

# Book Reviews

**Biocatalysis. Fundamentals and Applications.** By A. S. Bommarius (Georgia Institute of Technology) and B. R. Riebel (Emory University). Wiley-VCH, Weinheim, Germany. 2004. xxiii + 611 pp. 7 × 10 1/2 in. \$175.00. ISBN 3-527-30344-8.

The intent of this book, stated in the Preface, is to bridge the gap between basic texts and research articles published in the specific subfields of biocatalysis. Biology, biochemistry, molecular biology, organic synthesis, and chemical engineering are all overlapping parts of the discipline of biocatalysis; no practitioner can expect to be an expert in more than one of these disciplines. The authors have done a remarkable job of providing a guide that could be used by anyone trained in the fundamental disciplines and wishing to enter the field of biocatalysis.

The book comprises three major sections. The first seven chapters cover the basic tools and principles required of each subdiscipline; the next seven chapters discuss more advanced techniques; and the last six provide a review of applications. The authors clearly are preaching to the choir in the early chapters of the book. It is my feeling that those most likely to read this book are those who are already active in the field of biocatalysis and wish to improve their repertoire of available techniques. Those researchers who do not venture outside traditional chemical disciplines are not likely to be persuaded of the merits of the field, perhaps intimidated by the level of discussion of biology.

The first chapter points out advantages and disadvantages of biocatalysis; discusses terms such as biotransformation, fermentation, and the use of purified enzymes; and points out the impact of biocatalysis on such fields as green chemistry, pharmaceutical manufacturing, and the production of homochiral building blocks and drug intermediates. Milestones in this field are mentioned. [In this context, A. J. Brown's article on the biooxidation of mannitol to fructose, published in 1886 (*J. Chem. Soc.* **1886**, 49, 172), should have been cited, since it precedes Fischers' use of biocatalysis in 1894.]

The next few chapters provide discussion of basic principles and tools: kinetics, selectivity terminology, isolation of microorganisms, basic genetics, fundamentals of DNA isolation, cloning, expression of proteins, inhibition reactor design and operation, and so on. For the most part, the descriptions of items in the first five chapters are at a level easily understood by organic chemists.

Chapters 6 and 7 discuss real-world applications of enzymes in the detergent, pulp, and textile industry, crop protection, food additives, and fine chemicals. The description of various applications to chemistry is interesting, although some references are several years out of date. The next section of the book (Chapters 8–14) describes advanced tools and methods such as protein isolation, approaches to investigations of enzyme mechanisms, protein engineering, directed evolution principles, use of enzymes in artificial media, applications of biocatalysis in the pharmaceutical industry, and principles of bioinformatics. The last section is concerned with advanced applications and principles such as genomics, proteomics, evolution of biocatalytic functions, protein stability, artificial en-

zymes, design of processes, and comparison of biological and chemical processes.

The book is a concise guide for anyone wishing to pursue serious biocatalysis—organic synthetic chemists, process engineers, and biologists. Of these three groups, the book might be most difficult to digest by organic chemists, the group that may require the most convincing. History has shown that synthetic chemists will do almost anything to avoid the use of biological methods. The level of discussion of some of these methods in the book is certainly beyond most practitioners of synthesis, precisely the group that needs the most “motivation” to get started. If a second edition is planned, the authors might consider providing a section of a book with biocatalytic solutions to chemical transformations, much in the style of Kieslich's *Microbial Transformations* published in 1976 by Thieme-Wiley.

Overall, this is an excellent guide that should be read by everyone in the field.

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**Handbook of Secondary Fungal Metabolites, Volumes I–III.** By R. J. Cole and M. A. Schweikert (National Peanut Research Laboratory) (Vols. I and II); R. J. Cole, B. B. Jarvis, and M. A. Schweikert (National Peanut Research Laboratory and University of Maryland) (Vol. III). Academic Press, Elsevier Science, New York. 2003. xi + 1006 pp, xi + 819 pp, xi + 672 pp. 6.5 × 9 in. \$299.95. ISBN 0-12-179460-1 (set).

