BOOK REVIEWS

Grand Narratives Scrutinized

The Literature of Science. Perspectives on Popular Scientific Writing. MURDO WILLIAM McRAE, Ed. University of Georgia Press, Athens, 1993. x, 321 pp. $45.

Some years ago, a colleague who learned of my plans to attend a conference on science and literature said that she supposed that meant that postmodern critics had run out of humanistic texts to analyze and were looking for new colonies to exploit. Imperialistic or not, fashion—or, as we now say, "the social construction of reality"—has helped this field of study emerge. Interest in the relationships between science and literature can be traced back to Francis Bacon, centuries before C. P. Snow sketched the boundaries of the "Two Cultures," but it has heated up only in the last decade. The annual meetings of the 850-member Society for Science and Literature (SLS), founded in 1985, provide the chief forums for discussion of intersections between the sciences and clusters of other subcultures in the humanities, the social sciences, and medicine. Although the scientists at those meetings share insights with their colleagues across various aisles, the agenda thus far has been set by structuralist and deconstructionist articles of faith. These include the belief that disciplines are on the one hand communities of individual researchers and on the other hand social, political, and economic institutions arranged in cultural hierarchies of authority, prestige, and power. The orthodox assume that paradigms and languages govern perception and interpretation. As artificial constructs, languages ultimately refer back to themselves, and this self-reflexivity fixes the norms of all disciplines, prescribes what is to be investigated and how, influences the processing of data, and determines to an extent the conclusions. Literary bias is clear in other convictions: that researchers and artists alike "read" events and data in order to interpret, and that lab notes, grant proposals, and scientific articles are just as susceptible to linguistic and rhetorical analysis as are poems and novels.

The strengths and weaknesses of these assumptions are evident in *The Literature of Science: Perspectives on Popular Scientific Writing*, a collection of essays mostly by members of SLS. First, the weaknesses. For a book whose focus is writing aimed at a wide audience, it is ironic that some passages are themselves clotted with the jargon of contemporary cultural/literary theory. An extreme example is the editor's own attack—whose failings are all the more noticeable for coming after his lucid introduction to the book—on Oliver Sacks for having formulated a metaphysics of neurology out of sync with the theories of Michel Serres and Mikhail Bakhtin. A second irony is the degree to which literary stereotypes affect the ways the contributors deal with popular science, a case of the paradigm's being on the other foot. Emerson and Thoreau, for instance, function as litmus tests of social conscience, a mindset that explains the indulgence accorded Loren Eiseley.

Transcendentalism aside, the volume as a whole lacks historical perspective. A lone look at the 1930s by Doug Russell does recall the willingness of scientists like J. D. Bernal (*The Social Function of Science*) and Lancelot Hogben (*Mathematics for the Millions*) to demystify their disciplines in the interest of public debate. With a couple of exceptions, however, the essays here are not concerned with the quality or effectiveness of different kinds of science writing or with the character of the several audiences for which they are intended. Nor do they discriminate much between disciplines or scientists. It's odd that no one mentions Nathan Reingold's important essay "Definitions and speculations: the professionalization of science in America in the nineteenth century" (1976), which divides science writers into Cultivators, Practitioners, and Researchers, categories that would add rigor to these discussions.

Instead, most of the essays examine a single genre, the semipopular narrative of the evolution of science itself. Here, in identifying the versions of this "story," literary criticism shines. At the book's center is Martin Eger's description of what he calls the "new epic of science," a teleological narrative of the progress of science, as constructed by scientist-authors as diverse as Jacques Monod, Douglas Hofstadter, Roger Sperry, E. O. Wilson, and Joseph Weizenbaum. According to Eger (a physicist), the new epic tries to demonstrate that necessity drives science, whose development is construed as a process of convergence, extension, unification, and reconciliation. This grand narrative represents scientists as they wish to be appreciated; it embodies cultural fetishes like "holism" even as it seeks to mold society's esthetic and moral values. Eger maintains that very few scientists reject the notion of knowledge spiraling to greater heights, that they differ only on "interpretations of pieces" of the epic.

