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Book Reviews

Institutions; Education, Libraries, Museums

R. P. CREASE, *Making Physics: A Biography of Brookhaven National Laboratory, 1946–1972*. Chicago: University of Chicago Press, 1999. xii+434 pp. 94 illustrations. $38.00 (cloth), ISBN 0-226-12017-1. $22.50 (pbk), ISBN 0-226-12019-8.

Laboratories are like theatres, according to Robert Crease, author of this intriguing and richly detailed early history of the Brookhaven National Laboratory (BNL). Both laboratories and theatres are sites with various facilities for different groups of people to come 'to stage and witness special kinds of actions' for their respective communities or audiences. The emphasis on staging and witnessing, however, does not make Crease, Associate Professor of Philosophy at the State University of New York (SUNY), Stony Brook, into a postmodernist when it comes to understanding how science works. Rather he sees himself steering a middle course between those who view science as an objective pursuit and the constructivists who see it as purely a product of social negotiations. This he has tried to achieve by focusing on Brookhaven as an 'experimental community'.

In many respects, Brookhaven was a unique institution in the history of American science. Best known for its pivotal role in the development of particle accelerators and nuclear reactors, the laboratory opened in 1946–7 on Long Island, New York. It was the first national laboratory to engage in mostly unclassified, civilian, basic research, although in the McCarthy period scientists had to go through security investigations. The lab was modelled after a university, complete with a tenure system and disciplinary departments, including physics, chemistry, biology, and medicine.

The impetus for the lab came from scientific leaders on the east coast, people such as I. I. Rabi of Columbia who felt that western and midwestern institutions, especially the University of California and the University of Chicago, had taken unfair advantages of their wartime positions to lure scientists away from the east. To pool their resources, about a dozen northeastern universities formed what eventually became the Associated Universities Inc. (AUI) to seek federal support for a regional nuclear research centre where reactors and accelerators would be built. They gained approval and financing first from the wartime Manhattan Project and later from its successor the Atomic Energy Commission (AEC). The AUI managed the lab under contract with the AEC until 1997 when the Department of Energy (DOE), successor to the AEC, fired the AUI in the aftermath of a much-publicized radioactive leak from the spent fuel pool of a reactor. A new partnership between Crease's own university and Battelle now manages the lab for the DOE.

Almost from the beginning, a perception of Brookhaven as a dangerous nuclear facility dogged the lab's community relations. Crease blames these difficulties on both the public's exaggerated fear and the scientist's lack of effective outreach. Sensational reports by the media certainly did not help. When, for example, a young lab physicist died in a traffic accident in 1960 after being hit by a truck carrying spent reactor fuel, the *New York Times* headline was 'Atomic Scientist Killed by Radioactive Waste' (p. 103).

While Crease never loses sight of the world outside of the lab, his focus is on what went on inside it—scientists (both residents and visitors), engineers, administrators, accelerators, reactors, and the interactions among all of them as a community in conducting experiments. Crease delights in technical details about the construction of reactors and accelerators and the designs of experiments. He also exhibits a connoisseur's taste for good stories about personalities and the workings of the lab. As official historian and archivist of the lab (he splits his time between SUNY and BNL), he draws knowingly from Brookhaven's records and the large number of interviews he and others conducted over the years. The evocative concept of an 'experimental community' is thus illustrated but unfortunately never fully developed as an analytical tool in explaining how science works. Neither does the book take a comparative approach, although it does touch on what Crease calls 'performance rivalry', involving both

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cooperation and competition, between Brookhaven and other labs, especially the Berkeley Radiation Laboratory and CERN.

In between chapters on accelerators and reactors, Crease addresses the shifts in the broader political context of Brookhaven as a national lab, which follow the general transformation of American science in this period. Before the mid-1960s, high energy physicists could often get federal support for their expensive and esoteric field, with the justification that scientific progress was 'for the enlightenment and benefits of mankind'. Philip Morse, the reserved founding director, and his much more energetic successor Leland Haworth presided over a period of steady growth at the lab. The Maurice Goldhaber years, 1961–72, saw both Nobel-prize-winning discoveries and radical transformations in many ways. National science policy became politicized and the siting of huge accelerators became the subject of national competitions beyond the control of either Brookhaven or Berkeley. Protests against the Vietnam War created friction within the lab. By the time Goldhaber left the directorship in 1972, the experimental community at Brookhaven was very different from its golden days in the late 1950s and early 1960s.

In the end, Crease seems to reach for an inclusive understanding of science. The experiences of Brookhaven as an 'experimental community' indicate that in science both the experiments and the community matter. One might hope for a fuller development of this concept, perhaps in a sequel to this book, as an alternative to the various models of science proposed by postmodern critics of science. But for now, it joins a growing list of histories of the national laboratories as a solid contribution to our understanding of American science in the post-World War II years.

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Philosophical Aspects of Science

MARTIN PRIESTMAN, *Romantic Atheism: Poetry and Freethought, 1780–1830*. Cambridge: Cambridge University Press, 1999. xiii+307 pp. £37.50 (hbk). ISBN 0-521-62124-0.

'The Romantic period', that useful but imprecise term, is likely to call up recollections of German thought; and of opposition to 'Enlightenment' rationalism and deism, with its confidence that we were little clocks dwelling in the midst of an enormous clock. We might further associate it with a revival of religion of the heart, based upon emotions and aesthetic experience, associated with an admiration perhaps for gothic novels and gothic architecture, and a sympathy for the medieval and maybe even the modern Roman Catholic Church. Ballads, Chatterton and Ossian, the swirling mists of the Celtic fringe, and both the sublime and the picturesque might be expected to fit the taste of Romantics, whose acme of influence and importance would come at rather different times in different places, with romantic music generally coming a generation after poetry, prose and painting. That Romantics were invariably and uniformly averse to science was once widely believed, but nowadays we usually accept that it was brute materialism (with its passive atoms) and mechanics which were despised; and that dynamic science (electricity, chemistry and physiology) and medicine aroused enthusiasm, and even an urge to join in.

Martin Priestman seeks to revise this picture, indicating how the atheism that we might have associated with Enlightenment figures like Holbach and Helvetius, can be seen as central to the Romantics, anxious to get rid of Old Nobodaddy: his suggestion is that atheism is, for the English Romantic poets (Walter Scott is absent from the study) crucial to understanding in a way that German philosophy or literature is not. In their recent 'Reconstructing Nature', John Brooke and Geoffrey Cantor remark on the difficulty of finding genuine speculative atheists at this time, and many of us must have suspected that they were often straw men or bugaboos. Priestman allows his atheists to include pantheists and some unitarians, and identifies the term 'infidelity' (perhaps appropriately given its marital as well as religious applications) with what we would label atheism, which seems a little dubious—many of those in the Regency as at other times who betrayed their wives were not theoretically committed to disbelief in marriage. He sees deism—that middle ground between religion and irreligion—turning into atheism in Britain in the 1790s among advanced thinkers: referring to an 'elite sense of being absolved