and will make a useful contribution to the literature in this exciting area of research.

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Medicinal and Aromatic Plants—Industrial Profiles. Vol. 2. Perilla—The Genus *Perilla*. Edited by He-Ci Yu (Hankintatukku Natural Products Company, Helsinki, Finland); Kenichi Kosuna and Megumi Haga (Amino Up Chemical Company, Sapporo, Japan). Harwood Academic Publishers, Amsterdam, The Netherlands. 1997. xi + 191 pp. 17 × 24.5 cm. $89.0. ISBN 90-5702-171-4.

This is the second volume of a series of books each devoted to a particular plant species or a genus. The aim of the series according to Roland Hardman, its editor-in-chief, is to give an in-depth look at one plant genus, about which an area specialist has assembled information ranging from the production of the plant to market trends and quality control.

Perilla is a plant with a very long history in Chinese traditional medicine and is used in most Asian countries as a medicine, garnish, food, and food pigment. The plant is relatively unknown in Europe and in the United States. Thus, it is not surprising that 12 of the 14 chapters of the present book have been written by Asian scientists, mainly from Japan but also from Korea and Taiwan. The short introductive chapter by He-Ci Yu is well-written and is a stimulant to discover more about Perilla and an incitement to read the other chapters. Two of them deal with cultivation and cell and tissue cultures of Perilla. More interesting, at least for the author of the present review, are chapters 4−8 which describe the use of the plant in ancient times until the development of modern drugs. These descriptions range from *in vitro* and *in vivo* studies of extracts for their anti-inflammatory and anti-allergic activities to serious clinical studies in the treatment of allergy and atopic dermatitis. The other chapters of the book deal mainly with phytochemical investigations of the plant, ranging from the composition of its essential oil to the chemistry of flavonoids and anthocyanins. The excellent chapter by Kumi Yoshida et al. is of great interest for all scientists involved in anthocyanin chemistry and illustrates the use of modern NMR techniques for the structure elucidation of these plant pigments.

So far, most publications on Perilla have been in Chinese, Japanese, and Korean. Since this Asian plant is receiving increasing attention all over the world due to its potential for the treatment of allergy, one of the most widespread immunological disorders in humans, the present book has the merit of making this important plant comprehensible to a wide scientific community. Perilla will certainly become in the near future a plant of interest for pharmaceutical companies and academia in the West. Thus, this well-referenced book has a place in the library of any institutions involved in the manufacturing of drugs of plant origin and in academic institutions interested in plants used in traditional medicine.

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Organic Synthesis: The Science Behind the Art. By W. A. Smit (Zelinsky Institute of Organic Chemistry, Moscow, Russia), A. F. Bochkov (Institute of Biochemical Physics, Moscow, Russia), and R. Caple (University of Minnesota, Duluth, MN) The Royal Society of Chemistry, Cambridge, UK. 1998. xix + 477 pp. 15.5 × 23 cm. $52.95. ISBN: 0-85404-544-9.

Organic Synthesis is presented in five chapters: 1, Goals of an Organic Synthesis; 2, Tactics of Synthesis; 3, Strategy of Synthesis; 4, Molecular Design; and 5, Instead of Conclusion.

Chapter one is an introduction as to why synthesis is important and essentially presents a target-oriented vs an exploration-based rationale. Chapter two is the largest chapter, roughly half of the book, and it is presented in seven parts. In order, the chapter discusses general physical organic concepts vital to synthesis. General methods of making C−C bonds are discussed, followed by functional group exchange reactions. Controlling selectivity is presented next, followed by a very short account of reagents, equivalents, and synthons. Methods for constructing cyclic molecules are presented next, and the chapter concludes with bond cleavage and rearrangement reactions.

In chapter two, several named reactions are incorporated but many are only mentioned in passing. Many very important reactions are mentioned in several places but are not discussed in depth, such as the aldol condensation, whereas others, such as the Diels−Alder reaction, are discussed at great length. Modern reactions, such as the Heck reaction, other important reactions involving organopalladium chemistry, and modern methods of catalysis are either ignored altogether or mentioned only briefly. The important roles of diastereoselective and enantioselective reactions are also given little mention in terms of strategy. The important Sharpless asymmetric epoxidation is mentioned in chapter two (Part III) under functional group exchanges, but not at all in Part IV, which deals with selectivity. Other asymmetric epoxidation reactions are not even mentioned, and asymmetric dihydroxylation is also not mentioned.

