The theme of *The Landforms of Japan* can be identified without even opening it. The book jacket displays an aerial photograph of Asama volcano, which in 1783 erupted and produced a spectacular pyroclastic flow. The flow consisted of large blocks propelled with such power that they eroded a trough 1 to 2 kilometers wide and up to 40 meters deep as they moved 8 kilometers from the volcano. Clearly Japan is a showcase for the long-term geomorphic action of volcanism, active faulting, and related tectonism. Moreover, the book emphasizes that landform details are shaped by mass movements and floods, many of which are generated by typhoons.

Yoshikawa, Kaizuka, and Ota explain that they originally planned that this book would be published on the occasion of the 24th International Geographical Congress, held in Tokyo in 1980. Although publication was delayed until 1981, the authors have certainly achieved their avowed purpose of explaining Japanese landforms in an Occidental language. They can even be forgiven for inventing the word "unformitarianic" to describe the repeated occurrence of "catastrophic" changes in landforms following a similar pattern over a long history of landscape development. This lesson, so obvious in Japan, was somehow resisted by the majority of Occidental geomorphologists through a century of uniformitarian tradition.

The relationship between humans and landscape is a matter of deep appreciation among Japanese geomorphologists. Modern geomorphology began in Japan following the great 1923 Kanto earthquake. The human tragedy of this disaster, 143,000 lives lost and 128,000 homes destroyed, showed the hazard of the geologic environment. However, the event also showed the importance of Holocene stratigraphy. Of the houses founded on valley bottoms underlain by thick Holocene mud and peat, 68 to 90 percent suffered collapse. But houses located on relatively thin Holocene units overlying buried abrasion platforms experienced a mere 1 percent chance of collapse. Geomorphology was found to be of immense practical, as well as academic, value.

The Landforms of Japan is highly recommended as an introduction to geomorphic research in the Japanese Islands. This refreshing Oriental perspective will reward its Occidental readers by conveying a dramatic perspective on the interplay between tectonism and denudation. Neogene sedimentation, mountain building, erosion surfaces, glacial-eustatic sea-level changes, Quaternary climatic change, marine terraces, and coral reefs complete the dramatis personae on the great stage of Japanese geomorphic history. The message of classical tragic theater was that one must suffer to be wise. Here then is a relatively painless source of geomorphic wisdom.

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The 18th Century Reconsidered

The Ferment of Knowledge. Studies in the Historiography of Eighteenth-Century Science. G. S. ROUSSEAU and ROY PORTER, Eds. Cambridge University Press, New York, 1980. xiv, 500 pp. $39.50.

This volume's subtitle summarizes its chief purposes: not to examine the history of the science during the 18th century, but rather to indicate how that history has been written, what directions might be taken by future research, and what provisional syntheses might now be made. As editors and contributors explain, there has been a remarkably persistent tendency even among historians of science to regard this period as a "trough" between the heroic ages of 17th- and 19th-century science.

On the whole, the volume fulfills its goals admirably, albeit unevenly so. Most chapters do indeed provide at least adequate guides to modern literature on their subjects. Matters needing study, however, are handled erratically, and the reader will often have to guess that what is not discussed has in fact not been studied. For example, in keeping with the state of modern scholarship, relatively little explicit attention is given to neglected non-English and non-French people, archives, and topics. Similarly, there is some tendency to stress the need for large syntheses, with erratic acknowledgement of the fact that narrower studies still are in short supply.

Despite such unevenness, most chapters open up future prospects for research, and many offer stimulating and original syntheses (tentative, to be sure). Both qualities are evident in the highest degree in the chapters by Jacques Roger ("The living world"), John L. Heilbron ("Experimental natural philosophy"), and G. S. Rousseau ("Psychology"). Roger considers whether there could be a science called "biology" before there was a concept of "life"—that is, before biomechanism and animism gave way to "a vitalism that abandoned neither the mechanical nor the chemical explanations but recognized the originality of living beings and made possible a more phenomenological approach" (p. 277). Heilbron's specialty is the history of electricity, and his use of this seemingly narrow field as a model for the exploration of other experimental sciences can only be called superb. Rousseau deals with a field that no one defined in the 18th century but whose subject matter turns up repeatedly in a great variety of writings; in suggesting ways to approach this area and places to look for relevant information, Rousseau provides an important model for those interested in the history of the social sciences—especially sociology and anthropology—which did in fact have their origins in the 18th century.

