

Book Reviews

Plant Drug Analysis. A Thin Layer Chromatography Atlas. Second Edition. By H. Wagner and S. Bladt (Universität München). Photographs by V. Rickl. Springer-Verlag, Brooklyn, New York. 1996. xv+ 384 pp. 19.5 × 24 cm. \$198.00. ISBN 3-540-58676-8.

The publication of this updated volume whose first edition appeared in 1984 is extremely timely, given the increasing interest in the quality control of herbal drugs in countries all over the world. The authors contend that TLC is the most practical and useful of the available chromatographic techniques for plant drug analysis and that a compilation of photographic records of individual TLC separations serves the same purpose as would a catalog of spectral data in aiding routine identification and purification testing. This second edition of an already very well accepted reference book has been expanded to include 60 additional plants, inclusive of *Ginkgo biloba* and *Stevia rebaudiana*, and the photographic quality of TLC separations using long-wave UV (365 nm) has been greatly improved.

The book deals with about 230 major botanicals and is divided into 19 major sections, of which the first 17 provide standard TLC systems for commercially available crude drugs containing in turn alkaloids, anthracene derivatives, bitter principles, cardiac glycosides, coumarins, essential oils (including balsams, gums, and resins), flavonoids, hydroquinones such as arbutin and related compounds, cannabinoids and pyrones, lignans, naphthoquinones, pigments, pungent-tasting principles, saponins, sweet-tasting terpene glycosides, triterpenes, and valepotriates. Thus, if the alkaloids are taken as an example, information is provided, respectively, on the preparation of plant extracts, standard TLC solvent systems, and detection methods, the constituents of over 40 alkaloid-containing drugs, compound structural formulas, a TLC synopsis of important alkaloids, and 30 figures showing alkaloid separations with supporting captions. The authors also demonstrate that while three major commercially used solanaceous medicinal plants containing tropane alkaloids (the leaves of *Atropa belladonna*, *Datura stramonium*, and *Hyoscyamus niger*) are hard to differentiate from their alkaloidal profiles, these may be readily distinguished from their flavonoid patterns. There are two final chapters dealing with the screening of unknown commercial drugs and the thin-layer chromatographic analysis of herbal drug mixtures, respectively. The chapter on the phytochemical screening of unknown drugs steers the reader to information presented elsewhere in the volume and is a particularly valuable inclusion in the book. There are two appendices that provide details of 44 standard TLC visualization reagents and definitions germane to plant drug TLC analysis. The authors have chosen to include only a few general references on standard literature and then a short updated list of international pharmacopeias containing botanical monographs, but have provided a comprehensive and helpful Subject Index. Overall, the book is meticulously compiled, although a number of

inconsistencies were noted in the spelling of the names of compound classes and individual phytochemicals, and stereochemical details are omitted for a few structures.

This revised edition of *Plant Drug Analysis* is destined to become a major reference source that will be used on a daily basis in laboratories concerned with the routine investigation of medicinal plants and other herbal drugs. Because of its clarity of presentation, it could be used by personnel with only a minimal training in analytical chemistry or pharmacognosy. This book can also be recommended in plant drug discovery programs to complement LC/UV/MS dereplication procedures. In addition, it will have use as a teaching tool in undergraduate and beginning graduate level laboratory exercises. The authors are therefore to be congratulated for producing a very high quality volume of such extensive potential utility.

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Plants, People and Culture: the Science of Ethnobotany. By M. J. Balick (New York Botanical Garden) and P. A. Cox (Brigham Young University). Scientific American Library, New York, NY. 1996. ix + 228 pp. 22 × 24 cm. \$32.95. ISBN 0-7167-5061-9.

In recent years, interest in ethnobotany—the study of human uses of plants—has increased greatly among scientists and the general public. One catalyst for this surge in popularity is a realization that many of the traditional societies that are the primary subjects of its study are disappearing even more rapidly than are the diverse plant species upon which those societies have depended for thousands of years. This represents an erosion of cultural and aesthetic riches to be sure, but the disappearance of these societies may also have significant implications for the efforts of western scientists to discover new natural products-based pharmaceuticals and other plant-based biotechnologies.

In this recent addition to the Scientific American Library Series two preeminent ethnobotanists have teamed up to provide a thoughtful overview of the history, methodology, and significant discoveries of their field. *Plants, People and Culture: the Science of Ethnobotany* is a beautifully illustrated book comprising six chapters that describe the range of interactions between humans and plants, with a particular emphasis on practices of indigenous peoples. The book strongly reflects the personal experiences of the authors in Polynesia and Latin America.

