

lumber industry. Saikku's narrative stresses the close ties that existed between these. He demonstrates that the steady expansion of cotton cultivation was eventually linked to the development of steadily larger-scale flood-control techniques. Moreover, lumber companies opened up new areas to settlement and cultivation. Saikku also looks at how patterns of land ownership (plantation, small farm, tenant farm, sharecropping) impacted the region's environment and the links that existed between environmental and social problems like poverty. He ties the timber industry's growing impact on the region's ecology not only to patterns of land ownership but also to technological changes, such as the introduction of the steam-powered sawmill and steam railroads specifically built to haul previously inaccessible timber to sawmills and, ultimately, to distant markets. Ironically, as Saikku points out, the timber industry drew from the Delta's biological diversity for its resource base but paid little attention to preserving that diversity.

Many of the factors that contributed to the Delta's altered ecology parallel those that have modified ecologies in other regions, including new technologies, flood-control projects, land speculation, local boosterism, and the development of an infrastructure linking a hitherto-isolated area to larger markets. Thus, even though *This Delta, This Land* focuses on a specific area of North America, it provides insights for environmental problems in broader historical and geographical contexts.

Saikku's work has several significant strengths. He is a Finnish scholar, with no particular American political or social axe to grind, and so he views issues more dispassionately than many American scholars would. Moreover, the scholarship is comprehensive, drawing on a very impressive array of materials. Saikku utilizes accounts of early travelers in the region, private correspondence, government reports, company archives (especially those of lumber companies), surveyors' field notes, archaeological remains, and even Faulkner's fiction and the lyrics of blues music. To frame his narrative, Saikku makes extensive use of concepts from other disciplines, drawing on ecological science, for instance, to provide the background for his discussion of species extinction in the region.

This Delta, This Land has some flaws. It was originally a doctoral dissertation, and elements of the volume still show this—especially the long introductory discussion on environmental historiography, which would better have been

omitted. Finally, the book has only about a half-dozen illustrations. More are really needed to give readers a feel for the Delta about which Saikku so capably writes.

TERRY S. REYNOLDS

Susan Merrill Squier. *Liminal Lives: Imagining the Human at the Frontiers of Biomedicine.* xvi + 350 pp., illus., notes, index. Durham, N.C.: Duke University Press, 2004. \$23.95 (paper).

"Liminality" denotes a state of being in between phases. The term was first introduced by the influential social anthropologist Victor Turner in 1969. He pointed out that liminal entities are neither here nor there, but exist in between categories assigned by custom, law, or convention. Susan Merrill Squier took over this concept in order to study several liminoid phenomena relating to recent developments in biomedicine. From stem cells, tissue cultures, and embryos to "performances of aging," modern society is inhabited by many technoscientific liminal entities. To Squier "those beings marginal to human life . . . hold rich potential for our ongoing biomedical negotiations with, and interventions in, the paradigmatic life crises: birth, growth, aging, and death" (p. 9).

But Squier's interest in crossing frontiers goes further. As a professor in women's studies and literature, she also seeks to bridge the gap between different styles of thinking in cultural studies of science and technology. Thus, her work stands on a threshold too, and this study is a perfect example of the strength of a methodology that adapts to the scope of different disciplines. Squier does an excellent job of combining history, gender studies, literary criticism, and cultural studies of science. Fictional and nonfictional narratives are to her technologies of knowledge production; as such, both literature and science mediate social relations with material objects. But while the effects of scientific discourses on modernist literature have been well studied in the past, the same cannot be said about the influence of modern literature on scientific narratives, Squier argues. Although the field of literature and science studies has existed for decades, up to now very little has been done to illuminate the influence of literary texts on scientific thinking. Thus, it is Squier's aim to reevaluate the literature/science categorization, especially by drawing together literary critics and feminist studies of science.

