

book by Shapin, the two most recent attempts were Richard S. Westfall's *The Construction of Modern Science* (1971) and A. Rupert Hall's *The Revolution in Science* (1983). Unlike these and other predecessors, Shapin's book offers no survey of the major scientific developments in fields such as astronomy, cosmology, mechanics, optics, anatomy and physiology, and natural history. Rather, it contains but three chapters, each consisting of a provocative, relatively self-contained essay on the nature of scientific activity in 17th-century Europe.

Shapin's chapter titles nicely declare what this book is about: (i) "What was known?" (ii) "How was it known?" and (iii) "What was the knowledge for?" The first chapter, limited as it is to 64 pages (further reduced by illustrations), is of necessity a very selective account of 17th-century scientific achievements. Shapin concentrates on the overthrow of ancient cosmology and natural philosophy by Copernicus, Galileo, and their fellow heliocentrists; the creation of the mechanical philosophy by Descartes, Boyle, and others; and the mathematization of nature by Kepler and Newton. Selective and limited though it may be, Shapin's account is informed, nuanced, and articulated with clarity.

Chapter 2 offers a non-traditional account of 17th-century methodological developments. Of course, Shapin joins everybody else who has ever written on the topic in considering the central question of how inference from particular observations can lead to knowledge of universal causes and the attendant question of the level of certitude thus achievable. But readers familiar with Shapin's previous publications will not be surprised to find that he goes much farther, problematizing many of the certainties of traditional historiography. For example, he discusses meanings of the term "experience," tracing a crucial 17th-century shift in usage—from representing a statement of universally accepted fact (the product of many observations) to representing the particular experience of a particular natural philosopher. He discusses the practices by which private experiential knowledge could be converted into public property. As an example of the "making of scientific facts," Shapin analyzes Robert Boyle's use of the air pump. And he casts doubt on the value of 17th-century methodological theory for revealing anything about the actual scientific practice of the time, suggesting that the former should perhaps "be understood as a set of rhetorical tools for positioning practices in the culture and for specifying how those practices were to be valued" (p. 94).

Finally, in his third chapter Shapin turns to the social and political uses of 17th-century science. He believes that science is

"the contingent, diverse, and at times deeply problematic product of interested, morally concerned, historically situated people" (p. 165). It follows that the traditional view of science as an objective account of external reality, totally uncontaminated by human interests or passions, is untenable. However, Shapin insists, this is not to attack or devalue science but to reveal its richness as the human endeavor that it most surely is. Indeed, Shapin repeatedly affirms (both by word and by historiographic deed) his respect for the scientific enterprise—17th-century as well as modern—accepting its historically situated character but acknowledging also that it is "the most reliable body of natural knowledge we have got" (p. 165).

Viewed as a whole, Shapin's book is an impressive achievement. Informed readers will not agree with all of its interpretations and emphases: for example, I do not believe Shapin's portrayal of the background against which 17th-century developments are to be viewed does justice to non-Aristotelian alternatives. On the other hand, certain sections of the book are extraordinary for their insight and clarity: my future students will be required to read the discussions of the mechanical philosophy (pp. 30–54) and of the relationship between science and religion (pp. 142–55), which are superior to any other brief, introductory accounts available. Despite such virtues, I doubt that this book will attract a large readership among undergraduates; for, notwithstanding the sections praised just above, much of the book is packed with difficult ideas that will present a stiff challenge to all but the brightest and most dedicated. Nor do I believe that it will be seen as an adequate substitute for the traditional survey of major 17th-century scientific developments. I am hopeful, nevertheless, that Shapin's book will contribute to pedagogy in the history of science—if not as a required textbook, then as a teacher of the teachers, showing them how to communicate to their students a vision of science as a historically contingent, human activity.

David C. Lindberg

Department of History of Science,
University of Wisconsin,
Madison, WI 53706–1393, USA

Browsings

Australian Astronomers. Achievements at the Frontiers of Astronomy. Ragbir Bhathal. National Library of Australia, Canberra, 1996. viii, 236 pp., illus. Paper, \$A24.95. ISBN 0-642-10666-5.

Excerpts from oral history interviews with 18 astronomers, from Bart Bok to Jeremy Mould, along with biographical and

scientific background information.

Biological Psychology. Mark R. Rosenzweig, Arnold L. Leiman, and S. Marc Breedlove. Sinauer, Sunderland, MA, 1996. xxiv, 835 pp., illus. \$64.95. ISBN 0-87893-775-7.

A textbook that "explores the bodily bases of our experience and behavior," aimed at students with a variety of interests and backgrounds; CD-ROM, study guide, and other ancillary material also available.

The Collected Works of P. A. M. Dirac. 1924–1948. R. H. Dalitz, Ed. Cambridge University Press, New York, 1995. xxiv, 1310 pp., illus. \$250 or £175. ISBN 0-521-36231-8.

The first of two volumes bringing together the quantum theorist's scientific papers, arranged chronologically and accompanied by English translations when in other languages.

Concert and Opera Halls. How They Sound. Leo Beranek. Published for the Acoustical Society of America through the American Institute of Physics, Woodbury, NY, 1996. viii, 643 pp., illus. \$49.95. ISBN 1-56396-530-5.

An extensively illustrated account of 76 concert halls around the world accompanied by discussion of acoustical concepts, principles, and methods, and relevant architectural factors.

Conversations on the Uses of Science and Technology. Norman Hackerman and Kenneth Ashworth. University of North Texas Press, Denton, TX, 1996 (distributor, Texas A&M University Press, College Station). xiv, 109 pp. Paper, \$14.95. ISBN 1-57441-015-6.

A former chairman of the National Science Board is interviewed by the state of Texas's commissioner of higher education.

Cultural and Language Diversity and the Deaf Experience. Ila Parsanis, Ed. Cambridge University Press, New York, 1996. xiv, 306 pp. \$49.95 or £35. ISBN 0-521-45477-8.

A collection of 18 papers, including six "personal reflections," considering "the notion that deaf people are members of a bilingual-bicultural minority group" in the United States.

Encounters in Magnetic Resonances. Selected Papers of Nicolaas Bloembergen (with commentary). Nicolaas Bloembergen, Ed. World Scientific, River Edge, NJ, 1996. x, 550 pp., illus. \$86, ISBN 981-02-2505-9; paper, \$36, ISBN 981-02-2590-3. World Scientific Series in 20th Century Physics, vol. 15.

Thirty-three reprinted papers by the Nobel Prize winner with an autobiographical introduction and prefatory comments on individual papers or groups thereof.

Correction

In the heading of the review of *Comparative Vertebrate Neuroanatomy* (25 Oct. 1996, p. 521) the surname of the second author of the book, William Hodos, was misspelled and the ISBN number of the book, 0-471-88889-3, was given incorrectly.