

Book Review

Phosphorus World: Chemistry, Biochemistry and Technology By D. E. C. Corbridge (Harrogate, UK). D. E. C. Corbridge: P.O. Box 504, Harrogate HG3 1WN, UK. 2005. <http://www.phosphorusworld.com>. \$85.00. CD-ROM.

Richard A. Kemp

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Handbook of Reagents for Organic Synthesis: Reagents for High-Throughput Solid-Phase and Solution-Phase Organic Synthesis. Edited by Peter Wipf (University of Pittsburgh). John Wiley & Sons, Ltd.: Chichester. 2005. xii + 380 pp. \$140.00. ISBN 0-470-86298-X.

This book is the sixth of a continuing series of reference works on the topic of reagents for organic synthesis. The topics were derived from the *Encyclopedia of Reagents for Organics Synthesis*, which was originally published in 1995, and from the more current electronic version of this work, *e-EROS*. The aim of this volume "is to assemble in manageable format as much indispensable information on high-throughput solid- and solution-phase organic synthesis as possible," according to the editor. The topics covered a range from polymer-supported reagents to resins and linkers to techniques in molecular imprinting, wherein the reagents are listed in alphabetical order. The book opens with a list of recent review articles and monographs, which includes relevant Web sites and a list of procedures from Volume 1 in the series, *Solid-Phase Organic Syntheses*. A list of contributors and a subject index complete the book.

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Chemistry of Natural Products. By Sujata V. Bhat (Indian Institute of Technology Bombay, Mumbai, India), Bhimsen A. Nagasampagi (National Chemistry Laboratory, Pune, India), and Meenakshi Sivakumar (Quest Research Center, Mulund, Mumbai, India). Springer: Berlin, Heidelberg. 2005. xxxii + 840 pp. \$199.00. ISBN 3-540-40669-7.

The aim of the authors in producing this book was to provide an "easy to read overview of natural products." There are twelve chapters covering (1) Steroids; (2) Terpenoids; (3) Fatty Lipids and Prostaglandins; (4) Alkaloids; (5) Amino Acids, Proteins and Bioconversions; (6) Nucleic Acids; (7) Carbohydrates; (8) Insect and Plant Growth Regulators; (9) Phenolics, Natural Dyes and Pigments; (10) Marine Natural Products; (11) Antibacterials; and (12) Vitamins. Each chapter gives an introduction to the topic at hand and covers "nomenclature, occurrence, isolation, detection, structure elucidation both by degradation and spectroscopic techniques, biosynthesis, synthesis, biological activity and commercial applications, if any, of the compounds mentioned in each topic." The book concludes with Appendix 1 "Techniques in Isolation and Identification of Natural Products" and a subject index.

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Phosphorus World: Chemistry, Biochemistry and Technology. By D. E. C. Corbridge (Harrogate, UK). D. E. C. Corbridge: P.O. Box 504, Harrogate HG3 1WN, UK. 2005. <http://www.phosphorusworld.com>. \$85.00. CD-ROM.

Phosphorus World is the latest version of the well-known set of books by Corbridge on this ever-expanding subject of chemistry. This time, however, the book is available on CD-ROM in PDF format instead of paper, thus allowing a substantial (and welcome!) reduction in the price of the volume. The author began his comprehensive coverage of phosphorus chemistry over 25 years ago with the first edition in this series. During this time, the number of known phosphorus-containing compounds has skyrocketed to approximately 10^6 ; thus any attempt to be "comprehensive" is doomed to certain failure. However, as the author notes, *Phosphorus World* is intended to serve as a bridge between a graduate-level course and the original articles in the literature. This goal is extremely ambitious and raises high expectations, but for those of us working in main group chemistry in general and phosphorus chemistry specifically, we are fortunate that this remarkable volume exists. Overall, the publication is not perfect, but it contains such a vast amount of useful information for anyone interested in the expansive world of phosphorus chemistry that it makes overlooking the faults relatively easy. The prior print volume, *Phosphorus 2000. Chemistry, Biochemistry and Technology*, was evaluated in 2001 in an excellent review by Mitzel (*Angew. Chem., Int. Ed.* **2001**, *40*, 1783), and many of the detailed comments he made at that time, both good and bad, pertain as well to the current CD-ROM.

By design, the CD-ROM follows the same chapter headings found in earlier editions. A chapter on the historical background of phosphorus chemistry as well as an introduction to nomenclature opens the CD-ROM. As a long-time phosphorus chemist, I found the historical aspects particularly well written and interesting personally as well as quite useful in teaching undergraduate and graduate classes in inorganic chemistry. The author does an excellent job early on demonstrating the wide range of topics in which phosphorus chemistry plays a role, from Nature and biochemistry to fertilizers and industrial chemicals to beautiful examples of synthetic phosphorus chemistry designed to expand the typical oxidation states and coordination geometries of phosphorus.

More detailed chapters follow that cover the atomic and molecular properties of phosphorus compounds, bonding, and stereochemistry. At this point, the author begins to divide the various classes of phosphorus compounds into more manageable sections. There is a chapter on metal phosphides, followed by individual chapters on oxyphosphorus compounds, organophosphorus chemistry, azaphosphorus compounds, metal-phosphorus complexes, and phosphorus compounds containing other p block

elements. Each of these chapters has anywhere from 7 to 23 subheadings. Biological interests in phosphorus compounds, including biopolymers, are significantly covered in approximately 200 pages. Finally, there are chapters on the applications and characterization of phosphorus compounds. A chapter entitled "Special Topics" covering hydrogen bonding, stereochemistry, pseudorotation, and reactive phosphorus species was especially interesting to me in my role as educator. The author discusses these topics in great detail, and I can see that several lectures in a graduate level class could be based upon this chapter. All of the chapters are significantly referenced, although the author has had to pick and choose which references to include due to the number of papers in the primary literature. He states that the literature is covered up to late 2004.