The book is organized conceptually by types of relationships between humans and plants. Chapter One, *People and plants*, outlines these relationships, and

describes the earliest known uses of plants and the history of the field of ethnobotany.

Chapter Two, *Plants that heal*, will be of great interest to the readers of this journal. It begins with a history of traditional uses, as well as the discovery and modification by western scientists of quinine, salicylic acid, and vincristine/vinblastine. The chapter goes on to describe the drug discovery process today, including ethnobotanical methods and how these methods may provide leads that could be missed if we were to depend entirely upon "random" collections of plants for screening. It also includes a table of 50 drugs discovered from ethnobotanical leads. An in-depth example is provided by Cox's research in Samoa that has led to the discovery and development of the anti-HIV compound prostratin.

Chapter Three, *From hunting and gathering to haute cuisine*, represents a sampling of some of the many aspects of human use of plants for food, including dietary needs, evolution of crop plants and the use and preservation of wild food plants. Chapter 4, *Plants as the basis for material culture*, is a fascinating, eclectic discussion of boat-building, cordage and containers, arrow poisons, body paints, textiles, and fish nets. Chapter Five, *Entering the other world*, discusses traditional uses of psychoactive plants and their religious or spiritual significance. They include the Calabar bean in Nigeria, ebena snuff and ayahuasca in South America, as well as kava, marijuana, coca, opium, peyote, and others.

Chapter Six, *Biological conservation and ethnobotany*, ends the book with a description of the important role for ethnobotany in efforts to conserve biodiversity. The discussion is focused on sustainable use of tropical forests, highlighting nontimber forest products such as fruits, fibers, latexes, and medicines, and includes some perspectives of indigenous peoples toward conservation.

Plants, People and Culture is a broad overview of the science of ethnobotany for general audiences. The book was not intended as a research tool, and the material presented is largely anecdotal. It does not attempt to be truly comprehensive or to present any grand theoretical synthesis to advance the field of ethnobotany. However, it is intelligently written, beautifully illustrated, and offers sufficient descriptive and analytical depth to be absorbing and thought-provoking. Following the format of this series, it has a very reasonable compendium of suggested readings organized by chapter at the end of the book, rather than specific literature citations. This book would be an excellent addition to the personal library of anyone with an interest in ethnobotany.

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Plant Alkaloids: A Guide to Their Discovery and Distribution. By Robert F. Raffa (Northeastern University). The Haworth Press, Binghamton, NY. 1996. xiii + 279 pp. 15 × 21 cm. \$69.95. ISBN 1-56022-860-1.

Plants have been a unique source of therapeutically significant alkaloids for centuries, and continue to be excellent sources of drugs that would otherwise be time-consuming, expensive, and most difficult to commercially produce via synthesis. In addition, alkaloids serve as sources of prototypic models for semisynthetic modification to other compounds having improved pharmacokinetic properties, improved efficacy, and/or less toxicity. The quest for new bioactive alkaloids has increased in recent years as screening methods have become more rapid and more sophisticated. This book provides a guide to the distribution and discovery of potentially new alkaloids from species in over 300 plant families and summarizes the results of tests on approximately 30 000 samples representing about 19 000 species and 4000 genera. The text is a summary of the author's involvement (under the auspices of a number of governmental, industrial, and academic institutions) with the screening of thousands of plants for the presence of alkaloids with potential therapeutic merit. Screening was accomplished on fresh plant material in the field, as well as on herbarium specimens or in the laboratory, and involved using a small amount of material made available by scientists, collectors, and other individuals throughout the world. In general, Dragendorff's Reagent was utilized as the detection reagent, with the acknowledged understanding of the uncertainties inherent in the use of this or any of the other commonly utilized reagents in alkaloid detection. Nevertheless, the author estimates that approximately 85% of alkaloid-bearing plants can be detected by the methods utilized in this book. Toward that end, a number of known alkaloid-bearing plants were included in the survey to function as controls. Those samples giving "doubtful" or "trace" results were not recorded, nor were samples that were identified only to family at the time of collection and assay. The results are displayed by listing the positive tests representing known alkaloid-bearing plants first, followed by a listing of new species, and then by those that were negative. The positive tests are recorded as a fraction that represents the number obtained over the number of samples tested (only if more than one was tested). The genera and species listed are those that were cited by the collectors or suppliers, with no attempt being made to correct or modify this nomenclature, except to validate generic names and their respective synonymies. The family assignments, with few exceptions, followed those of Mabberley (*The Plant Book*, Cambridge University Press: Cambridge, 1989). The plant parts tested were usually leaves and stems, notwithstanding the fact that roots are a common site of occurrence for alkaloids. Of the approximately 19 000 species tested, about 3600 tested positive for the presence of alkaloids, of which 3200 species were new, on the basis of current literature. These positive plants represented a total of 315 families with the following distribution: 48 gymnosperms and ferns (134 species); 43 monocotyledons (199 species); and 224 dicotyledons (2900 species). Despite all of the uncertainties inherent in this screening, this textbook will be extremely useful to anyone undertaking the discovery of novel and potentially useful alkaloids. One can see at a glance the relative distribution of alkaloids within families and genera, and the author has placed a short discussion of the distribution and

