of such awards on teaching commitment and quality are difficult to gauge, they do make a public statement that excellence in teaching is a valued commodity.

Rojstaczer calls attention to a long-standing concern of professors and administrators, but he offers no new insights into how to establish a better balance between research and teaching. He makes no attempt to define what would constitute a more appropriate relationship between these two activities at a research university. And he chooses to ignore the obvious point that there are plenty of excellent colleges and universities where the emphasis is not on grant-funded research. For the research universities themselves, the challenge has always been to develop the full capabilities of students while staying at the cutting-edge of scholarship. How best to meet that challenge remains an open question.

References
1. H. Rosovsky, *The University: An Owner's Manual* (Norton, New York, 1990), p. 309.

BOOKS: CHEMISTRY

Reacting to History

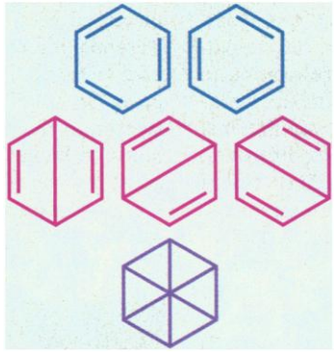
Jay Labinger

A couple of years ago, at a history of science conference, I heard the following story: A heart surgeon and a historian of science meet at a party, and start chatting. "You know," says the surgeon, "I've always been interested in history of science, and I'm planning to take it up when I retire in a couple of years." The historian replies, "Funny you should say that; I've always been interested in heart surgery, and when I retire...."

This anecdote makes a valid point: as in other disciplines, doing history of science well requires skill and training. Surely, though, neither the historian who told the story nor his highly appreciative audience (also mostly historians) would have any hesitation in deciding which of these two transoccupationals they would be willing to consult professionally. Studying the history of science serves a variety of purposes, some of which may be accomplished as well by a practicing scientist as by a professionally trained historian. Furthermore chemistry, compared to physics and biology, has been a relatively neglected subject of "metascientific studies" (the history, philosophy, and sociology of science). Hence a new book on history of chemistry by a practicing chemist is most welcome, at least to this chemist reviewer.

Chemical Creativity
Ideas from the Work of Woodward, Hückel, Meerwein, and Others
by Jerome A. Berson
Wiley-VCH, Weinheim, Germany, 1999. 207 pp. Paper, $54.95. ISBN 3-527-29754-5.

In *Chemical Creativity*, Jerome Berson, a professor at Yale University, presents several case studies in 20th-century chemistry. Most are drawn from physical organic chemistry, Berson's own field of research. He discusses such questions as how problems are selected and attacked, and why one researcher's experiment is accepted as convincing while another's falls into neglect. He argues that an examination of how earlier chemists have gone about their activities can provide useful lessons for today's chemists. For example, Berson traces several decades of work on the so-called "dienone-phenol rearrangements" to demonstrate how a set of apparently closely related reactions can proceed by a variety of quite different mechanisms. The research, which developed from efforts toward the synthesis of steroidal hormones, shows that the specific mechanism depends crucially on the fine details of structure and reaction conditions. This story is a useful cautionary tale, particularly for those of us who are quick to wield Occam's razor as an intellectual weapon.



Ring representations. The valence bond method approximates the ground state of benzene (purple) from the superposition of the two Kekulé (blue) and the three Dewar (red) forms.

Other chapters aim at getting beyond narrow technical content to address broader issues. One such study examines Erich Hückel's contributions to the molecular orbital theory of unsaturated and aromatic compounds. It explains their limited initial impact on the organic chemistry community, and Hückel's virtual abandonment of the field, in terms of his personality, his competition, and even his involvement with the Nazi party. The longest and most ambitious chapter begins as a lengthy commentary on the "Special Convictive Power of Symmetrization Experiments," Berson's characterization of mechanistic tests that distinguish whether a reaction pathway proceeds via a symmetric intermediate. The author then shifts to a much more general problem: in trying to account for the reception of new ideas, scientists often appeal to aesthetics, as in a "beautiful theory." How are we to understand why one theory or experiment, rather than another, is perceived as beautiful? Berson suggests that our innate attraction to symmetry is a factor. His discussion of symmetry ranges over widely diverse topics, from Kepler's model of the heavenly spheres to the neuroanatomy of human vision. Even if its relevance to the experiments under question is not convincingly demonstrated, it is an interesting speculation.

Berson is sensitive to the concern that he is practicing history without a license, but his experience and expertise give him a special perspective that compensates. The anecdote above implicitly asks whether history of science should be done by historians or scientists; this book helps make a case for answering, simply, "Yes." Beyond its specifically stated purpose of improving the minds of practicing chemists, it provides an alternative, complementary perspective to history by historians. It is instructive, as a sort of second-order metascientific study, to compare Berson's take on Hückel with that offered by a professional historian, Mary Jo Nye (*1*). The facts presented in the two accounts are much the same, but the emphasis and interpretation they receive are significantly different.

Berson anticipates that professional chemists will constitute the bulk of his audience, but he hopes that others will read *Chemical Creativity* as well. Those who do—out of interest in how chemists think and in what ways they are typical of or different from scientists in other fields—will at least be entertained and, hopefully, also enlightened. Even though much of the technical material presented is highly specialized, Berson generally does a good job of clarifying concepts and terms that will be unfamiliar to the non-chemist and of explaining the key issues in the evolution of each case (there are only a few lapses). At this point, however, I cannot refrain from complaining about the price of the volume: $55 for a paperback of 200 pages. Perhaps the production costs were high because of the liberal offering of reaction schemes and photos; despite an annoying number of typos, the book is rather attractive. But such pricing is self-defeating for a book that strives to attract readers by appealing to general interest rather than professional needs.

References
1. M. J. Nye, *From Chemical Philosophy to Theoretical Chemistry* (University of California Press, Berkeley, 1993), chap. 9.

The author is at the Beckman Institute, California Institute of Technology, 139-74, Pasadena, CA 91125, USA. E-mail: jal@its.caltech.edu

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