The goal of chapter two seems to be an introduction to construction methodology, but the organization is difficult to follow. Part V, for example, deals with synthons and reagents, but it is presented *after* a discussion of making C−C bonds and functional group transformations. Since most methods for making C−C bonds rely on functional group transformations to "set them up," and synthons are an integral part of planning C−C bond-forming reactions, this order of presentation is peculiar.

Chapter three is focused on a retrosynthetic analysis strategy. Chapter four discusses target selection based on structural peculiarities as well as target function. Strategies for preparing crown ethers, enzyme mimics, and ligands for various reactions are presented in this context. Chapter five is a very brief summary of the role of synthesis in general organic chemistry.

Chapter four effectively talks about how to choose a target, or at least how to look for structural features in a target that may be important. Once again, the presentation order is peculiar, since one would logically choose a target and analyze its structural features before planning reactions to make C−C bonds and functional groups.

In general, I find the presentation to be "backwards" for planning and executing a synthesis. There is a lot of information in this book, and if the reader is well-versed in synthesis, it can be useful. For a novice to synthesis, I believe the presentation order in spreading key information out rather than focusing the reader's attention and the difficulty in sorting out the logical order of reactions will cause problems.

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The Combinatorial Index. By Barry A. Bunin (Arris Pharmaceutical, San Francisco, CA). Academic Press, San Diego, CA. 1998. xvii + 322 pp. 17.5 × 25 cm. $79.95. ISBN 0-12-141340-3.

The relatively new technique of combinatorial chemistry has revolutionized the approach of chemists to the synthesis of compounds for practical applications. First used extensively in the pharmaceutical industry, it is increasingly being applied in other areas such as the chemistry of materials and the discovery of new catalysts. The advent of combinatorial chemistry could be seen as a threat to natural products chemistry, since at least initially some pharmaceutical companies eliminated or downsized their natural products discovery drug programs to put resources into combinatorial chemistry. This reviewer prefers to see it as an opportunity for new advances in natural products chemistry, since natural products, with their complex three-dimensional scaffolds, make ideal "cores" for combinatorial development. In addition, in spite of advances in making combinatorial analogs with natural product-like structural features (*J. Am. Chem. Soc.* **1998**, *120*, 8565−8566), a recent survey indicates that natural products are still superior to synthetic compounds as a source of chemical diversity (*Angew. Chem., Int. Ed.* **1999**, *38*, 643−647).

With the perspective that combinatorial chemistry can enhance the value of natural products as lead compounds for drug discovery, the book under consideration should be of interest to a substantial number of natural product researchers. Written by one of the pioneers in the solid-phase synthesis of non-peptide combinatorial libraries, it provides a convenient summary of the state of the field as of 1996 and early 1997. A particularly attractive feature of the book is the inclusion of representative experimental procedures for the major reactions, a feature which will ensure that the book will end up on the laboratory bench rather than in the library.

The book opens with two short chapters on introduction and background, and these are followed by four substantial chapters dealing with the major aspects of combinatorial synthesis. Chapter 3, "Linkers for Solid-Phase Synthesis," provides an overview of over fifty different kinds of linkers for linking carboxylic acids, amides, alcohols, amines, and other functional groups to resins. Chapter 4, "Combinatorial Solid-Phase Synthesis," then covers methods for carrying out key chemical transformations (carbon−carbon bond formations, condensation reactions, oxidations, reductions, etc.) on solid supports. Chapter 5 deals with "Analytical Methods for Solid-Phase Synthesis" and Chapter 6 covers "Preparation of Solution Libraries and Combined Approaches at the Solution/Solid-Phase Interface." These chapters are followed by five helpful appendices, including one giving a very useful summary of functional group transformations for combinatorial solid-phase synthesis.

This book provides a very good overview of combinatorial chemistry in a format that will make it especially useful to new entries into this area. It is hoped that it will find a ready readership not only among synthetic chemists, but also among natural product researchers looking for ways to enhance the value of their discoveries by applying combinatorial methods to analogue preparation.

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