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BOOK REVIEWS

Bioactive Heterocycles I. Topics in Heterocyclic Chemistry, 06. Edited by Shoji Eguchi (Nagoya University, Japan). Series Edited by R. R. Gupta. Springer: Berlin, Heidelberg, New York. 2006. xiv + 220 pp. $149.00. ISBN 3-540-33350-9.

Bioactive Heterocycles I is a continuation of critical accounts about heterocyclic compounds within the series *Topics in Heterocyclic Chemistry*. The present volume provides comprehensive reviews of the chemistry and bioactivity of selected groups of heterocycles and natural products.

The first chapter by Ohno and Eguchi covers the synthesis of biologically interesting heterocycles employing squaric acid as a starting material and/or bioisostere. Coverage here includes the synthesis of natural and unnatural bioactive heterocycles. Mechanistically interesting transformations, such as pericyclic reactions, are highlighted. In the second chapter, Nishino discusses the chemistry and structure of 1,2-dioxanes derived from manganese(III)-based peroxidation of alkenes. Many 1,2-dioxanes possess important bioactivity and novel structure, and in this chapter, Nishino systematically presents information on a variety of manganese(III)-catalyzed aerobic oxidation reactions utilizing various substrates, including reaction mechanisms and structure. Chapter 3, written by Somei, provides a review of the chemistry and biology of 1-hydroxyindole derivatives. He has published several earlier reviews on the subject of 1-hydroxyindoles; the current work focuses on recent results from his research group from 2005 to the present. After briefly discussing methods for the preparation of 1-hydroxyindoles, Somei describes a variety of reactions on this class of indoles and its derivatives. Highlights include nucleophilic aromatic substitutions and some unexpected transformations. In the final section of this chapter, he briefly outlines the biological activity of 1-hydroxyindoles and analogues.

In Chapter 4, Eguchi provides an excellent overview of the most recent advances in the synthesis of quinazoline alkaloids, with an emphasis on natural products. A brief introduction is followed by a description of recent methodology applied to the synthesis of the quinazoline ring system, including aza-Wittig methodology, the use of microwave-assisted synthesis, and metal-catalyzed reactions. The remaining chapter is a nice summary of recent total syntheses of quinazoline alkaloids, with an emphasis on bioactive natural products and analogues. Chapter 5, written by Kita and Uemura, provides a review of the isolation, bioactivity, and biogenesis of novel marine alkaloids. Structurally fascinating marine natural products studied in the authors' labs include the pinnatoxins, norzoanthamine, pinnaic acids, zamamistatin, and symbiomine. Aspects of structure elucidation, synthesis, and biological activity are also discussed. Each class of marine natural product is structurally novel, possessing unique physiological properties and/or biosynthetic origin. The final chapter by Kiyota concerns synthetic studies on heterocyclic antibiotics isolated from terrestrial sources that incorporate a nitrogen atom in their structure. Antibiotics discussed include glutarimides, antimycins, and tabtoxins. The focus is primarily on work related to the chemical synthesis of these natural products. However, incorporated within the discussion are the preparation of structural analogues and related biological activity.

Overall, this book covers in detail several classes of bioactive heterocyclic compounds including selected natural products. The focus is on the most recent advances, and the clarity of the presentation is very good. It should be of interest to individuals interested in the discovery and synthesis of bioactive small molecules, including research scientists in academia and industry. I would expect this book to be a standard reference in university and industry libraries.

Gary Sulikowski, *Vanderbilt University*

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Marine Natural Products. Topics in Heterocyclic Chemistry, 05. Edited by Hiromasa Kiyota (Tohoku University, Sendai, Japan). Series Edited by R. R. Gupta. Springer: Berlin, Heidelberg, New York. 2006. xiv + 288 pp. $169.00. ISBN 3-540-33728-8.

The search for marine natural products is well-known for colorful pictures of exotic sea creatures which, after having been found to contain the cure for cancer, disappear into the depths, never to be seen again, or for accounts of scuba-diving chemists in waters alive with poisonous sea snakes—in short, the sort of sensational stuff that even nonchemists find interesting. That sort of thing will not be found in this book. This is not to say it will be uninteresting to organic chemists since it deals with some exciting current topics in natural products and synthetic organic chemistry.

This slim, nicely bound volume consists of a series of well-organized and up-to-date chapters by several young Japanese chemists, many of them at Tohoku University in Sendai, who specialize in marine natural products. The overall theme of this volume can be stated to be total synthesis, as five of the eight chapters deal with this topic. As might be expected, marine polyether toxins are well represented with two chapters on this subject: a general review and review of their total synthesis. The longest chapter is on the synthesis of marine macrolides, which unfortunately are limited to dactylolide, lasonolide A, and leucascandrolide A. However, the structures of 20 other macrolides and recent references to their syntheses are thoughtfully provided at the end of the chapter. This chapter also includes a very useful section on the stereoselective synthesis of tetrahydropyrans. Other synthetic topics include the halogenated medium-ring ether lipids of the laurencin type, the biosynthetically fascinating manzamine alkaloids, and selected compounds containing bicyclic or spirocyclic acetals.

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Only a few minor flaws were noted, such as mistakes in the citation of their own papers by the authors of Chapters 3 and 4 and the statement in Chapter 2 that dinoflagellates occupy a phylogenetic position between eukaryotes and prokaryotes. As is pointed out in the Preface to the series, 50% of all molecules listed in Chemical Abstracts can be considered heterocyclic, and since heterocycles are, if anything, even more common among marine natural products, one has to set limits. Because of this, some of the more important heterocyclic marine natural products such as diazonamide A, the cephalostatins, spongistatin 1, or salinosporamide A are not even mentioned in this book. Nevertheless, this book represents a valuable and timely resource, which is expected to be especially useful to graduate students, and should be included in all scientific libraries.