The best essays depict recent attempts by individuals to cast themselves as players in this secular drama or deal with the tensions between high-church versions of the narrative by followers of Thomas Kuhn, who believes that disciplines lurch along in paradigm shifts, and low-church revisions by disciples of Stephen Jay Gould, who warns against thinking about history as progress and improvement because the ideas so often lead to racism and inequality. Robert T. Kelley argues that in writing *Fractals: Form, Chance, and Dimension* (1977) Benoit Mandelbrot appealed over the head of the scientific establishment to the court of public opinion to assure his place in history. Although Mandelbrot feared alienating his professional colleagues by "popularizing," his strategy was grounded in his belief that culture shapes science as much as science shapes culture. Similarly, David Porush looks at James Gleick's best seller *Chaos* (1987) as the packaging of a field of study for pop and professional consumption. More properly called "deterministic chaos," or "dissipative structures," the name given to the field by Ilya Prigogine, "chaos" seemed a better choice given Gleick's endeavor to mythologize a Kuhnian-style paradigm shift. Prigogine plays no part in Gleick's "story." When Porush asked why, Gleick denied that American chauvinism was a factor and discounted his own role as a literary "maker" of chaos theory. Porush believes the real reason for Gleick's neglect of the chemist is that Prigogine's own semi-popular book, *Order out of Chaos: Man's New Dialogue with Nature* (1984), offers a competing version of the great epic. Because Prigogine thinks the Kuhnian model of the development of science overstates the function of crisis, he emphasizes the accumulation of evidence for "dissipative structures" within a continuum reflecting "the internal logic of science and the cultural and social context of our time." Louis P. Masur's sprightly treatment of the delightful baseball metaphors with which Stephen Jay Gould explains evolution (natural or professional) as "punctuated equilibrium" rather than as teleological

spiral is entertaining, as is Allison Bulsterbaum Wallace's review of the kamikaze ecologist David Quammen's natural histories, which reject anthropomorphic readings of evolution altogether.

Other notable essays concentrate on what happens when colorless, passive, professional languages mutate and escape from the lab. Jeanne Fahnestock contrasts the protocols of *Science* and its sister publication, the popular *Science 82* (and subsequent years 83–85). Articles in the latter "celebrate" and "glamorize" alleged results, whereas those in the former emphasize the process of discovery and the tentativeness of conclusions. Journalists may be given to dramatic if irrelevant metaphors, as if I were suddenly to claim that the cellulose in this page could feed 78 trillion plankton, but, says David Stone in his study of the mix of fact and fiction in *Omni* magazine, that is the price science has to pay for cultural support. When scientists laugh at appropriations of the principle of indeterminancy as evidence of free will, they do not understand that such metaphors offer ordinary citizens an opportunity to protest against a "rationalized state power" that all too often seems deterministic because of its far more systematic exploitation of scientific achievements. If scientists think the public ignores the importance of precise investigation of "ultimate realities," lay audiences worry about how political and commercial decisions will affect them personally and conclude that scientists ignore the issues of power and morality.

Textual analysis can sometimes obscure the motives of scientists who write for readers beyond the cloister, but among the rewards of this volume are the glimpses of their reasons. Though self-promotion and missionary zeal are common, scientists also write to amuse, to make money, to secure funding, to voice ethical or moral concerns, or simply to correct the misapprehension that geneticists have nothing better to do than clone dinosaurs. But, the essays reveal, scientists are also driven by traditionally literary impulses: the need to confess doubt, to heal a damaged psyche, or to realize personal ambitions. Charles M. Anderson's essay on the physician Richard Selzer allows the man to speak for himself: "Do you ask me why a surgeon writes? I think it is because I wish to be a doctor." Such epiphanies fade amid the contributors' own rush to uncover bias, to attack the straw man of positivism, or to reassess the authority with which science compels cultural assent, but these moments remind us that science, like culture, is first and foremost a human endeavor. While the volume is hardly a bridge between the Two Cultures, it locates some metaphorical fords across the stream, and

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metaphors, after all, are what science and culture are about—or so it seems to us today.

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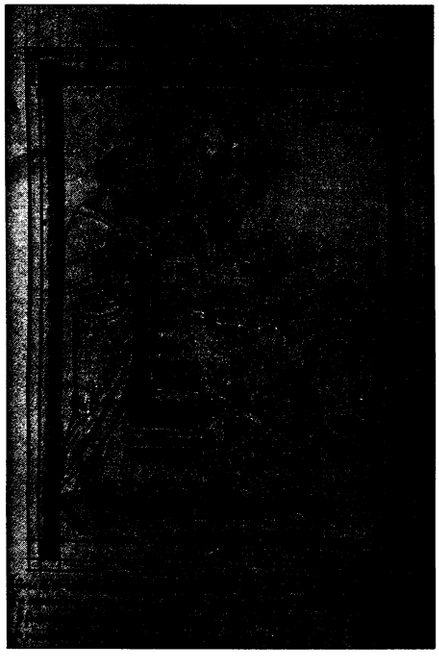
Underlaborers for Science

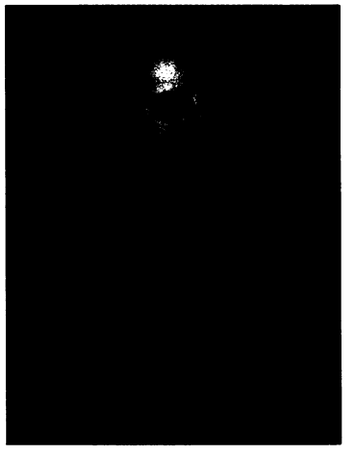
Taking the Naturalistic Turn. Or, How Real Philosophy of Science Is Done. WERNER CALLEBAUT, organizer and moderator. University of Chicago Press, Chicago, 1993. xxii, 553 pp., illus. $85 or £67.95; paper, $29.95 or £23.95. Science and Its Conceptual Foundations.