This three-volume set is an extensively expanded and revised new edition of a 1981 volume by R. J. Cole and R. H. Cox that was entitled *Handbook of Toxic Fungal Metabolites*. These new volumes follow a general format similar to the original, except that all spectral data are provided as listings, rather than as actual spectra, and details of isolation protocols for individual compounds are also included. The entries are organized by structural class and offer concise, yet thorough summaries of information about individual fungal metabolites. Each entry includes structure, fungal source(s), complete spectral data (including NMR position assignments) and physical properties, isolation methods, reported bioactivity, and literature references. The level of detail varies to some degree from one entry to another, but this appears to be due simply to differences in what is available in the primary literature—indeed, the comprehensiveness of the entries would likely preclude the need to track down the original references in many instances. Thus, these volumes contain the distillation of a very impressive library of information. Given the content of the three volumes (ca. 2500 pages; spectral data for over 1000 compounds), together with the specialized nature of the content, the cost seems reasonable.

The content and organization of Volume I is illustrative of all three books, and the entries are of uniform high quality throughout. Volume I consists of 25 chapters of varying length, each describing a compound class such as indole alkaloids (including ergots), chaetoglobosins/cytochalasins, fusicoccins, and aflatoxins. Some of the categorizations appear arbitrary; for example, individual chapters are devoted to janthitrems and paspalinines, compounds that could also be considered indole alkaloids. In addition, some relatively obscure sets of metabolites with only one or two literature reports are given their own chapters (e.g., phomosines, fiscalins, cercophorins in Volume III). No specific pattern of organization is described in the Preface, but each volume displays a primary chemistry theme. The focus of the first half of Volume I (ca. 500 pages; 10 of 25 chapters) is placed on indole-containing or indole-derived metabolites. Approximately two-thirds of Volume II (ca. 500 pages; approximately 18 of 30 chapters) is dedicated to sterols and related compounds, while over half of Volume III (ca. 350 pages; 7 of 23 chapters) is devoted to compounds that could be categorized as trichothecene mycotoxins or members of this general class. Volumes I and III appear to cover most of the best known remaining classes of mycotoxins. The organizational scheme used for the remainder of the compound classes in these volumes is not clear. Each volume ends with a chapter entitled "Miscellaneous Metabolites". The reason for including such chapters in each volume is not explained, although this section of Volume III is said to incorporate compounds of all types that appeared after completion of Volumes I and II. Spot checks revealed only very few typographical errors in the data listings.

The volumes do have a few shortcomings. Of primary concern is the omission of a significant number of prominent classes of fungal metabolites. While it would be difficult, if not impossible, to ensure inclusion of every fungal metabolite type, some of the missing compound types are particularly significant. The most obvious omissions consist of medically important classes and other groups of compounds discovered through screening for pharmacological activity, including lovastatins, cyclosporins, echinocandins, penicillins, cephalosporins, zaragozic acids/squalestatins, asterriquinones, destruxins, mycophenolic acid, and others. While some groups with medically relevant activities are included, emphasis appears to have been placed on agriculturally relevant compounds, particularly mycotoxins. These classes are clearly important, and this theme appears to be carried over to some degree from the 1981 edition. However, according to the Preface, the three volumes are said to be "comprehensive to the extent that all major groups of secondary fungal metabolites are included". This statement does not accurately reflect the content. While it may be true that all "major groups" of compounds considered to be *mycotoxins* are included, others are not. Unless further volumes are forthcoming that cover the key classes of fungal metabolites that are omitted from these volumes (a possibility not suggested within), the series title is somewhat misleading. Compounds from basidiomycetes are also incorporated, but that coverage is similarly noncomprehensive, as several important classes of basidiomycete metabolites are also not included (e.g., strobilurins, illudins, psilocybin, amanitins).