For specialists, one of the pleasures of this volume will be the opportunity to see how the experts view their fields in contexts broader than what is possible within a monograph. In addition there are the pleasures of seeing how different authors treat the same topics—Newtonianism, for example, is a pervasive theme, revealing more variations than a Bach fugue. But specialists and nonspecialists alike will get little enlightenment from two chapters: H. J. M. Bos on "Mathematics and rational mechanics," and Eric G. Forbes on "Mathematical cosmography." Anyone interested in rational mechanics will appreciate Bos's analysis of the work of Clifford Truesdell on Euler, but one would naturally like to see some discussion of the available scholarship on people like d'Alembert and Laplace. Forbes chose to present not historiography but an original piece of research on some branches of astronomy as these were investigated by the Nuremberg Cosmographical Society. The limitations of these chapters are indicated by the fact that Forbes mentions Laplace once in passing and that Bos refers to him not at all.

The editors made the laudable decision to deal with scientific fields as these were defined or ill-defined in the 18th century, and most contributors discuss the then-existing connections between fields now considered distinct. Even M. P. Crosland's "Chemistry and the chemical revolution," which seems to delineate a recognizably modern field, deals with matters that will seem strange to modern chemists, who ought also to consult passages and chapters devoted to theories of matter, experimental science, and natural philosophy. Modern physicists will have to do even more digging.

In addition to obviously relevant chapters by Bos and Heilbron, consultation of the index will reveal three quite different definitions of "physics."

Another problem will confront readers unfamiliar with the works of Michel Foucault, who is cited repeatedly in the first two-thirds of this volume. To understand this French philosopher-historian requires the learning of an esoteric language in which seemingly ordinary words like "context" (or "contextualism") and "discourse" are given special connotations. The uninitiated reader is advised to start with the first pages of Roger's chapter and the final pages of Rousseau's, and then to consult Schaffer's longer discussion (the chapter on "Natural philosophy") of Foucault and other philosophers of science.

Steven Shapin's "Social uses of science," the latest entry into the long and futile debate between so-called externalist and internalist historians of science, presents other problems. Since most of the contributors treat the social dimensions of their topics, and since it is a cliché of modern life that science does have social uses, the reader may well wonder at Shapin's aggressive, polemical defense of his subject. Shapin observes that most internalists have neglected contexts other than the philosophical and the religious and moves from this point to the assertion that ideas do not have a life of their own and that the more fundamental basis of ideas is social (p. 108 and elsewhere). Both assertions need examination. Though Shapin repeatedly calls for empirical research, one gets the impression that research should be directed toward validating what are being stated as obvious truths. How scientific ideas originate and how they are used are distinct and difficult subjects, and Shapin barely touches upon the former. Nonetheless, and while calling for more research, he is able to claim that "accounts of natural reality were constantly generated with a view to legitimating social arrangements" (p. 131). In response to charges that externalists are sometimes social determinists, or sound as if they are, Shapin accuses internalists of the same. Unfortunately for his argument, he interprets statements concerning the influence of Neoplatonic and alchemical literature on Isaac Newton as indicative of an underlying view that Newton was "passively shaped by" those books with which he was acquainted (p. 110). This curious interpretation reduces to nonsense any study of the history of ideas. There is also the question of how one defines social groups. Social historians have debated this issue for a long time, and some contributors to this volume, apparently unaware of the problem, are blithe in their statements about the ever-rising bourgeoisie. Shapin offers no definitions, but he inadvertently touches upon serious matters of social taxonomy: does one define "class" on the basis of shared ideas, social status, economic condition, or political influence or power? (There are other options, too, such as literacy.) Do advocates of different scientific theories constitute different social groups? Is it significant that anti-Newtonians are to be found in apparently different social groups? These admittedly large and controversial questions are more familiar to social historians than to historians of science who venture into social history. Far from wishing to discourage the pursuit of these topics, I would like to see them better handled, and I wish externalists would pay less attention to sociological models than to social historians like J. H. Hexter and Alfred Cobban.

If this review has tended toward the critical, it is because I wish that a fundamentally excellent volume were still better. What can be said without qualification is that the contents are so rich and varied that any reader will find them rewarding. Above all, no reader will come away from the book with the idea that "trough" could be an adequate description of scientific learning in that best of all possible centuries.

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