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Martin J. S. Rudwick, *Scenes from Deep Time: Early Pictorial Representations of the Prehistoric World* (Chicago: University of Chicago Press, 1992), xiii + 280 pp., \$45.00.

For many of us inhabiting the world of the late twentieth century it is hard to imagine a world without deep time. From now-classic films like Walt Disney's *Fantasia*, to television programs like Carl Sagan's *Cosmos* and the popular writings of Stephen Jay Gould, as well as the ever-popular displays lining the halls of natural history museums across the world, awareness of the immensity of the prehistoric time scale and our own later appearance are so constitutive of our culture that belief in deep time is largely taken for granted.

Martin Rudwick's *Scenes from Deep Time* serves as a reminder of a world in the process of recognizing the vast expanse of its own prehistory. "Deep time" – a phrase borrowed from John McPhee's *Basin and Range* (1981) – expresses the especially unimaginable magnitude of this time scale; "Scenes" refers to the book's focus on attempts to pictorially represent the enormity of this time scale and the sequences of events that gave rise to the origin of the world and of life, and the appearance of the first humans.

The pictorial representation of deep time, as Rudwick points out, raises a special set of problems. Unlike lived time, or historic time, deep time denotes a prehuman and preobservational moment. Without human eyes to witness scenes of origin, the imaging (as well as imagining) of these scenes is an especially critical problem. Given this problem, one way that finished scenes of deep time function is to make visible what is invisible, and to give the illusion that the viewer can become witness to what is actually unseeable. Borrowing a notion from the influential *Leviathan and the Air-Pump* (1985) by Steven Shapin and Simon Schaffer, Rudwick argues that scenes of deep time thus serve (and served) to make

the viewer a “virtual witness” to a world “that vanished long before there were any human beings to see it” (p. 1).

The historical study of the construction of the actual scenes, as Rudwick views them, raises an even wider range of related problems. Appearing to be realistic, or at least as realistic as possible, scenes from deep time, especially as the genre emerged in the nineteenth century, represented assemblages that were actually based on theoretical inferences drawn from extremely fragmentary evidence. Underdetermined by the available data (drawn mostly from fossil remains then being unearthed), the scenes carried over conventions from artistic and literary traditions into the finished representations. Like any other completed work of art (here Rudwick’s position resembles art historian Michael Baxandall’s theories of the historical explanation of pictures), the finished scenes from deep time were cultural products of historically rooted and culturally embedded conventions.

The same cultural construction of the scenes from deep time makes them of especial interest to the historian and philosopher of science. Representing a juxtaposition or intersection of both artistic and scientific traditions, these scenes relied heavily on the skills and the collaborative interaction of both artists and scientists. A close examination of their construction can thus make transparent the historic interdependence of both artist and scientist, a relationship that has been frequently obscured by the almost exclusive emphasis on the scientific value of the finished representations. Of equal philosophic importance are considerations of how sequential scenes were altered alongside the obviously increasing data-base of fossil evidence. Here, Rudwick draws on Bruno Latour’s notion of a “cascade” of representations (from “Visualisation and Cognition” [1976]) to argue that representations of deep time offered progressively bolder reconstructions of unobservable time. Though they may be viewed as rational reconstructions of what appears to be a process of scientific discovery in a “growth” or cumulative model of science, Rudwick argues convincingly that the finished representations are also human and cultural constructions. This is a critical feature of his analytical perspective.

Rudwick’s actual analysis tells the story (in narrative mode) of the origin, emergence, and maturation of the scenes from deep time. At their inception, they drew heavily from a variety of Western cultural influences that included the biblical tradition on the origins of “man” (predictably enough, nearly always depicted as a white Western male surrounded by subordinate females) and artistic movements in landscape art associated with themes of the sublime. While the scenes from deep time may be seen to occupy a well-

