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Publisher *Taylor & Francis*

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## Phosphorus, Sulfur, and Silicon and the Related Elements

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713618290>

## Book Reviews

**To cite this Article** (1981) 'Book Reviews', *Phosphorus, Sulfur, and Silicon and the Related Elements*, 12: 1, 127 — 129

**To link to this Article:** DOI: 10.1080/03086648108078297

**URL:** <http://dx.doi.org/10.1080/03086648108078297>

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## *Book Reviews*

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THE VOCABULARY OF ORGANIC CHEMISTRY, By Milton, Orchin, Fred Kaplan, Roger S. Macomber, R. Marshall Wilson and Hans Zimmer, all: Organic Division, Department of Chemistry, University of Cincinnati, Cincinnati, Ohio, A Wiley-Interscience Publication, John Wiley & Sons, New York, Chichester, Brisbane, Toronto, 1980, 607 pp. \$35.00.

At a time when the market is flooded with contributions to the scientific literature, both in periodical and book form, it is difficult to find new subject matter for a reference- or textbook that fills a genuine need for chemists of all descriptions. This has nevertheless been achieved in an impressive fashion by the combined effort of five organic chemists from the University of Cincinnati. The 15-chapter "Vocabulary" satisfies such a need for all those who have any dealings with chemistry, and organic chemistry in particular.

The need for a centralized catalogue of concepts in any worldwide scientific discipline, such as organic chemistry, is made all the more urgent by the increasing specialization in both research and teaching which makes it increasingly difficult to acquire or retain a broad knowledge of the subject. Scientists whose mother tongue is other than English will consult this work often with considerable benefit in their reading of the literature and in the preparation of their own manuscripts in English.

A book of this nature stands or falls in the choice of the appropriate criteria. A proper balance must be struck in such a work between theoretical fundamentals on the one hand and the mass of practical concepts available in the preparative, analytical, technical, organometallic, biochemical and natural-product fields on the other. This book achieves this goal nicely by clearly illustrating important principles and concepts with well-chosen examples.

The worker in sulfur or phosphorus chemistry doubtless will benefit from the description of terms pertinent to this area of research and to other elements where the IUPAC nomenclature for a large variety of compound classes is to be found. The biological and technical importance of sulfur and phosphorus compounds is recorded also in a variety of chapters, representing a further bonus for the reader. This is true as well for other specialized areas of research.

In summary, the authors have succeeded in compiling and explaining key concepts in organic chemistry in only 609 pages, including index, whereby all important aspects of theory, compound description and practical application are recorded. Occasionally, this reviewer might have desired some changes in the text, but by and large the "Vocabulary" is a welcome addition to the chemical literature and a wide readership seems to be assured. The effectiveness of all scientists concerned with the field of organic chemistry can be increased by the use of this book.

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THE INORGANIC HETEROCYCLIC CHEMISTRY OF SULFUR, NITROGEN AND PHOSPHORUS, Henry G. Heal, Academic Press Inc. (London) Ltd., 1980, 271 Pages, \$82.50.

The increasing interest in inorganic heterocyclic compounds, manifested by the regularly scheduled international conferences on this subject, makes this book a very welcome addition to the literature. From the highly diverse field of heterocyclic chemistry, which embraces such substances as mineral silicates, chelate complexes of metals, metapolyphosphates, and carboranes, the author has chosen to cover a particular range of topics, namely the covalent ring compounds based on the various combinations of the elements nitrogen, sulfur, and phosphorus, and certain well defined related areas of non-cyclic chemistry. It is to be regretted that the scope of this book could not be expanded to include rings containing other elements such as oxygen and carbon.

Following a short introductory chapter on the status, nomenclature and general methods of synthesis, 150 pages are dedicated to sulfur-nitrogen chemistry. This material is subdivided into chapters on cyclic sulfur imides with two-coordinate sulfur, on imides and amides of sulfur(IV) and sulfur(VI) as source materials for inorganic heterocycles, on sulfanuric halides, on formally unsaturated cyclic sulfur nitride S-halides and derivatives, on unsaturated cyclic sulfur nitride S-oxides and S-oxide ions, and a concluding chapter on sulfur-nitrogen heterocycles which deals with bonding and electron-counting.

