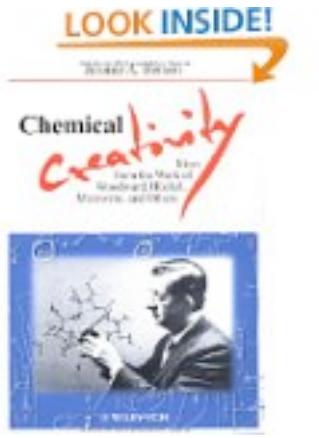

Chemical Creativity: Ideas from the Work of Woodward, Hückel, Meerwein, and Others
by Jerome A. Berson
Wiley-VCH, 1999

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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." "Funny you should say that," replies the historian. "I've always been interested in heart surgery, and when I retire…."

Obviously this anecdote makes a valid point: doing history of science well requires skill and training, just as any other discipline. But surely neither the historian who told it nor his highly appreciative audience (also mostly historians) would have any hesitation in deciding which of those two transoccupationals they would be willing to consult professionally. We can acknowledge that the study of history of science serves a variety of purposes; for some of them a practicing scientist may be as well placed to make a valuable contribution as a professionally trained historian. Furthermore, compared to physics and biology, chemistry has been a relatively neglected subject of "metascientific studies" — 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.

In *Chemical Creativity*, Jerome Berson presents several case studies in 20th century chemistry, primarily physical organic chemistry, his own field of research. He argues that by examining how earlier chemists have gone about their activities, including questions such as how problems are selected and attacked, or why one researcher's experiment is accepted as convincing while another's falls into neglect, history can provide useful lessons for today's chemist. For example, he traces several decades of work on the so-called "dienone-phenol rearrangements," in order to demonstrate how a set of apparently closely related reactions can proceed by a variety of quite different mechanisms, depending

crucially on the fine details of structure and reaction conditions. This is a useful cautionary tale, particularly for those of us who are quick to wield Occam's razor as an intellectual weapon.

Other studies aim at getting beyond narrow technical content to address broader issues. One such examines Erich Hückel's contributions in molecular orbital theory, and proposes to explain their initially quite limited 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. It 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 for that lack. The anecdote cited 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 and complementary viewpoint to history by historians. It is instructive, as a sort of second-order metascientific study, to compare Berson's take on Hückel with that of a professional historian (e.g., Mary Jo Nye, *From Chemical Philosophy to Theoretical Chemistry*, Chap. 9). The facts presented in the two accounts are much the same, but the emphasis and interpretation they receive are significantly different.

While Berson anticipates that professional chemists will comprise the bulk of his audience, he expresses the hope that others will read it too. Those who do, out of interest in how chemists think, and in what ways they are both typical of and different from scientists in other fields, will at least be entertained, and hopefully enlightened as well. Even though much of the technical material presented is highly specialized, Berson does a generally good job (there are a few lapses) of clarifying concepts and terms that will be unfamiliar to the non-chemist, and explaining the key issues in the evolution of each case.

On this point, however, I can't refrain from complaining about a negative feature: the price of the volume. Perhaps the production costs were high because of the liberal offering of reaction schemes and photos — the book is quite attractive (although the number of typos is annoyingly large) — but $55 for an under-200-page paperback seems unconscionable to me. For a book that hopes to attract readers by appealing to general interest rather than professional needs, this is a self-defeating policy.