Each volume is separately indexed by compound name, molecular formula, molecular weight (accurate mass), and source. While these indices are well done and easy to use, comprehensive indices that cover all three volumes would

have been significantly more helpful, because one does not necessarily know which volume might have a compound of interest until one becomes familiar with the content of each. There is no information on the cover of individual volumes that indicates which classes are covered inside. As it stands, if one wishes to query a compound, compound type, formula, mass, or fungal source, the index of each volume must be checked separately. A searchable CD-ROM version of these volumes, or even a searchable CD-ROM index, could add considerably to their utility.

The target audience for these books is relatively specialized to those who work in some capacity with fungal metabolites. Such researchers will find them to be valuable references that complement existing computer and hard-copy databases, particularly because of the extensive spectral data (and assignments) that are included with individual entries. The focus on agriculturally related fungal metabolites and mycotoxin classes will naturally be of greatest utility for researchers with agricultural interests, or those who focus on "sick-building syndromes" associated with fungi and other health issues related to mycotoxins. Prospective users in the pharmaceutical sciences may be concerned by the absence of certain relevant and important compound groups, but the volumes still offer considerable appeal, as many of the compound classes covered within are encountered routinely in pharmaceutical screens. These volumes concentrate a large collection of useful data in one source and would certainly be a worthwhile addition to any library used by researchers who study fungal metabolites.

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**Eucalyptus: the Genus *Eucalyptus*.** Edited by John J. W. Coppen (Natural Resources Institute, University of Greenwich, UK). Taylor and Francis, London. 2002. xiii + 450 pp. 7 × 10 in. £78.99. ISBN 0-415-27879-1.

This book is Volume 22 of the Series: Medicinal and Aromatic Plants—Industrial Profiles, edited by Roland Hardman. Consistent with the theme of the series, this volume is a compendium of 18 chapters providing a comprehensive review of the economically and medically important plants of the genus *Eucalyptus*. The book is conveniently divided into three parts, and each chapter is followed by an extensive list of references.

Part 1 contains six chapters that provide a general understanding of this genus of over 800 species, including the botany of the genus, impact on the environment in different parts of the world, cultivation and genetic improvements that have been made in the case of oil-bearing species, the chemistry of eucalyptus oil (with structures of more than 30 volatile and nonvolatile compounds), and a discussion of the theory and practice of distillation of eucalyptus leaf oils. Especially noteworthy is the extensive table (Table 5.2, 38 pp) listing the characteristic constituents of the essential oils from the various species of eucalypts including the total percentage of essential oil and percentages of individual components. Entries are ac-

accompanied by references to the primary literature. This would certainly be useful to those natural products chemists interested in essential oils.

Part 2 contains five chapters that deal with the cultivation and production of eucalypts around the world with special reference to the leaf oils. One chapter each is devoted to Australia, China, South Africa, the rest of the Africa, and India. Discussion includes some history, the species cultivated, various aspects of cultivation, leaf harvesting methods, oil production, chemical comparison of the oil derived from various species/regions, economic aspects, and uses of the oil.

Part 3 deals with the biological and other end-uses of eucalyptus oil and contains seven chapters. One is devoted to the chemistry and bioactivity of the nonvolatile constituents of eucalyptus including the polyphenols, macrocarpals, and other phloroglucinol derivatives, notably the euglobals. Detailed discussion of the isolation, structure elucidation, biosynthesis, and the biological activity of euglobals is included. The antimicrobial activity of eucalyptus oil is discussed in the next chapter, followed by a chapter on its use in insect and pest control. A further chapter focuses on the chemical ecology of herbivory in eucalyptus with special attention to the interactions between mammalian herbivores (mainly marsupials), as well as insects, and the essential oils. Another chapter is devoted to eucalyptus oil products in the market and discusses the use of the oil in pharmaceutical products, perfumery, aromatherapy, personal care products, and insect repellents. The chapter includes several tables providing details of these products in condensed format. Professor Coppen summarizes the production, trade, and market for eucalyptus oil worldwide in one chapter, while the final chapter expounds on current trends and future prospects in research on eucalyptus oil.

