

Book Reviews

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BOOK REVIEWS

Organic Syntheses. Reaction Guide. D.C. LIOTTA and M. VOLMER. John Wiley and Sons, 605 Third Avenue, New York, NY 10158. 1991. xiv + 854 pp. 15 × 22.5 cm. \$49.95. ISBN 0-471-54261-x.

There is no resource more valuable to the practicing synthetic organic chemist than *Organic Syntheses*. This venerable series, now in its 70th year, describes detailed procedures for the preparation of numerous organic compounds. The present *Reaction Guide* is an excellent means by which to search the seven collective volumes and four subsequent annual volumes of *Organic Syntheses*. Liotta and Volmer have wisely chosen to use a pictorial format in presenting the individual preparations, much in the genre of the very successful series *Compendium of Organic Synthetic Methods* and *Annual Reports in Organic Synthesis*. Any organic chemist worth his or her carbon will be able to use this *Reaction Guide* quickly and effectively.

The *Guide* is organized into eleven different chapters entitled Annulation, Rearrangement, Oxidation, Reduction, Addition, Elimination, Substitution, C-C Bond Formation, Cleavage, Protection/Deprotection, and Miscellaneous. Most chapters are further subdivided; for example, Annulation is divided into sections according to ring size formed, and Oxidation is categorized into Heteroatom, Epoxidation, Halogenation, Chromium Reagents, Manganese Reagents, and General. Each section is listed in chronological order, with reference to the *Organic Syntheses* volume, page, and year. As the authors freely admit, some entries are listed in more than one chapter. Thus, examples of the Claisen rearrangement are listed both under C-C Bond Formation and Rearrangement. Some section choices seem strange, e.g., listing the formation of the imine of hexafluoroacetone (p. 399) in the Elimination Chapter rather than with the preparation of other imines in the Substitution-Trigonal Chapter. Therefore, since there is no index of any kind, in order to locate this particular preparation, a searcher would have to know that an elimination operation (POCl_3) is required in the second step of this synthesis! Some Ring Expansion examples, but not all, are cited in the Rearrangement Chapter. The individual entries are brief, usually four to a page, and display only the reaction, the reagents, and the *Organic Syntheses* reference. Yields are not included (a mistake, in this reviewer's opinion).

A major criticism is the authors' decision to adhere strictly to the chronological order of citation, which leads to the frustrating circumstance that preparations of the same compound often appear on different pages! For example, syntheses of 2-iodothiophene are on page 164 and 170; the acetylation of thiophene, by two different methods, appears on page 695 and 700, and a similar benzoylation of thiophene is on page 699; two different nitrosations of cyclooctene appear on pages 340 and 351; the hydrolyses of two nearly identical dihydropyrans are depicted on pages 321 and 322; and numerous examples of the dehydration of amides to nitriles are sprinkled throughout the Elimination chapter. In all of these cases, it would have been logical to list these reactions together, in a group, rather than in the intransigent chronological order so adopted. For example, I can imagine a researcher scanning a section and stopping after encountering the (first) preparation of 2-iodothiophene, even though the second synthesis may be superior! In contrast to what is stated in the Preface, this reviewer found at least one example of an aromatic substitution reaction, the nitration of thiophene, in the Oxidation Chapter (p. 201) rather than in the Substitution—Aromatic section.

In summary, despite my mild criticisms, this volume would be an important addition to the libraries both of frequent users of *Organic Syntheses* and to organic chemists who, like myself, delight in browsing through collections of miscellaneous organic reactions for ideas. As Leo Paquette states in the Foreword to this volume, "few of us are totally aware of the riches contained [in *Organic Syntheses*]." *Reaction Guide* is a successful attempt to unlock the door to these riches.

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Chemistry and Significance of Condensed Tannins. Edited by R.W. HEMINGWAY and J.J. KARCHESY. Plenum Publishing Corporation, 233 Spring Street, New York, NY 10013. 1989. xi + 553 pp. 16.5 × 24.5 cm. \$110. ISBN 0-306-43326-5.

This volume was derived from the proceedings of the first North American Tannin Conference held in August 1988 in Port Angeles, Washington. The objective of this conference, as stated in the preface, was to "bring together people with a common interest in condensed tannins and promote interdisciplinary interactions that will lead to a better understanding of these important substances." The second objective was to publish this book, the first monograph dedicated to tannin chemistry in several decades.

The introduction traces the history of leather manufacturing in North America and the chemistry of hemlock and spruce tannins. It is based on Dr. H. L. Hergert's acceptance address for the first North American Tannin Conference Award. To accommodate the diverse subject matter, the remaining 32 chapters are grouped into sections dealing with biogenesis, structure, analytical methods, reactions, complexation, biological significance, and specialty chemicals. Representative chapters from each section best illustrate the variety and specificity of subjects covered: "Tannins—Their Place in Plant Metabolism," "Structural Variations in Proanthocyanidins and Their Derivatives," "Chromatography of Proanthocyanidins," "MNDO Molecular Orbital Analyses of Models for Proanthocyanidin-Methylolphenol Reactions," "Carbohydrate-Polyphenol Complexation," "Microscopic Studies of Tannin Formation and Distribution in Plant Tissues," and "Tannin-Based Wood Adhesives."