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Asymmetric Synthesis: The Essentials. Edited by Mathias Christmann (RWTH, Aachen, Germany) and Stefan Bräse (Technical University of Karlsruhe, Germany). Wiley-VCH Verlag GmbH & Co. KGaA: Weinheim. 2007. xl + 346 pp. $115.00. ISBN 978-3-527-31399-0.

This book contains more than 50 brief, "essay-type" chapters on current research in one area of the field of asymmetric synthesis written by experts in the topics at hand. The chapters follow a similar format and generally include an introduction to the background of the topic, a description of the reaction with examples, a conclusion and a look at future perspectives, a curriculum vitae of the author(s), and references. It is organized into five parts, each of which includes an introductory chapter: (I) Chiral Auxiliaries in Asymmetric Synthesis; (II) Metal-catalyzed Asymmetric Synthesis; (III) Biocatalysis and Organocatalysis: Asymmetric Synthesis Inspired by Nature; (IV) Asymmetric Reactions in Total Synthesis; and (V) Asymmetric Synthesis in Industry. A subject and an author index complete the book.

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Fundamentals of Metallic Corrosion: Atmospheric and Media Corrosion of Metals. Corrosion Engineering Handbook, 2nd ed. By Philip A. Schweitzer (Consultant, York, PA). CRC Press/Taylor & Francis Group: Boca Raton, FL. 2007. xx + 728 pp. $99.95. ISBN 0-8493-8243-2.

This book covers the science of corrosion in metals and alloys. The author discusses the mechanisms of corrosion and the effects of atmospheric corrosion in the first two chapters and describes the corrosion of different types of metals and their alloys in the remaining chapters. Compatibility data are provided for each metal and alloy, and references to more data are included. The author also examines the corrosion resistance of various nonferrous metals and alloys. A brief subject index completes the book.

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Degradable Polymers and Materials: Principles and Practice. ACS Symposium Series 939. Edited by Kishan Khemani (Plantic Technologies, Ltd., Santa Barbara, CA) and Carmen Scholz (University of Alabama, Huntsville). American Chemical Society: Washingon, DC (distributed by Oxford University Press). 2006. xiv + 442 pp. $199.50. ISBN 0-8412-3972-X.

This book was developed from a symposium of the same name held in San Diego, CA in March 2005 and covers "various aspects of current research and development related to design, synthesis, properties, processing, applications, degradation, and biodegradation of a variety of novel polymers and materials", to quote from the Preface. There are 24 chapters, which are organized into the following thematic sections: Introduction; Natural Polymers; Synthetic Polyesters; Polymer Synthesis; Characterization; and Degradation Mechanisms. An author index and an extensive subject index complete the book.

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The Potential Distribution Theorem and Models of Molecular Solutions. By Thomas L. Beck (University of Cincinnati), Michael E. Paulaitis (The Ohio State University and The Johns Hopkins University), and Lawrence L. Pratt (Los Alamos National Laboratory). Cambridge University Press: Cambridge. 2006. xiv + 230 pp. $125.00. ISBN 0-521-82215-7.

There is an unfortunate tendency for some investigators to use commercial simulation packages without having first acquired a basic knowledge of statistical mechanics. With this book, the authors attempt to redress this problem, emphasizing molecular solutions.

An interesting feature of this book is the use of what the authors call the "potential distribution theorem," better known as the Widom particle insertion method, as a unifying principle. As the authors point out in the Preface, this book is not an appropriate place to begin one's study, and I tend to agree. The first half of McQuarrie's book *Statistical Mechanics* should be studied first. The authors presume that the reader knows about intermolecular forces and pairwise additivity of such forces. These concepts and those related to the separation of kinetic and potential energy in classical statistical mechanics are used without discussion.

The approach is rather formal. For example, the pair distribution theorem is not defined as a local density but as an average of delta functions. This is, of course, equivalent but hardly intuitive. The Percus−Yevick and hypernetted chain approximations are obtained by functional differentiation. This is a beautiful formalism, but it gives no insight into either the accuracy or the origin of these approximations. The reasonable question "What is a hypernetted chain?" is neither asked nor

answered. Moreover, the highly useful mean spherical approximation cannot be, or has not been, obtained by functional differentiation, and this approximation is not even mentioned. The direct correlation function is defined by functional differentiation but with no insight into what is direct about this function and why it is useful.

A number of applications, including electrolytes and the Debye−Hückel theory and polymers, are included. All this is accomplished in less than 200 pages. A notable feature of this book is that each chapter has an accompanying set of interesting examples, which I encourage the reader to work through. For example, the fundamental formula for the Debye−Hückel pair correlation function is found in an example rather than in the text.

The scaled particle and Percus−Yevick chemical potentials of a hard-sphere fluid are plotted in Figure 7.12. These are simple analytic results that are not presented in the text, but which could have and should have been given. The Carnahan−Starling result, which is also analytic, is also plotted without any explanation as to what this is. Evidently, the reader is expected to know something of the accuracy of these approaches as simulation results, which are readily available but are not plotted.

Gaussian units are used for electrostatics. This is my preference, but those who think that SI units are somehow more fundamental may be unhappy.

The book is attractively presented. Although Landau is spelled once as Landu and Plischke is consistently spelled as Plishke, in general the book is relatively free of typographical errors. The reader will find reading this book similar to walking or driving through a scenic countryside with few signs. The absence of these is an advantage for the frequent traveler for whom such signs are a distraction, but the infrequent traveler may have some difficulties finding his or her way. With this caveat, this book is recommended.

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