defined location within these established cultural forms, Rudwick argues that a distinct *genre* of representation unlike any other emerged in the 1860s. This genre, he argues, was closely related to the increasing discoveries of extinct fossil forms and the simultaneous growing awareness of the age of the earth and its evolutionary history. The development of and increasing emphasis on this genre of representation was also closely linked to the development and emergence of the professional study of the earth's history, the discipline of knowledge becoming defined as "geology." In this disciplinary context, purportedly "scientific" representations of earth history, which effectively concealed their aesthetic or literary influences, also served an authorizing and legitimating function. The theme of legitimation, and of how related cultural conventions were carried over (though not always intentionally) into the scenes as part of this effort, is an especially interesting feature of Rudwick's analysis. Equally interesting is how the genre was altered as it made its way into wider audiences through the textbooks of the newly emerging geology and the popular science designed for younger readers.

The book itself – without surprise – relies heavily on reproducing scenes from deep time, arranged so that they appear to tell a story of their own development. Accompanying them is a brief narrative commentary and description by the author. Additional textual material from the original sources that described each scene is reproduced (frequently in translation) for the reader. While the author's narrative serves as a useful guide (Rudwick encourages readers to develop their own perspective in his concluding section), and raises a range of theoretical problems for the thoughtful reader, it is the scenes themselves that draw our attention. Handsomely reproduced and beautifully displayed, they evoke a range of contradictory emotions that range from the comic to the horrific.

Readers of this journal will be especially pleased to see many familiar drawings satisfyingly historicised. Among these are the very widely reproduced drawings from *Henre De la Beche* (of Rudwick's *Great Devonian Controversy* fame), which include "Awful Changes" (1830), the cartoon of Charles Lyell as "Professor Ichthyosaurus," as well as the more sobering *Duria antiquior* (1830), the cartoon of life in "a more ancient Dorset." Practising paleontologists (especially paleobotanists) will resonate with the problems of representing assemblages for which exceedingly fragmentary and frequently confusing evidence exists. Here Christian Hohe's remarkable artistic representation of botanical assemblage entitled "Overall View of the Coal Period" (1844) for August

Goldfuss's *Fossils of Germany* is especially noteworthy for its attempts to represent a Carboniferous forest based on incomplete paleobotanical evidence: only the trunks of the arborescent forms are shown, with the leaves left out altogether! Historians of evolution will see the familiar Tennysonian "nature red in tooth and claw" theme chillingly displayed in many scenes, such as John Martin's "The Country of the Iguanodon" for Gideon Mantell's *Wonders of Geology* (1838) and the related "The Iguanodon and the Megalosaur" from Louis Figuier's *Earth Before the Deluge* (1863). Especially moving – to this reviewer at least – is the sequence of drawings representing the early stages in the emergence of the genre, as embodied in Johann Scheuchzer's biblical images from *Sacred Physics* (1731), which blur the distinction between art and science, and the more mature forms of the genre, like "The Period of the Muschelkalk [Middle Trias]" by Franz Unger (1851), a melancholic image of the solitary struggle of *Nothosaurus giganteus* in a swirling and desolate moonlit seascape.

According to Rudwick, the book is intended for current-day museum workers, who will be interested to see how their representational practice draws on many sources, and the extent to which even their own more contemporary representations rely on the combination of fragmentary or inadequate evidence and contemporary cultural conventions. But the book will, I suspect, have an even wider appeal: from historians of science to cultural historians, from practicing paleontologists to art historians (who appear not yet to have attached meaning to *this* genre), the images in this book will speak to most anyone. If there is range of emotions evoked by the images themselves it is because consideration of deep time forces us to confront the insignificance of our own existence. This existential theme is played out in many of the scenes, but is especially vivid in Johann Scheuchzer's "The Creation of Man from the Dust of the Earth (*Homo ex Humo*)." Here, an inner pastoral picture representing the "shining" moment of the creation of "man" among other lower forms of life is encased in an organic outer frame composed of grotesque neotenus reproductive and skeletal forms; the contradiction between the glorious story of life told by the inner picture, and the macabre death-forms framing the pastoral creation of life, serves as a powerful reminder of the central theme of Western thought: the dichotomous relationship between life and death. *Scenes from Deep Time* reminds us that behind any celebratory picture of life lies the horrific reminder of death.

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