A further 91 pages describe ring and cage structures in phosphorus-sulfur and phosphorus-nitrogen compounds. Members of the latter class of compounds are the *cyclo*- and *closo*-phosphazanes and phosphazenes. A chapter on polymeric phosphorus nitrides and related compounds such as  $(\text{PN})_x$ ,  $(\text{P}_3\text{N}_5)_x$ ,  $(\text{PN}_2\text{H})_x$ ,  $(\text{OPN})_x$ , and  $(\text{SPN})_x$  concludes the second part of the book. A ring index is included as a guide to the inorganic ring systems presented in the book.

This reviewer was delighted to find the structure of a compound first prepared by him adorning the dust jacket, but the references do not list the paper in which the synthesis was described. Nor are references for the synthesis of  $\text{R}_2\text{C}=\text{N}-\text{S}-\text{N}=\text{S}=\text{N}-\text{S}-\text{N}=\text{CR}_2$ -type compounds included. Also, references to the non-heart-shaped  $\text{S}_5\text{N}_3^+$  cation are incomplete. Because, as the author states in the preface, this book is intended as a reference text rather than as a monograph, completeness with respect to material and references within the framework of the title should be expected.

Apart from these few shortcomings, this book can be highly recommended to the specialist in inorganic heterocyclic chemistry and to the general scientist who wants an overall picture of the state of research in this area.

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May 25, 1981

THE HETEROCYCLIC CHEMISTRY OF PHOSPHORUS: SYSTEMS BASED ON THE PHOSPHORUS-CARBON BOND, Louis D. Quin. John Wiley & Sons, New York, 1981; xiii+ 434 pp. \$47.50.

The maturity of an area of chemistry can often be judged by the quality of the monographs describing it; by this criterion, using Professor Quin's book as a guide, the chemistry of phosphorus-carbon heterocycles is a fully matured area. This book is admirable. It is not designed to be exhaustive, though it seems to have omitted nothing significant; it is designed to be a guidebook to the synthesis, physical and chemical characteristics, and broad significance of the phosphorus-carbon heterocycles. The book is lucidly written and logically arranged; its references are complete and commendably up-to-date (to mid-1979). Its diagrams are copious and clear; its index thorough.

The arrangement of topics is logical. After an opening general survey chapter, there are substantial chapters on synthetic methods for each of the two most important ring sizes, the five- and six-membered rings. One chapter covers syntheses of all the less common small and large ring compounds. For me the highlights of the book were the three long chapters on the value and significance of  $^{31}\text{P}$ ,  $^{13}\text{C}$ , and  $^1\text{H}$  nuclear magnetic resonance spectroscopy in understanding structural and electronic effects in these heterocyclics. Indeed, these three chapters include material of great value not only for heterocyclic phosphorus chemistry, but for all phosphorus chemistry. A final chapter surveys conformational questions; the influence of ring size on reactions at phosphorus; and the participation of phosphorus in "aromatic" systems.

Professor Quin deserves the thanks of the phosphorus research community for his very successful achievement; this book will be useful not only to workers in heterocyclic phosphorus chemistry, but to all who want to learn more about the interplay between structure, properties, and reactivity in phosphorus chemistry.

HAROLD GOLDWHITE

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## ERRATA

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Vol. 8, p. 167, left column, line 19

Reads incorrectly:  $\text{Mo}(\text{S}_2\text{C}_2\text{H}_2)_3$ , VI, 2.33(2), 1.0 (however, *vide infra*)

Should read:  $\text{MoO}(\text{S}_2)(\text{S}_2\text{CNPr}_2)_2$ , obtained by Weiss *et al.*<sup>15</sup>