The appendices provide useful information for growers and producers of the oil that includes addresses for purchasing seeds, quality criteria for the oil, and packaging and labeling requirements. The book is well indexed with a separate subject index and a species index. The book will be of interest to the general natural products chemist interested in learning more about this extensive genus, as well as to specialists working in the field of eucalyptus chemistry, biology, pharmacology, or botany.

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**Kava: from Ethnology to Ethnopharmacology.** By Yadhu N. Singh (South Dakota State University). CRC Press, Boca Raton. 2004. vii +167 pp. 7 × 10 1/4 in. \$99.95. ISBN 3-415-32327-4.

After experiencing rapid rates of growth in the United States, Western Europe, Australia, and other areas during the 1990s, sales of kava (*Piper methysticum*), sometimes referred to as kava kava, have plummeted. The world market for kava is in turmoil, following the unexpected ban by the German government in 2002, with at least seven other countries rapidly following suit. Concerns about

potential hepatotoxicity have all but doomed kava, at least for the present in industrialized nations, despite the lack of any compelling mechanistic evidence to support those concerns and despite careful reviews by experts of the case reports, most of which contain too many confounding variables (pre-existing liver disease, concurrent use of hepatotoxic drugs, moderate to heavy use of alcohol) to be able to provide conclusive evidence of a causal relationship between kava consumption and liver toxicity. Nevertheless, liability insurance rates for kava herbal products have soared in the U.S., thereby forcing many companies to drop the herb due to the insurmountable costs, not because of any general consensus regarding kava's risks.

Enter this book. It is one of the "Medicinal and Aromatic Plants—Industrial Profiles" series from CRC, an impressive compilation of about 40 titles thus far. As such, it follows the logical format of the series, with the following chapters: introduction; history, folklore, traditional and current use; production, marketing, and quality assurance; botany and ethnobotany and current use; chemistry of kava and kavalactones; pharmacology and toxicology of kava and its kavalactones; and clinical studies and therapeutic implications.

Written by a pharmacologist and expert on kava who is also a native of Fiji, one of the few native sources of kava in world trade (others being Vanuatu, Samoa, and Hawaii), the book is one of the most authoritative treatments on this fascinating herb available in the literature. The author has extensive experience with this herb and has published numerous papers on its botany, ethnobotany and ritual use, pharmacology, etc. Another book, *Kava: The Pacific Drug*, was written by Vincent Lebot et al. in 1992 and, thus, despite its excellent treatment of the botany, origin and distribution, ethnobotany, etc., is not as up-to-date regarding the many scientific publications that have appeared during the intervening decade.

While interest in kava from an ethnobotanical and ritualistic perspective formerly dominated much of the coverage about kava, the issue of potential hepatotoxicity has taken center stage for obvious reasons. The author deals with this by citing the various reports that have been compiled as late as 2002 (the apparent time when the volume was completed) as well as discussing the speculative evidence about kava and possible drug interactions. After reviewing clinical trials on kava's benefits, he concludes that it is a "relatively safe and effective herbal agent for treating everyday anxiety and probably for full-blown anxiety disorders as well".

A meta-analysis of seven controlled clinical trials on a proprietary standardized kava extract from Germany has demonstrated the extract's safety and efficacy as an anxiolytic. Other trials on different formulations have similar conclusions. This is hardly news to anyone who has ceremonially ingested the bitter-tasting beverage made of kava root and rhizome, as is frequently done in the South Pacific, where kava usually enjoys the rank of the most esteemed botanical in the various native cultures. A kava beverage or a drug or dietary supplements made from kava root will have an almost immediate effect on a person; within 10 to 20 min one will feel the mild relaxing effects on skeletal muscles, while mental faculties remain clear; that is, there is little or no sedative effect.