Werner Callebaut, Belgian evolutionary epistemologist and accomplished radio interviewer, has produced the best introduction one can imagine to contemporary philosophy of science. From 1985 to 1990, Callebaut interviewed 24 philosophically minded biologists and biologically oriented philosophers and sociologists of science. He then spliced together the interviews to make it seem as though the 24 were talking to each other about a series of common topics. The result is much lively and generally accessible conversation on some of the most pressing issues in both philosophy and biology today. An added treat is the biographical and historical material that Callebaut includes on the cast of characters, who include Donald Campbell, Patricia Churchland, Ronald Giere, David Hull, Philip Kitcher, Bruno Latour, Richard Lewontin, Helen Longino, and Michael Ruse.



Two early philosophers. [Bodleian Library MS Ashmole 304]

However, the book's informality and Callebaut's sympathetic interviewing style belie darker worries about the current state of the philosophy of science. These clouds emerge only occasionally in the interviews themselves but become very clear in Callebaut's Postscript. Readers may already suspect that trouble is afoot when Callebaut justifies his format by suggesting that the philosophical projects of his interlocutors make sense only if they are seen as talking to each other. Whatever else "the naturalistic turn" in philosophy may have accomplished, it seems to have diminished philosophical aspirations. Specifically, philosophy *of* science has become philosophy *for* science. Whether this subtle metamorphosis is to the benefit of philosophy or science remains to be seen.



John Locke [The Granger Collection]

Philosophers through the ages have not been known for their modesty. However, Callebaut allows a rather humble image of the philosopher to emerge from his interviews. It is that of "underlaborer," a term that John Locke coined in 1690 to describe the relationship between "master-builders" such as "the incomparable Mr. Newton" and others, such as Locke himself, who rest content with "removing some of the rubbish that lies in the way to knowledge" (quoted on p. 200, footnote 7). Locke assumed his custodial duties after Newton instructed him on how to write a persuasive review of *Principia Mathematica* without having to introduce much of its arcane mathematical structure.

How different is the situation today? According to Callebaut (p. 450), "Two-thirds of the more visible philosophers of biology today have spent time in the very same lab (Lewontin's at Harvard)." There are many ways of interpreting this observation. On the surface, it indicates that philosophers have finally become interested in the nitty-gritty aspects of scientific research. This is certainly a prominent way of "taking the naturalistic turn." However, philosophers whose politics are somewhat to the right of Lewontin's Marxism are more cynical. For example, Alexander Rosenberg periodically suggests that this singular reliance on Lewontin's charity may compromise the philosopher's critical independence.

Although I share Lewontin's political sympathies, I must confess that the conservative critics may have a point. Many of the philosophers speak of Lewontin—and, to be fair, E. O. Wilson as well—as genuine "natural philosophers." We are led to believe that they are no mere technicians but true visionaries, much as Newton was regarded by Locke. Unfortunately, the philosophers of science never describe each other in such edifying terms. Indeed, some make a virtue of their reliance on science to provide the entire basis for their inquiries. Philosophy of biology simply blurs into theoretical biology. Thus, when asked if he worried about whether philosophy had lost its point, Robert Brandon (p. 446) replied, "We philosophers of science are doing very good work now, and we don't know what the hell we are doing!" Clearly, Brandon is not setting his own agenda.

Understandably, the sociologists find the current state of the philosophy of science rather puzzling. To underscore their perplexity, Callebaut juxtaposes interlocutors so as to produce a suitably jarring effect. In a section on "the unfathomable goals of inquiry," he first has Philip Kitcher explain that science aims for ever greater unification of the phenomena of nature. Philosophers presumably aid in the task by showing how various phenomena logically fit together. Sociologist Bruno Latour is then brought in to question whether this is the sort of thing a philosopher ought to be doing (p. 218): "But philosophy is not about unifying factors; philosophy is about protecting against one factor's hegemony." When Latour thinks of a philosopher, he seems to have Socrates, not Locke, in mind.

To be sure, Western philosophy over the last 300 years has been strongly aligned with the natural sciences. Even philosophers who are normally presented as "science critics," such as Husserl and Heidegger, typically limit their complaints to the extension of natural scientific methods into the human domain. However, since Locke's day, there has also been active debate over the exact source of the natural sciences' allure, and even over