Each of the chapters serves as a wonderful way to learn about phosphorus chemistry in a very short amount of time, and the reader is able to learn a great deal very quickly on a wide range of topics. However, one will not become an expert simply by reading this book; a visit to the primary literature is required for that. Nonetheless, this CD-ROM can be quite useful when one is contemplating a new area of chemistry in which to work. I am interested in reactions of divalent main group compounds with CS₂, for example, and as a personal "test" for the volume, I looked up all the reactions of phosphorus with CS₂ to serve as background. Within 5 min I had approximately 10 different reactions of phosphorus compounds with CS₂ to serve as useful comparisons. I found this a very acceptable bargain for a few minutes of my time!

On the whole, the topics are presented clearly and the book is generally well written. Figures and tables are interspersed well with the text, and the book is easy to read and comprehend. I find the vast number of synthetic reactions listed in the CD-ROM alone enough to make this a "must have" for any preparative chemist.

There are shortcomings to the CD-ROM, and to the previous volumes as well, however. The references are in nonstandard format and contain many errors in spelling. There are occasional errors in figures and drawings and the references therein, but in general the reader can easily figure out what was meant. It would have been extremely helpful if the references and the index were interactively linked within the text, so one could go to the index, find a topic of interest, click on the page number, and be brought immediately to the appropriate page. Being able to click on a reference within the text and having the citation pop up would also have been useful. These features are possible and can be found in other PDF files. With a volume such as this, choices about which subjects to include must be made, and consequently some important topics are given less coverage than perhaps other authors would have done. As an example, phosphorus-containing pincer ligands are mentioned several times in the index, but little overall coverage is given to this important class of compounds.

The CD-ROM of *Phosphorus World* contains 1348 pages, 376 figures, and 281 tables. The amount of useful information is enormous, and the cost of the CD is a bargain at \$85. I feel this volume should be a standard addition to the laboratory of any chemist working directly in the field or around the periphery of phosphorus chemistry. There is probably no faster way to

get acquainted with the vast world of phosphorus chemistry than with this electronic "book."

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The Comprehensive e-Book of Named Organic Reactions and Their Mechanisms. By Elbertus Kruiswijk. The Chemical Bookstore: Aberaman, U.K. 2005. <http://www.namedorganicreactions.co.uk>. 1980 pp. Approximately \$23.00.

Originally anticipated by the author as a year-long project in 1996, this opus is the result of nine years of labor on the subject. The scope of the book is impressive; the author set out to include every named reaction no matter how obscure. While some might quibble about the inclusion of the Bartlett–Condon–Schneider reaction (hydrohalogenation of alkene), the Alder–Rickert reaction (a retro-Diels–Alder) or a number of other similar transformations, it is the author's contention that "everyone can name a reaction and, of course, I did so." The result is some 1300 named reactions, each with an example, a proposed mechanism—or more accurately, a reaction pathway—a brief discussion of the transformation, and note of its related reactions, followed by literature references.

Those seeking to know more about a given named reaction and its link to other transformations will derive the greatest benefit from this book. The author explicitly correlates related transformations. Looking for an alternate to the Fischer indole synthesis? Everything from the Baeyer–Emmerling to the Yurovskaya is included for perusal. Content, on the whole, is impeccable in its thoroughness and recent in its coverage. Not only does the author include references up to and including January of 2005, but several named reactions are from the current millennium: both Arndtsen muchnone and Yamamoto ketone syntheses date to 2001. In several instances, the author not only provides an example of a typical reaction, but also includes mechanistic nuances that lead to other useful transformations. The Bäckvall acetoxylation is described, with an addendum detailing the intriguing chloride effect in this transformation. Disturbingly, olefin metathesis is not included in any of its iterations, other than an oblique reference under the Tebbe olefination. To be fair, the author states that reactions such as the aldol (and presumably olefin metathesis) are not included per se since they are not known by a developer's name. It seems an oversight, however, not to include the Schrock or Grubbs catalysts, at the very least, given the importance of this reaction.

There are several shortcomings in this work. As is the case with a number of tomes in this area, the mechanisms provided are often oversimplified, excusable from the point of view of requiring brevity, and occasionally wrong, inexcusable given the author's stated belief that an undergraduate level of knowledge in organic chemistry is sufficient to understand them. I doubt most undergraduates would pick up on the errors. That, coupled with the widespread delusion that anything written in a book must be true, is dangerous. The author tends to use examples that are different from the mechanism of a given

transformation, leading to potential confusion on the part of inexperienced organic chemists. A slight aggravation is the lack of hypertext links in the pdf document. It is true that Acrobat's find/search options allow rapid identification of a given author or reaction, but it would have been easy, presumably, to link the reaction type with its every mention in the text, not only in the index but also when it is cross-referenced. It is hoped that the next version of this e-book will take advantage of this option.

One might ask the question of whether the organic community needs a book with a listing of 1300 named reactions. This e-book is not for the diabolical writer of cumulative examinations or

for the stressed first-year graduate student. Rather, this work is best suited for the practicing researcher, as it provides a valuable resource for deeper searching on a given reaction.

Note Added after ASAP Publication. After this book review was published ASAP on November 18, 2005, the author name, publisher, URL, and price were corrected. The version published November 21, 2005, is correct.

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