BOOKS: HISTORY OF SCIENCE

Biomolecules and the Bomb

by Nicolas Rasmussen

In May 1962, Queen Elizabeth II graced a dedication ceremony taking place in an unprepossessing, starkly functional new building on the outskirts of Cambridge: the Laboratory of Molecular Biology (LMB) of the Medical Research Council (MRC). At this, the pivotal moment of Soraya de Chadarevian's *Designs for Life*, one may say that "molecular biology" as we know it was baptized, in that the LMB was the first major institution to bear the then rather new label. With a tightly focused local history of this remarkable institution, de Chadarevian aims to illuminate the British context of the development of molecular biology and the way political forces impressed themselves upon the emerging field during the "long postwar period" (1945 to the mid-1970s).

Designs for Life
Molecular Biology after World War II
by Soraya de Chadarevian
Cambridge University Press, New York, 2002. 443 pp. $55, £35. ISBN 0-521-57078-6.

The original LMB, and thus molecular biology, was formed as a locally expedient "confederation" (as de Chadarevian puts it) of three research programs that corresponded to the institution's initial divisions: the protein chemistry of Fred Sanger, the protein crystallography of John Kendrew and Max Perutz (the LMB chairman), and the freshly conceived molecular genetics program of Francis Crick. Since the beginning of the Second World War, protein crystallographers had been practicing "biophysics" in the Cavendish laboratory under Lawrence Bragg—after 1947, in a distinct, MRC-supported unit for "biomolecular structure"—but once Bragg left Cambridge in 1953, his successor regarded the biophysicists as a "cuckoo's egg" in his nest and wanted them out. Sanger desired more space than was available in the Biochemistry Department and more time and resources for his protein sequencing research. Five years of hard academic politicking failed to secure an adequate University home for the biophysicists in central Cambridge, and so the new biophysicist-biochemist confederacy reluctantly accepted the move to an independent institution on the city's outskirts, one generously funded by the MRC as a flagship for modern biomedical research in the United Kingdom. The MRC's decision to establish a laboratory of molecular biology was facilitated by Sanger's 1958 Nobel Prize, and the 1962 Prizes for Perutz, Kendrew, and Crick, announced just months after the LMB opened, seemed ample validation of it.

But why, with the many other worthy scientific enterprises vying for support in the immediate postwar era, did the MRC, and the British public in general, favor biophysics–cum–molecular biology so generously? De Chadarevian, a historian of science at the University of Cambridge, offers two explanations. First, in a culture shocked by the advent of the atom bomb, not only did certain scientists turn away from nuclear physics toward less militarized and more "wholesome" fields, but society as a whole felt compelled to compensate for the bomb with life-saving biomedical research, particularly in the symbolically loaded field of biophysics (i.e., the physics of life). The evidence de Chadarevian offers to support the claimed importance of this cultural force in Britain could be stronger, but her view fits with what other historians have shown occurred in the United States. Second, crystallography was a field in which British science particularly excelled; thus, supporting Bragg's protein crystallographers was a way of maintaining global scientific leadership and stemming the flight of good British scientists to the United States. Here de Chadarevian makes her case convincingly. She demonstrates a discourse on "brain drain" in policy documents at a surprisingly early date and illustrates the element of British pride with, for instance, the crystallographic patterns prominently used on wallpaper, fabrics, and even tableware at the 1951 Festival of Britain.

Model of success. John Kendrew showing Queen Elizabeth II a model of myoglobin at the LMB's official opening in May 1962.

CREDIT: MRC LABORATORY OF MOLECULAR BIOLOGY, CAMBRIDGE

World War II had created a special opportunity for the growth of biophysics in Britain, allowing the LMB to flourish into the 1970s. The war also had created a mindset in the LMB's founders that expressed itself fully in the institution's culture. Many had studied aspects of physical chemistry before 1939, and had been involved in radar or operations research during the war. They prized research progress above all, whereas they saw the disciplinary boundaries and teaching concerns of academia as secondary matters—at best irrelevant and at worst obstacles to the efficient advance of knowledge. Thus the media and glassware kitchen, along with many other support services, were centralized in the LMB for greater efficiency. Discussion and collaboration among the divisions was fostered by a centralized canteen, designed to replace the individual tea rooms where British laboratory groups traditionally met separately. Run by Gisela Perutz, the canteen's operations occupied a surprising amount of executive attention. Foreign researchers reported astonishment at the number of canteen breaks taken each day, but appreciated the opportunity to converse with "the gods of molecular biology." Even more than before the move, postdoctoral researchers with outside funding, particularly from the United States, did far more of the research at the LMB than permanent staff or local students. This local culture of research-first collaborative confederacy, together with the science of molecular biology as conceived at LMB, was, according to de Chadarevian, successfully exported by the many postdoctoral trainees who moved on to the discipline's new departments at other institutions.

De Chadarevian offers a path-breaking treatment of the development of modeling and computer methods for x-ray crystallography as well as a fascinating reconstruction of the history of Watson and Crick's 1953 DNA models. It emerges that, unlike the lab's various myoglobin and hemoglobin models, none were saved or otherwise treated with much respect. From this, the author argues that the DNA work was not perceived as especially important in 1953—at least, not as important as it came to be seen by the 1960s, when the double helix became a banner for the triumphant spread of molecular biology, which largely replaced its forerunner biophysics on laboratory nameplates world-

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wide. She also explores the major role that the LMB and its influential leaders played in the British science policy arena, from the immediate postwar expansion of the MRC ambit, through Labour Government's "white heat" innovation policy in the 1960s and the Conservative's Rothschild Report era in the 1970s, to UK participation in the European Molecular Biology Organization and beyond.