However, whether kava will regain its former short-lived popularity as a licensed drug in Western European countries and elsewhere, and as a dietary supplement in the U.S., remains to be seen. Currently (October 2004) a

movement is underway to induce governments to reconsider their bans (the UK Medicines Control Agency has already agreed to do so), and the WHO is reportedly reconsidering its position on kava, largely as a result of the lack of compelling evidence showing a direct causal link to hepatotoxicity. Access to this excellent book will help all those who are considering the safety and the benefits of this unusual and effective medicinal plant.

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**Aloes. The Genus *Aloe*.** Edited by T. Reynolds (Jodrell Laboratory, Royal Botanical Gardens, Kew). CRC Press, Boca Raton, FL. 2004. xvii + 386 pp. 7 × 10 1/4 in. \$119.95. ISBN 0-415-30672-8.

This multiauthored book, which is also Volume 38 of the series *Medicinal and Aromatic Plants—Industrial Profiles*, gives extensive information on the chemical, biological, and medicinal aspects of the genus *Aloe*. The thick and fleshy leaf of aloe plants can be divided in three zones: the outer green rind; the mesophyll that produces, when the leaf is cut, a usually yellow-brown exudate (drug aloes); and the innermost colorless parenchyma containing a transparent mucilaginous jelly (aloe gel). Two plants dominate the commercial aloe market and the research literature: *A. vera* (L.) Burm.f. (= *A. barbadensis* Mill.), which furnishes the gel now largely used in cosmetic and therapeutic preparations, and *A. ferox* Mill. as a source of the drug, a bittering or purgative agent.

In the preface of this volume, the editor provides a brief but very interesting overview of the history of aloes. The following 17 chapters are grouped by subject to form four parts. In Part 1, Chapters 1 and 2 treat the geographical distribution of the genus *Aloe* and the taxonomy of the Aloaceae, respectively.

Part 2 deals with chemical investigations of *Aloe* species at the levels of exudate, gel, and whole leaf extract. Chapter 3 is a comprehensive review of the numerous phenolic compounds so far isolated from *Aloe* plants. These substances, which commonly occur as C- and/or O-glycosides, do not exist in the leaf parenchyma, where polysaccharides and glycoproteins are characteristic. From inspection of the structures of the low molecular weight phenolics, it is evident that all of them originate from the acetate-malonate pathway through cyclization of polyketide precursors. Thus, this kind of secondary metabolism appears to be typical of the genus *Aloe*. In my opinion, the only flaw in this excellent survey of the *Aloe* constituents is that the biosynthetic issue is neglected. Chapter 4 covers the chemistry of carbohydrates occurring in the gel. The structure of the primary polysaccharide, an acetylated mannan, is widely discussed since it is unique among the known plant mannans. Aloe lectins are the subject of the next chapter. Lectins are sugar-binding proteins or glycoproteins that agglutinate cells and/or precipitate glycoconjugates; their presence in *A. arborescens* was first reported in 1978. Since then, several aloe lectins (alocins) have been isolated and partially characterized. In this chapter, the chemical

properties, as well as the biological and pharmacological activities, of these substances are extensively reviewed.

Following are two chapters dealing with analytical methodology. They describe separation procedures and physical methods for determining the chemical composition of aloe pulp (Chapter 6) and drug aloes (Chapter 7). Chapter 8 tackles questions concerning the production and the commerce of different types of aloe gel. It is particularly intended for aloe processors and aloe purchasers.

Part 3 is devoted to the pharmacological aspects of aloes and includes six chapters. Chapter 9 reports a large number of therapeutic applications of different aloe preparations with special emphasis on the laxative and collateral effects of aloe drugs. The next four chapters focus on *A. vera*'s wound-healing abilities (Chapter 10), on *A. vera* as powerful healer for thermal and frostbite injuries (Chapter 11), on the prevention of sun-induced skin cancer with plant saccharides (Chapter 12), and on interactions of the specific components of the aloe pulp with the immune system (Chapter 13). Chapter 14 addresses exclusively the bioactive properties of *A. arborescens* (also known as Japanese aloe).