uses of the plants of each family at the beginning of the test results for that family. The actual test results consume 220 pages of the text and are followed by a three-page appendix citing the location of herbaria where samples were identified and/or deposited and a two-page bibliography citing 22 references. The index is alphabetized via genus and occupies 49 pages. Although the book is expensive for the individual purchaser, it is an invaluable addition to the library of anyone interested in the source and distribution of plant alkaloids and will serve as a primer for those beginning research in this area. Departmental and university libraries will certainly wish to add it to their collection. In summary, this book is an appropriate testament to a lifetime of efforts in the screening of alkaloid-bearing plants by a notable scientist in his field and leaves a legacy for others to pursue and follow.

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Studies in Natural Products Chemistry, Vol. 18, Stereoselective Synthesis (Part K). Edited by Attar-Rahman (University of Karachi). Elsevier Science, Tarrytown, NY. 1996. xiv + 1094 pp. 16.5 × 24 cm. \$656.25. ISBN 0-444-82458-8.

Even though the title of the eighteenth volume of *Studies in Natural Products Chemistry* is *Stereoselective Synthesis*, only 11 of the 20 chapters focus on synthesis. The other chapters cover a range of topics that include isolation and structure determination, compilation of spectroscopic data, immunochemistry, conformational studies, and a theory on the function and evolution of secondary metabolites.

Many of the chapters are comprehensive reviews that will be valuable reference sources for many years to come. Particularly noteworthy for their comprehensive coverage are the chapters by T. Hudlicky on morphine synthesis, by B. Figadère and A. Cavé on the stereoselective synthesis of acetogenins of annonaceae, by I. Fleming and S. K. Ghosh on the synthesis of nonactic

acid and its derivatives, by J. R. Stille and N. S. Barta on the aza-annulation strategy to natural product synthesis, by Y. Watanabe on the selective reactions and synthesis of inositol phosphates, by T. Kamikawa on the synthesis of phytosphingolipids, by A. Ganesan on the dimeric steroid-pyrazine marine alkaloids, and by B. Mikhova and H. Duddeck on the ¹³C-NMR spectroscopy of coumarins and their derivatives.

The remaining chapters are less comprehensive reviews that contain to varying degrees personalized accounts of the author's own research accomplishments. These include chapters by L. A. Paquette on strategies for the stereocontrolled synthesis of natural products, by J. Mulzer on the synthesis of polyketides, by A. Ichihara, H. Oikawa, and H. Toshima on the total synthesis of tautomycin and oscillatoxin D, by G. Adam, A. Prozel, J. Schmidt, B. Schneider, and B. Voigt on brassinosteroids, by M. Arimoto, H. Yamaguchi, and S. Nishibe on the structure elucidation and synthesis of lignans, by M. Tori on the absolute configuration of some liverwort sesquiterpenoids, by S. B. Mahato on gymnenic acids, by C. Christophersen on the role of secondary metabolites, by O. Muñoz, A. Penalzoza, A. G. Gonzalez, A. G. Ravelo, I. L. Bazzocchi, and N. L. Alvarenga on the natural products from the Celastraceae family, by E. B. Bergter and M. H. S. V. Boas on the structural chemistry of glycolipids, by L. Moroder and J. Lutz on conformational studies of gastrin hormones, and by L. Moroder, G. Hübener, and M. Gemeiner on studies in immunochemistry.

Overall, this volume continues the excellent tradition that has been established for the *Studies in Natural Products Chemistry* series. The comprehensive reviews are uniformly of high quality and will have lasting value as reference sources. Considering the price of this volume, however, it is surprising that so many of the chapters are primarily personalized research accounts, some of which even have rather extensive experimental data and drawings of spectra. The volume is probably too expensive for most individual collections, but it is a valuable acquisition for libraries.

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