Vignettes: The Human Heritage

The desire to dictate the behavior of others is such a timeless and universal attribute of our species that it must rank with the sex drive, maternal instinct, and the will to survive in terms of the likelihood of its being part of our biological heritage.

—*Frans de Waal*, in *Good Natured: The Origins of Right and Wrong in Humans and Other Animals* (Harvard University Press)

Even a casual analysis of the number of ways the concept of fear can be expressed in the English language reveals its importance in our lives: alarm, scare, worry, concern, misgiving, qualm, disquiet, uneasiness, wariness, nervousness, edginess, jitteriness, apprehension, anxiety, trepidation, fright, dread, anguish, panic, terror, horror, consternation, distress, unnerved, distraught, threatened, defensive. The so-called ascent of man occurred in spite of the continued existence of fear rather than at its expense.

—*Joseph LeDoux*, in *The Emotional Brain* (Simon and Schuster)

development of the Internet, the vast network of networks that is now a fundamental element of the country's information infrastructure.

Like most popular narratives, this one focuses on people: the team at BBN that devised and installed the Interface Message Processors (IMPs) that served as ARPANET nodes; the researchers at the network sites (many of them graduate students) who made the system work and developed many of its specifications; the network users who unexpectedly made e-mail the most popular network application; and the officials at DARPA who conceived and funded the ARPANET and the later work on TCP/IP, the protocols that made the Internet possible. The authors convincingly demonstrate that the work on the ARPANET and Internet, as in the rest of the field of computing, was a team effort, with contributions from many individuals and organizations. They also show the importance of having people of vision in charge of such efforts, especially, as in the case of the ARPANET, when there is resistance from many who say the technology will not work.

Where Wizards Stay Up Late is a highly readable book. Indeed, it compares favorably with Tracy Kidder's *The Soul of a New Machine*, the Pulitzer Prize–winning account of the development of a commercial computer. Like Kidder, Hafner and Lyon show great skill in teasing an interesting story out of a complex tale and in maintaining the narrative while explaining highly technical concepts. To help bring life to the subject, they throw in plenty of amusing anecdotes, such as tale of the first-time network user at an early demonstration of the ARPANET. The man typed an instruction at a terminal and, receiving the response "HOST DEAD," cried out in terror, "Oh, my God. I've killed it!" (p. 181). The book is well researched. The authors rely heavily on original documents and oral histories, including many of the interviews conducted by Norberg and O'Neill for the IPTO history, which are currently on file at the Babbage Institute.

Philip Shiman
5505 Ivor Street, Springfield, VA 22151, USA

■

A Mixed Career

The World Made New. Frederick Soddy, Science, Politics, and Environment. LINDA MERRICKS. Oxford University Press, New York, 1996. siv, 223 pp. $105 or £60. ISBN 0-19-855934-8.

Most biographies of scientists are stories of success. The case of Frederick Soddy is somewhat different. He achieved much in the years before the Great War as a pioneering radiochemist and won a Nobel Prize in 1921. In 1914 he got his first chair, in the Scottish university of Aberdeen. In 1919 he took up, at the age of 43, one of the two chemistry chairs at Oxford. He went to Oxford with the aim of building a new research school. In this he failed miserably: his temperament, jealous colleagues, the structure of teaching and research, all conspired to marginalize him. He managed to build a new laboratory in 1928 but got scant thanks for it. His own research in this period was practically non-existent, and after retirement he was almost forgotten. But in the late 1940s Soddy emerged again. The atomic bombs of 1945 gave Soddy, the last surviving important British atomic pioneer, a new lease on life. His fame rested in part on his work with Rutherford at McGill in Canada, in the very early years of the century, but Rutherford had died in 1937. Soddy published a history of atomic energy in 1949, and a biography of him by a crackpot nuclear enthusiast was published in 1953. Soddy had been immortalized in literature in 1914: H. G. Wells acknowledged him as the source for much of his atomic warfare novel *The World Set Free*, itself reissued in 1945.

Already before 1914 Soddy was a well-known popularizer and commentator on science: he argued that atomic energy if released on a large enough scale would transform the world ($E=mc^2$ became associated with atomic energy only in 1945); he was a great believer in progressive causes and in the power of science in the right hands. In the very early 1920s Soddy was briefly associated with the left, but thereafter he became linked with small groups of indeterminate political affiliation seeking to transform the world by various means. Soddy's particular interest was monetary reform; he hated conventional money and the banking system, as he saw it the cause of most modern miseries. He put energy and environment at the center of his alternative economics, publishing a great deal on the topic in the 1920s and early 1930s but continuing to write on it into the 1940s. Merricks acknowledges that his writings are allusive and obscure and difficult to summarize.

Merricks stresses Soddy's "prescience": about atomic energy, the social relations of science, the danger of war, European federalism, and environmental economics. But although she contextualizes Soddy by looking in some detail at marginal political and intellectual groupings of the interwar years, she does not recognize the extent to which his general ideas were fairly common, even among scientists. She is also somewhat too ready to accept Soddy's self-evaluation as a genius ahead of his time struggling against ignorance; that too has not been unusual in scientists. That said, Soddy is a worthy subject of a biography, even though his papers are not extensive enough for an especially rich portrait of the man.

D. E. H. Edgerton
Centre for the History of Science, Technology, and Medicine, Imperial College, London SW7 2AZ, UK