The last three chapters of the book (Part 4) discuss topics that are apparently unconnected: chromosomal evolution in *Aloe* (Chapter 15), aloe leaf anatomy (Chapter 16), and pests of aloes (Chapter 17).

The book is well written and properly indexed and referenced (with literature coverage extending to 2002); in addition, all figures, tables, and chemical formulas are printed in a clear and consistent manner. In conclusion, the volume is highly recommended to anyone interested in studying the fascinating aloe plant from chemical, biochemical, pharmaceutical, taxonomic, horticultural, and economic points of view. It should also be in the library of any institution established for research in the areas of phytochemistry and phytomedicine.

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**Reviews on Indian Medicinal Plants, Vols. 1–3 (Abe-Alle; Alli-Ard; Are-Azi).** Edited by A. K. Gupta and N. Tandon, Assisted by M. Sharma (Indian Council of Medical Research, New Delhi). 2004. xxii + 543 pp (Vol. 1); xxii + 508 pp (Vol. 2); xxii + 496 pp (Vol. 3). 25 × 15.5 cm. \$40.00 per volume. ISSN 0972-7957.

These three volumes mark the beginning of an ambitious project being undertaken by the Indian Council of Medical Research, and contain altogether 148 monographs on plant genera beginning with the letter "A" that are used as medicinal plants in India. Since some of the monographs embrace several species in the same genus, all told there are 600 species covered in the three volumes. Plants imported into India have been excluded from this series of monographs. The information contained has come from both extensive literature searching and by direct contact with individual scholars. Publications in national and international journals by Indian scientists (either working inside or outside of India) form the basis of the citations,

of which there are 8400 altogether in Volumes 1–3. The compilation of each volume has been overseen by a Technical Review Committee composed of a number of well-known authorities on medicinal plants, including S. S. Handa (Chair), K. C. Chunekar, V. K. Kapoor, B. N. Mehrotra, and the late P. K. Das. The present and the future volumes in this series are intended for use by scientific agencies, health authorities, policy planners, and the herbal drug industry, as well as individual researchers. Each tome is very reasonably priced for a hardback volume and has considerable aesthetic appeal as a result of its attractive dust cover.

Every monograph is designed to contain the following sections and subsections: General Information (inclusive of botanical nomenclature; habit and habitat; regional and other names; Ayurvedic description; therapeutic uses in the Ayurvedic Pharmacopeia; properties and uses ascribed; ethnobotanical studies); Pharmacognostic Studies (macroscopic and microscopic characteristics); Chemical Studies (in which the chemical constituents of the individual plant parts of each plant part used in the Indian System of Medicine are indicated); Pharmacological and Biological Studies (with much of the work covered having been carried out at the Central Drug Research Institute, Lucknow); Clinical Studies (provided without comments on their validity); Toxicological Studies (inclusive of toxicity to humans); References (with full titles and updated to 2000); and Additional References (mainly of a more general nature or somewhat peripheral to the main bibliographic citations). Chemical structures have deliberately been excluded from these monographs, presumably in an effort to reduce their overall length. Most of the monographs are supported by a good-quality color photograph of at least one species. In each volume there is a helpful list of abbreviations, appendices on the ethnobotanical/traditional uses of plants and on important general literature sources, and useful indices of botanical names, bioactive chemical constituents, pharmacological and biological activities, and regional and other plant names. The volumes have been carefully proofread, and this reviewer did not see many errors or omissions. Since many of the plants included have been introduced to other countries, these books will have a corresponding wider appeal to natural products researchers.