In addition to an introductory chapter that explores her "methodological tool kit for literature

and science," *Liminal Lives* offers different case studies in order to make clear what Squier (following Bruno Latour) calls "literature and science in action" (p. 45). In different literary and artistic fantasies related to sources derived from medicine, science, and politics, she traces "the modern replotting of the human" (p. 21). What is most fascinating about some of these case studies is that Squier examines the world of the scientific laboratory, finding scientists using novels and poetry in order to reflect on their work and social responsibility. Thus, it is not only—as one would expect—the world of popular media and culture that produces fictional narratives about ongoing reconceptualizations of the human life span. In the chapter about the biotechnology of tissue culture, as conducted in the Strangeways Research Laboratory in Cambridge in the 1930s, Squier shows how, alongside the public excitement and anxiety about tissue and embryo culture experimentation, researchers also reflected on their ambivalences by way of poems that circulated through the lab.

Squier's case studies live up to expectations generated in the methodological parts of her book. Moreover, she offers the reader a fine sampling of the biomedical imaginations that draw on and enable technological developments. I hope that this brilliant and well-written book will find a wide readership.

BARBARA ORLAND

Andrew Watson. *The Quantum Quark*. x + 464 pp., table, apps., bibl., index. New York: Cambridge University Press, 2004. \$30 (cloth).

The aim of this book is to present the history of quantum chromodynamics in all its multicolored glory. Andrew Watson hopes to do this while remaining at the level of the educated layperson, assuming little in the way of a math or physics background in his readers. I have mixed feelings about both the hope and the aim. Although Watson is a dab hand at the illuminating metaphor—using the second hand on a clock to illustrate orthogonal transformations, for example, or swapping "crabby twins" as a way of getting a grip on antisymmetrization—and although the level of mathematico-physical knowledge required to understand every aspect of this book, from Dirac's equation to lattice quantum chromodynamics, would undoubtedly exclude all but a highly restricted subset of the potential readership, there is still something deeply unsatisfying about having Schrödinger's equation, say, "explained" in words, and at times it's as if one can hear the metaphors creaking under the load.

With regard to the history itself, Watson certainly and not surprisingly goes beyond Andrew Pickering's *Constructing Quarks* (Edinburgh, 1984), bringing us as up to date as is possible in a field such as this, but (thankfully for some) without the sociological speculations. The narrative is as internal as can be, with no social determinants, no economic factors, no "opportunities in context"—indeed, not much even in the way of personalities. Occasionally the story is leavened by an amusing anecdote (or, rather, the kind of anecdote we physics geeks might find amusing), such as the story of how "penguin diagrams" got their name. This may make it sound utterly dull, but it is not, because of the nature of the story and because Watson is an elegant, witty, and accomplished writer who carries the reader along with his own enthusiasm for the subject.

And what you get from the history is rich enough, covering not only the theoretical but also the experimental and instrumental aspects. Thus the chapters take us from perturbation theory and the problem of renormalization, to the particle zoo and the "Eightfold Way," on to the introduction of color, the history of accelerator technology, and the "world of jets," then through the wonderfully named baryon bags and pomerons, glueball hunters and "lattice jockeys," concluding with the possibility of quark stars. At times, as Watson admits in the preface, it does read a bit like a Russian novel, and—like my old paperback of *War and Peace*—it comes with a glossary of names and also a timeline.

And as Watson also notes, the history is complicated, involving, of course, not only multifarious interactions between the theoretical and experimental domains but also plenty of twists and turns in both. This is certainly vastly better than the usual "standing on the shoulders of" narrative we get from the retired physicist. However, as twisted as it is, the history is still "straight" in the sense that just about everything is seen as contributing to the great march forward. Splits and deviations from the main plan of advance, which both the sociologist and the philosopher would home in on as sites of theory choice, or perhaps even examples of underdetermination, are here at best treated as mere digressions or at worst reinterpreted from today's perspective. Thus, Oscar Greenberg's application of parastatistics to solve the problem of baryon statistics is here understood as contributing to the development and acceptance of the theory of "color" to which it was, at the time, regarded as a competitor. More broadly, the decline of the S-matrix program and the rise in the fortunes of field the-

Barbara Orland is managing director of the newly founded Center for History of Knowledge of the Federal Institute of Technology of Zurich and the University of Zurich. Her research interests lie in the fields of the history of biomedicine and biotechnology. She has edited *Artifizielle Körper—Lebendige Technik: Technische Modellierungen des Körpers in historischer Perspektive* (Zurich: Chronos, 2005).