Chapter topics within each section complement each other. The authors avoid duplication by judiciously referencing other chapters. Unfortunately, finding the cross-referenced material is more cumbersome than necessary because the chapters are not numbered. The proceedings format does result in some repetition of introductory material, especially for structures of the most common compounds, nomenclature, etc. This will be unnoticed by most readers because the wide range in subject matter will lead them to select chapters of greatest interest. Each section is concluded with an overview that ties chapters together by summarizing recent accomplishments, unresolved problems, future research needs, and opportunities associated with the sectional topic. The overview chapters also provide links between sections. Most of the authors are scientists currently active in tannin research. Their experience and knowledge of the subject matter is reflected in the quality of the papers. The chapters are not lengthy, yet they are filled with detailed technical information, relevant history, and the latest advances.

This volume is not merely a compilation of unrelated symposium papers. The selection of specific subjects for each chapter, their organization into related sections, and the use of overview chapters help to unify the contents. The editors have succeeded in their efforts to produce a book that promotes interdisciplinary interaction and interest in the study of condensed tannins. It is an excellent reference source that will be read by many individuals from various scientific backgrounds. Consequently, it should be purchased by scientific and technical libraries. Phenolic chemists, phytochemists, chemical ecologists, soil chemists, and plant biologists are just a few of the scientists who would find this volume a valuable addition to their personal libraries.

RICK G. KELSEY, *USDA Forest Service*

Flora of Saudi Arabia, Vols. 1-3. A.M. MIGAHID. King Saud University Libraries, P.O. Box 22480, Riyadh 11495, Saudi Arabia. 1988. 3rd edition. 250 pp. (Vol. 1), 282 pp. (Vol. 2), 150 pp. (Vol. 3). 22 × 28 cm. Hardbound. Price not known. ISBN not known.

This flora was developed as a teaching reference for the students at Riyadh University and was first published in 1974; a second edition (1978) added color photographs, new records of plant collections, and changes in nomenclature. The present edition is similar to the preceding one with only minor changes and the addition of 156 species as a result of Professor Migahid's finding new records of plants in the field. Saudi Arabia lies primarily within the Saharan-Arabian floristic region; this region is characterized by an arid climate with perhaps 1500 species of vascular plants of which 200 are endemic. No statistical data were provided by Professor Migahid on the number of species or genera he treated, but I roughly counted nearly 1200 species in 550 genera; these are presented phylogenetically by order and family, the ferns, gymnosperms, and dicots in Volumes 1 and 2, and the monocots (ca. 200 species in 100 genera) in Volume 3. This flora is relatively poor in species number compared to the flora of the Sonoran and Chihuahuan deserts in North America. For example, Baja California, an area of less than 1/10 the size of Saudi Arabia, has approximately 3000 species and varieties of vascular plants.

The strong feature of this publication is the key to distinguish the genera within 123 families that are recognized; however, it is lacking in many features that will make it hard to sell to those who live outside Saudi Arabia. For instance, taxonomic keys to families or species are not presented. Taxonomic descriptions of families, genera, and species are brief and not in a comparative format; those of the families are placed at the beginning of the flora rather than integrated in the classification of the other taxa. Except for one phytogeographic map presented without explanation, descriptive information is lacking on the geography, ecology, and vegetation. An index is presented for each volume but not a comprehensive one as in the previous edition. For more information on the morphology of and ecology of the taxa, one might consult *Ecology and Flora of Qatar* by K.H. Batanouny (University of Qatar, 1981), *Flora of Kuwait* by H.S. Daoud and A. Al-Rawi (KPI, London, 1985), and *Flore du Sahara* by P. Ozenda (2nd ed., C.N.R.S., Paris, 1977).

Most of the three-volume work is filled with numerous color photographs and occasional black and white illustrations of plants. Nearly half of the color photos are fuzzy and lack artistic style. The quality of the publication could have been improved by simply leaving out the poor photographs and employing more of the drawings that are much clearer. The publisher recognized the poor quality and apologized on the last page of two of the volumes—"King Saud University Press regrets that because of unclear originals, some photos are not clear." However, many of the same photographs appeared slightly clearer in the earlier edition although the quality was still poor. I also found one description of a species that did not agree with the photograph—the flowers of *Argemone mexicana* were correctly described as being bright yellow or orange, but the one photograph shows a white-flowered species of *Argemone*, the only species treated in the genus. Good color photographs can be found for most Saudi Arabian plants in *An Illustrated Guide to the Flowers of Saudi Arabia* by Sheila Collenette (Scorpion Publishing, Essex, England, 1985)—a book that also includes species not mentioned in Professor Migahid's flora, e.g., *Argemone ochroleuca*.