Overall, Volumes 1–3 of *Reviews on Indian Medicinal Plants* will offer an attractive new literature resource for those interested in their coverage. It is hoped that the same care and attention so readily evident in the present books will be maintained in future contributions to this series. While the decision of the editors to spotlight the work of Indian medicinal plant workers specifically has merit, science is international in its boundaries, and perhaps key contributions on a given plant or its constituents by others can be mentioned in future volumes of this series. Finally, it is to be hoped that these and future volumes can be ultimately obtained via electronic access, since this could enable the detailed information compiled to be used much more efficiently and also cut down on the considerable amount of bookshelf space that will be required to house all of the hard copies envisioned for this series.

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**The Handbook of Clinically Tested Herbal Remedies, Vols. I and II.** Edited by M. Barrett (Pharmacognosy Consulting). Haworth Press, Inc., Birmingham, NY. 2004. xxvii + 1435 pp. 16 × 22 cm. \$129.95. ISBN 0-7890-1068-2.

Barrett's two volumes constitute a uniquely valuable treatise on herbal medicines. Organized into three parts—introductory material (11 chapters), methodology (2 chapters), and botanical product profiles and clinical trial information (32 single herbs, 10 herbal formulas)—it distinguishes itself from other compendia by including selected critical reviews of relevant clinical studies. The two volumes are sold as a unit purchase.

Initial chapters in Part I deal with the history and regulation of U.S. botanicals (Barrett and Israelson), a reprint of Tyler's article in *Scientific Review of Alternative Medicines* (2000, 4, 17–21), and a chapter dealing with "Identifying and Characterizing Botanical Products" (Barrett). An excellent summary of "Standardization of Botanical Preparations" (Koetter and Barrett), an introduction to bioavailability determination (Biber and Lang), chapters dealing with determining efficacy, evaluating safety, and conducting clinical trials, and a brief chapter on pharmacopoeias and botanical monographs complete this part.

In Part II, Methodology, the two chapters do not describe the science in general, but rather acquaint the reader with the selection criteria for inclusion in the profiles part of the treatise. Low Dog's chapter, "Clinical Trial Reviewer's Guidance and Checklist", is particularly well written and a must read to interpret the profiles and products described in Part III.

Part III contains the equivalent of 42 chapters, over 1280 pages. Inclusion of products was based on the strict criterion of having been tested in clinical trials. Each profile is organized to include information on the preparations used in the trials, a trial summary, and botanical supportive information and references. Detailed descriptions of the product's clinical studies, along with an expert reviewer's critical comments on each study, conclude each profile, the length of which varies from six pages for "Boxwood" to 126 pages for "Ginkgo".

The strengths of these volumes lie in their readability, excellent organization, and the critical presentation of clinical study data in the profiles. Also valuable is the presentation of hard to find product manufacturer and supplier information. There are relatively few errors. There is, however, a disconcerting reference to the European (Belgian) *Aristolochia* adulteration incident of the early 1990s as causing "liver" failure, when renal problems were actually caused. Another weakness is the lack of timeliness of some of the profiles. While kava is updated through the CDC's safety warning of 2003, green tea's profile is current only through 2000 and lacks several recent studies on polyphenon E. In the profile on "Butterbur, Purple" no mention of the Commission E pyrrolizidine alkaloid limits (1 mcg/d) is found, nor are the adverse events documented in Brinker's text (*Herb Contraindications and Drug Interactions*, 3rd ed.; Eclectic Medical Publications: Sandy, OR, 2001) or Ernst's *British Journal of Gyneology* article (2002, 109, 227–235) listed. Although this treatise is already extensive, this reviewer would like to have seen profiles on DonQuai, feverfew, nettles, pynogenol, soy phytoestrogens, and *Viburnum* (sp. *prunifolium*) added to Part III. Finally, an unusual weakness, this reviewer's copy began

to lose its covers while being read for review (both volumes).

In conclusion, this book should be in all health profession libraries as a reference. It is a treatise that will be valuable to undergraduates, graduate students, and professionals in the health sciences who are confronted with questions concerning botanical medicines' safety, efficacy, and uses, as supported by clinical evidence. Additionally, it sets forth excellent clinical study criteria that should be valuable to

manufacturers and researchers planning trials of these entities.

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