Alex Owen is Professor of History and Board of Lady Managers Professor of Gender Studies at Northwestern University. She is the author of *The Darkened Room: Women, Power, and Spiritualism in Late-Victorian England* (1989, 1990, 2004) and *The Place of Enchantment: British Occultism and the Culture of the Modern* (2004).

Dan Plafcan is a postdoctoral fellow in science and technology studies at the University of Tokyo. His research focuses on the politics of knowledge making and technology building in U.S.–Japan collaborations that concern space-based remote sensing.

Terry S. Reynolds is Professor of History at Michigan Tech. He has authored several books and articles on the history of water power and is now working on a paper describing attempts by an Upper Michigan iron mining company to promote agriculture in that region's harsh climate.

Alan Richardson is Professor of Philosophy and Distinguished University Scholar at the University of British Columbia. He is the author of *Carnap's Construction of the World* (Cambridge, 1998) and coeditor, with Gary Hardcastle, of *Logical Empiricism in North America* (Minnesota, 2003).

Shirley A. Roe is Professor and Chair of the Department of History at the University of Connecticut. She is the author of *Matter, Life, and Generation: Eighteenth-Century Embryology and the Haller–Wolff Debate* (1981) and coeditor of *Science against the Unbelievers: The Correspondence of Bonnet and Needham, 1760–1780* (1986).

Kristina Rolin is Academy of Finland Senior Research Fellow at the Helsinki School of Economics. Her current research project concerns the intersections of social epistemology and feminist epistemology. Her articles have appeared in *Perspectives on Science, Hypatia, Social Epistemology*, and *Philosophy of Science*.

Niall Shanks holds the Curtis D. Gridley Distinguished Professorship in History and Philosophy of Science at Wichita State University. He is the author of *God, the Devil, and Darwin: A Critique of Intelligent Design Theory*.

Ann B. Shteir, Professor of Humanities and Women's Studies at York University, is the author of *Cultivating Women, Cultivating Science: Flora's Daughters and*

Botany in England, 1760 to 1860 (Johns Hopkins, 1996). Now working on gender and iconography, she is writing a cultural history of Flora as goddess of flowers. With Bernard Lightman, she has edited a forthcoming volume on science, gender, and visual culture.

Pamela H. Smith teaches early modern European history as Professor of History at Columbia University. She is the author of *The Body of the Artisan: Art and Experience in the Scientific Revolution* (Chicago, 2004) and *The Business of Alchemy* (Princeton, 1994) and coeditor of *Merchants and Marvels: Commerce, Science, and Art in Early Modern Europe* (Routledge, 2002).

Robert W. Smith is Professor of History at the University of Alberta. He has published extensively on the history of the physical sciences in the nineteenth and twentieth centuries, particularly the history of astronomy, cosmology, and space science. As McCalla Professor at the University of Alberta in 2005/2006, he is working on a history of scientific discovery.

Marianne Sommer wrote her doctoral dissertation on anthropomorphism in primatology, using *National Geographic* articles among other sources. As a postdoc at the Max Planck Institute for the History of Science, Berlin, and at Penn State University, she worked on a project in the (pre-)history of paleoanthropology, which she continues as a junior faculty member in science studies at the Eidgenössische Technische Hochschule in Zurich.

Martin S. Staum, Professor of History at the University of Calgary, is the author of *Labeling People: French Scholars on Society, Race, and Empire, 1815–1848* (Montreal: McGill-Queen's, 2003), and is pursuing research on the nature/nurture controversy in nineteenth-century French anthropology, psychology, and sociology.

William C. Summers is a professor in five departments or programs—ranging from Molecular Biophysics and Biochemistry to Women's, Gender, and Sexuality Studies—at Yale. His research has focused on virology and microbiology, history of medicine and science, and the relations between science and the humanities. He has taught and published on topics ranging from thermodynamics to antiviral drugs to East Asian studies and ancient Greek philosophy.

Philip M. Teigen is Deputy Chief of the History of Medicine Division at the National Library of Medicine in Bethesda, Maryland. He is writing a history of rabies in Gilded Age Massachusetts. His most recent essay on medical historiography, "William Osler Again," appeared in the *Bulletin of the History of Medicine* (2001, 75:745–755).

Jennifer Tucker is Associate Professor of History at Wesleyan University. A cultural historian specializing in the history of science, especially of the nineteenth