

Book & Media Reviews

edited by

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University of Tennessee
Knoxville, TN 37996-1600**Chemical Explanation: Characteristics, Development, Autonomy**International Society for the Philosophy of Chemistry:
Summer Symposium on the Philosophy of Chemistry
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edited by Joseph E. Earley, Sr.

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reviewed by Daniel Berger

This book, like all conference proceedings, is a mixed bag. Because I am a layman in philosophy, my review will be a cook's tour, conducted by an organic chemist with an interest in bonding theory. More philosophically aware reviews may be found elsewhere (1). However, *Chemical Explanation* is not exclusively philosophical in focus. A number of its papers deal explicitly with history in order to raise unanswered questions or to point out that certain problems have been dealt with before. Other papers are short review articles, summarizing the thought of others, which may or may not point to new directions for research.

The book is divided into four sections: General Considerations, Specific Applications, Representation and Instrumentation, and Development and Social Impact.¹ The section titles fit well, though unfortunately the fourth is a catch-all for papers that sometimes seemed awfully woolly. Equally unfortunately, the reader is reduced to scanning the table of contents in an attempt to find topics; there is no index.

The papers I considered best were those that succeeded in communicating sensible ideas to a chemist with no formal training in philosophy. Thus, papers that made excessive use of philosophical jargon, or devoted themselves to areas only peripherally related to chemistry, or defended nonsense, or were incomprehensible or vague, are not on my short list.

Fortunately, few papers were only peripherally related to chemistry. Elmar Kühl and Timm Lankau remain firmly in the realm of subatomic physics, and Ko Hojo presents a fuzzy and unintentionally unflattering summary of the philosophy of Kitaro Nishida.

Others used chemical examples in arguments that pointed to extra-scientific thought: James F. Salmon uses the doubtfully illustrative example of chemical reactions for a process universe in his explication and defense of Pierre Teilhard de Chardin. Mark R. Nowacki and Wilfried ver Eecke use dubious chemical analogies to explore Hegel's conception of a free society. And Werner W. Brandt presents an enjoyable, but only incidentally chemical, biographical review of Michael Polanyi.

On the other hand, I relished Jaap van Brakel's essay, in which he impatiently demolishes the pretensions of reductionists and points out that a theory of *everything* isn't much use to *anyone*. He calls loudly for a return to "the rough ground" of explaining specific aspects of chemistry as a necessary preliminary (and antidote) to simply cramming those aspects into a pre-existing philosophical system. By and large the successful papers followed his advice.

Readers of this *Journal* will particularly enjoy Eric Scerri's contribution, "Constructivism, relativism and chemical education." He discusses various definitions of constructivism; points out that relativism is very much a minority position in the philosophy of science; and urges chemical educators to get their ideas straight before expounding on the epistemological implications of their work. Similar ideas have been expressed in this *Journal* (2).

Chemical explanation is well-covered, though not always in a useful way. William Goodwin gives an excellent phenomenological description of explanation in organic chemistry, while Giuseppe del Re explores the close relationship between reaction mechanisms and chemical explanation. The colonization of chemistry by quantum mechanics is both explored and resisted in articles by Robin Findlay Hendry and Paul A. Bogaard, who use the history of ideas to show that, unless it explains and predicts molecular structure, quantum mechanics is useless to chemists.

On the other hand, V. N. Ostrovsky makes a not-very-convincing attempt to defend the reduction of chemistry to quantum mechanics, arguing that because we can calculate electron configurations, the periodic table is fully explained! And James Mattingly argues, astonishingly, that molecules have no definite structure because we can't pin down *precisely* where their nuclei are.

Last but not least, R. Bruce King's "Chirality and Handedness" should be required reading for chemical educators since he explains just what the difference is and why it is important.

Unfortunately for most readers, the preceding paragraphs enumerate what they will find useful; most of the other articles are densely larded with jargon, too-brief summaries of material found elsewhere, or are of poor quality.² This book is too expensive for most individuals, and I don't recommend it for libraries unless they are already building a philosophy of chemistry collection. However, as I've pointed out, several individual articles *are* well worth reading and will be useful for chemical educators. Copies of those articles should be obtained from the New York Academy of Sciences³ or through inter-library loan.

Notes

1. The table of contents is found online at <http://www.annalsnyas.org/content/vol988/issue1/> (accessed Apr 2006).
2. Those desiring thumbnail impressions of all the papers in this book may contact the reviewer at bergerd@bluffton.edu.
3. The volume's Web address is found in note 1. Educational institutions with database subscriptions may have Web access to the full content of the volume.

Literature Cited

1. Allin, S. B. *HYLE* **2004**, *10*, 179–181; Glymour, C. *Philosophy of Science* **2004**, *71*, 415–418.
2. Scerri, Eric R. *J. Chem. Educ.* **2003**, *80*, 468; see also Letters in **2004**, *81*, 194–195.

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