In addition to Professor Migahid's flora, and the aforementioned references, a more comprehensive account on the Arabian peninsular flora is being prepared by the Royal Botanical Gardens at Kew.

RICHARD W. SPIUT, *World Botanical Associates*

Chemotaxonomie der Pflanzen, Vol. IX. ROBERT HEGNAUER. Birkhäuser Verlag, AG, Klosterberg 23, CH-4010 Basel, Switzerland. 1990. XII + 786 pp. 16.5 × 24 cm. SFR 580.00. ISBN 0-490-21302.

Hegnauer's *Chemotaxonomie der Pflanzen* represents a continuing series of comprehensive overviews of the distribution and systematic significance of plant natural products. Volume VIII, which appeared in 1989, treated the dicot families Acanthaceae to Lythraceae. This Volume IX, which is a supplement to Volume V, covers the rest of the dicot families, Magnoliaceae to Zygophyllaceae. Because of the dramatic increase in chemical data, the chemotaxonomic index, presently in preparation, will appear as a separate volume.

Key references to comprehensive treatments of natural products as well as the modern systematic alignments of the dicot families are found in the introduction to Volume VIII. As in the previous volume, nearly 120 plant families are discussed in detail with listings of the different types of natural products that have been isolated from various taxa of a given plant family, and structures of new natural products within a family are shown. This is followed by a brief statement of chemotaxonomic and general phylogenetic considerations and a wealth of literature references. Each section on a plant family provides an addendum with more recent treatments of the subject plus pertinent references, with many entries ending in August 1989. Specific reference is made to the economic value as well as biological activities and the ecological significance of natural products within certain members of a plant family.

For decades, the Hegnauer series has provided a superb service to scientists in plant systematics, natural product chemistry, the pharmaceutical sciences and, more recently, chemical ecology. In his foreword, Professor Hegnauer announced that Volume IX will conclude the series *Chemotaxonomie der Pflanzen*. With these contributions Professor Hegnauer has set himself a monument. All we can add is: Congratulations and "vielen, vielen Dank."

NIKOLAUS H. FISCHER, *Louisiana State University*

Ergot Alkaloids: Chemistry, Biological Effects, Biotechnology. Z. REHÁČEK and P. SAJDI. Elsevier Science Publishing, P.O. Box 882, Madison Square Station, New York, NY 10159. 1990. 343 pp. 16 × 23.5 cm. \$159.00. ISBN 0-444-98767-3.

This volume is the first comprehensive book to appear in this field since the publication of the well known text on ergot alkaloids by A. Hofmann. It provides an extensive and detailed treatment of this fascinating group of natural products and reflects the remarkable progress made in understanding various aspects of these compounds.

The first chapter gives a general introduction to microbial technology. The second deals with the historical background, chemistry, sources, production, isolation, and biological activities and therapeutic applications of the ergot alkaloids, reflecting the continuous and growing interest in these fungal metabolites for their importance as therapeutically useful agents; ergot has become a "treasure-house" for drugs. Minor problems in this chapter include Figure 26, which shows the possible relationship between ergoline and neurotransmitters and is uncomprehensible in this form. The sub-chapter 2.5.11 on structure-activity relationships is too short, and the reviewer found the lack of reference to the stereochemistry at position C-8, which could be a valuable starting point for investigations of structure-activity relationships, to be disappointing.

The third chapter (36 pages) is an exhaustive review on the different aspects of parasitic and saprophytic cultures. In the reviewer's opinion, Figure 34, on the size comparison of different organisms and components, is not necessary. The brief fourth chapter (12 pages) describes the present state of knowledge in the field of ergot alkaloid biosynthesis, including catabolism and degradation. The fifth chapter (72 pages) on the physiology of formation of ergot alkaloids and the sixth chapter (70 pages) on the regulation of biosynthesis play a key role in the understanding of the biosynthesis of the alkaloids and their industrial production. The last three chapters (42, 8, and 6 pages, respectively) give brief reviews of industrial aspects and future prospects, although the reviewer cannot understand the necessity of the subchapters on research and innovation management and education.

The book is well referenced and has good subject and author indexes giving full coverage of the contents. Unfortunately many illustrations, graphs, and tables are poorly reproduced and too small and difficult to read. Typographical errors are few, but the print quality of the letterpress is poor. In spite of these deficiencies, this is an excellent book, providing not only a review of the ergot literature but also an illustration of the present problems facing ergot research. As the story of ergot is far from resolved, the book is highly recommended for any individual working in an area related to ergot alkaloids for both chemistry and biochemistry libraries.

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