With its many perspectives on the rise of molecular biology in Britain, *Designs for Life* will be appreciated by biologists, historians, and those involved with science policy. The book will surely interest anyone intrigued by the way science seems to follow its own internal logic while participating centrally in the society in which it is embedded.

BOOKS: SCIENTIFIC PRACTICE

A Star to Sail Her By

James Austin

Over the last couple of decades, the practice of science has, to put it mildly, become more complicated. In the era following World War II, science in the United States was culturally homogeneous, labs were small, research funds were easy to come by, and scientists had wives at home to watch the kids. In that climate, graduate education focused, appropriately, on science rather than management.

Times have changed, and the skills scientists need to succeed have expanded. Today's labs are culturally diverse and women are well represented. Many young scientists are parents who, through personal desire or financial necessity, are equal partners in raising their children. Funding is harder to come by than it used to be, and the more complex and arcane rules of the funding process are taken seriously by the scientists' home institutions and supporting agencies alike. In short, managing a laboratory is more technical than it used to be. It is also more necessary because there are pressures on principal investigators and their lab workers to spend additional time at work and at home. Running a laboratory is skill- and time-intensive; when the grant proposals are written, the technicians hired, and the discontented postdocs assuaged, there can seem to be little time left for doing actual science—especially when teaching, professional service, and raising families is thrown into the mix. With *At the Helm: A Laboratory Navigator*, Kathy Barker aims to help young scientists raise their scientific productivity by providing them an easily absorbed short course on management in the context of the single-investigator science laboratory.

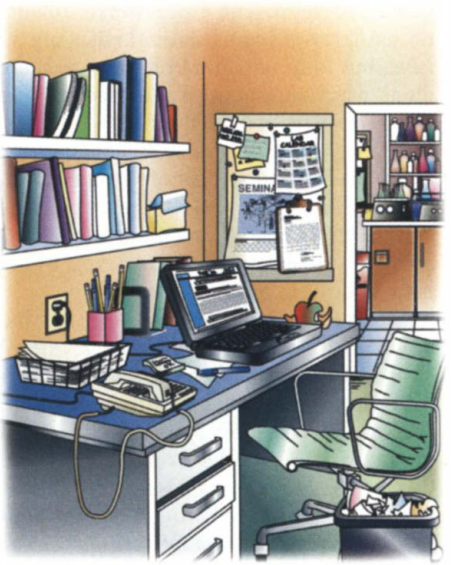
At the Helm
A Laboratory Navigator
by Kathy Barker
Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York, 2002. 362 pp. $45. ISBN 0-87969-583-8.

Unlike most business-management tomes, *At the Helm* presents few overarching theories or unifying principles. Barker prefers instead a common-sense approach to everyday decisions in a wide range of areas. In considering lab leadership, for example, she comments, "The nature of research, and the implicit respect for the intelligence and capabilities of other lab workers, means that barking out orders will not necessarily get you anywhere." She suggests keeping at least two backup copies of important data, one off site in case of disaster. Discussing visas for foreign workers, she notes that the "prevailing wage" requirement means a small lab might have to pay an H-1B visa holder as much as a large biotech company would offer. In various chapters, she provides recommendations for the effective use of unexpected free time, advice on how to fire someone, and hints on maintaining a productive laboratory culture. For a new principal investigator, the sections on determining authorship and hiring personnel are likely to be especially valuable.

In a few places, the book relies too much on the author's own experience (a reflection, no doubt, of her desire to keep things simple). In her discussion of time management, for example, Barker advises that "it is usually best to keep only one to-do list and calendar for both personal and work-related tasks." That is a fine suggestion, but this is clearly a matter of personal taste, and she probably provides more detail here than needed. Such faults, however, are few and easy to forgive (especially because they were obviously committed in the interest of producing a useful book).

At the Helm is a font of practical information, and for that reason ought to be read by young scientists. Indeed, it is the only work available on managing a single-investigator science lab. But what sets the book apart is that Barker implicitly encourages careful consideration of what it means to be a scientist. Rather than presenting, as some advisors do, an overly narrow, self-reflective vision of how a science lab ought to be run, she offers an abundance of diverse observations from recently published sources, as well as unattributed (and often conflicting) quotations from personal interviews, to assist young researchers in charting a personal course through science.

This aspect is perhaps best displayed in the book's final section, "Having It All," which focuses on adapting work styles to changes in personal circumstances, such as getting married or having children. The four quotations that begin the chapter present contrasting views on the compatibility



of science and personal life. Horace Judson reports that "[w]ives, children, houses, regular hours are the bane of committed laboratory research, [James] Watson made clear." In contrast, Max Perutz notes that for 36 years his Cambridge colleague Alan Hodgkin "did most of his experiments with his own hands and yet found time to have a family life; to develop wide interests in literature, painting, and music; to watch birds; and to cultivate lasting friendships with a great variety of fascinating people." The juxtaposition dispels the myth, common among young researchers, that success in science requires abundant inputs (i.e., hours in the lab) instead of, or in addition to, abundant outputs (i.e., publications in high-impact journals). Without discouraging those eager and available to work long hours, Barker's book offers the promise of an alternative—sound management leading to greater productivity—for those who want to have a life outside the lab.

The numerous practical ideas make *At the Helm* a valuable read for many scientists embarking on their careers. But Barker also offers, implicitly, a compelling argument that young researchers have the right—and, indeed, the responsibility—to chart their own course, deciding for themselves how to do good work while seeking rich and meaningful professional and personal lives.

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