *Bursting the Limits of Time* is written with an enviable lightness of touch. Intelligently arranged, each section of each chapter has a succinct conclusion in which the essential elements of the preceding discussion are neatly distilled. In addition, the volume is comprehensively cross-referenced, and richly illustrated with almost 180 plates, which, in almost all cases, complement the narrative and assist interpretation.

Rudwick devotes considerable attention to the spaces of earth science, particularly to the epistemic tensions evident between the sensual immersion of work in the field, and scholarly and synoptic work in the museum and laboratory. Rudwick describes how fieldwork became essential to "establish any credibility or authority" in geotheory, whilst "indoor speculation" remained an important component of mineralogy and paleontology (p. 42). The study of fossils, in particular, depended upon their circulation by proxy in the form of illustrations. Not only did paper representations of rocks, fossils, and landscape features effectively collapse the geographical separation between field and museum, but also they permitted simultaneous comparison of specimens, facilitating their identification and classification. Paralleling this material translation of knowledge, the linguistic relocation of scholarly work exerted a significant influence upon the consumption of ideas in the Republic of Letters. Rudwick shows, for example, that work by George Cuvier, when translated into English, was "distorted" by its editor, Robert Jameson, to serve as a geotheoretical system which might challenge that of Hutton (p. 510). As Rudwick claims, this demonstrates the complex politics and disparate personal motivations which underpinned work in the earth sciences.

Bursting the Limits of Time is a monument to Rudwick's scholarship, and, despite his fears to the contrary, provides an engrossing, convincing, and entirely fashionable account of the ways in which the earth was brought to scholarly attention at the turn of the nineteenth century. Despite the volume's considerable scope, there are aspects of Rudwick's contextual narrative from which the reader might wish more. In his discussion of physical geographers, for example, Rudwick frames their work as principally descriptive, rather than explanatory. Whilst this might be true for a number of French savants engaged in chorography during the eighteenth century, there was, arguably, a nomothetic basis to much work in physical geography elsewhere in Europe. This is a minor criticism. Rudwick is to be congratulated on a volume which speaks not only to the history of geotheory, but also to the conduct of international science, to issues of warrant and credibility, and to the transmission and reception of knowledge. Rudwick's planned sequel--tracing the development of earth science during the nineteenth and twentieth centuries--is, therefore, to be anticipated eagerly.

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