Book Reviews

An Illustrated Chinese Materia Medica. By Jing-Nuan Wu (Ming-I Herbals, Alchem, Dr. Wu's Herbs). Oxford University Press, New York. 2005. viii + 706 pp. 7 × 10 in. $175.00. ISBN 0-19-51407-6.

It is a distinct honor to review this text by the late Dr. Wu Jing-Nuan, who embodied many of the personal and professional attributes of one steeped in Chinese classics and Taoism. He was highly respected in the traditional Chinese medical community. Dr. Wu previously published English translations of two of the most important classics in Chinese literature: the Yi Jing (*Book of Changes*) and the *Ling Shu*, which is the second part of the *Huang Di Nei Jing* (*Yellow Emperor's Classic of Internal Medicine*), the fundamental basis of traditional Chinese medical philosophy. This current work, completed by his daughter, continues what can only be regarded as Dr. Wu's legacy of bringing a deeper understanding of traditional Chinese medicine (TCM) and Chinese culture to the western world.

The introduction provides a succinct but valuable overview of TCM philosophy that can help those uninitiated in TCM to form a basic understanding of the traditional context of the system. It begins with a synopsis of the historical development of Chinese medicine that adds a richness to the Chinese herbal medicine literature often not provided, dynastically chronicling some of the most important philosophical schools of thought that were integral to the development and evolution of traditional Chinese medicine as it is practiced today. This is followed by a presentation of the various elements that form the basis of TCM pharmacology: temperature, five flavors and directions of action ascribed to herbs to describe their physiologic function, how botanicals are integrated into the channel (meridian) theory of acupuncture, some basic diagnostic principles of TCM, and an overview of the manner in which botanicals are formulated and prescribed. This text, while by no means a complete presentation on TCM philosophy, provides a systematic context for the materia medica that follows.

The materia medica presents approximately 318 botanical entries, arranged alphabetically according to botanical nomenclature in a single-page monographal format with the typical fields of information of TCM herbals, including nomenclature, part used, Chinese energetic classification, functions, uses, inclusion in primary formulas, dosage, and contraindications. It is perhaps the most beautiful presentation of Chinese materia medica to date in the English language. Each entry is accompanied by exquisitely beautiful color illustrations of the plant and medicinally used plant part. While such illustrations are readily available in Chinese-language texts, they are generally not included in those in English, and this makes for a uniquely beautiful presentation of Chinese herbalism.

A unique contribution to the otherwise standard therapeutic information is the inclusion of a useful, albeit brief, overview of harvesting instructions, which is usually absent from other works. If there were a criticism to levy regarding the materia medica it would be the inclusion of several species of the Aristolochiaceae, whose members contain aristolochic acid, a highly toxic compound associated with nephrotoxicity and the potential for stomach, bladder, and kidney cancer. While they are a legitimate part of the Chinese materia medica, the presence of aristolochic acid in several species of *Aristolochia*, as well as in *Asarum* (xi xin), should carry an appropriate caution, as the potential for toxicity has been known for many years. Only the entry for *Aristolochia manschuriensis* (guan mu tong), cited as the species of choice for Akebia (chuan mu tong), includes an incomplete caution, and, as of 2004 in China, *A. manschuriensis* is no longer considered an acceptable source of mu tong.

This text ends with a useful glossary of TCM terminology that can assist the reader in understanding the contents; it is indexed according to both pharmaceutical nomenclature (with pin yin) and also English common names. The text could have benefited from a primary pin yin index, as many TCM practitioners, a primary audience for this text, are not familiar with botanical and pharmaceutical nomenclature. It could have also benefited from harmonizing the English common names with *Herbs of Commerce*, a legal standard for nomenclature in the United States. These are small criticisms that do not detract substantially from the presentation of the work in its entirety.

The sheer beauty of the text makes it a must-have for all those interested in TCM and represents a hallmark in the TCM contributions offered by a very special individual who embodied many of the principles that make the subject of Chinese medicine so rich.

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Mass Spectrometry in Biophysics: Conformation and Dynamics of Biomolecules. By Igor A. Kaltashow and Stephen J. Eyles (University of Massachusetts). John Wiley & Sons, Hoboken, NJ. 2005. xvi + 458 pp. 16 × 24 cm. ISBN 0-471-45602-0.

Mass spectrometry (MS) is a versatile detector, as it can detect anything that can acquire charge. However, until not so long ago, its utility was limited to small molecules. Today, with recent advances such as electrospray ionization, it is possible to detect and analyze large molecules such as proteins. A lot has been written about this technique's applications in several fields, including biochemistry (e.g., peptides and protein sequencing). However, its applicability in molecular biophysics has not previously been addressed in a textbook. Thus, this book is a timely piece that provides an understanding of mass spectrometry as a valuable tool for studying biophysical problems, particularly biomolecular dynamics and higher order structure. The book is targeted for mass spectrometrists not very familiar with biophysics and biophysicists who wish to apply mass spectrometry to their scientific problems.

Accordingly, the book has been nicely organized, with the first three chapters devoted to an overview of basic concepts and conventional techniques in molecular biophysics, followed by an overview of biological mass spectrometry. This lays a background for both audiences to

comprehend advanced techniques described in later chapters. Chapters 4, 5, and 6 illustrate the applications of various MS methodologies for studying protein higher order structure, transient structural states of proteins and kinetics of protein folding, protein assembly, and enzyme catalysis. The utility of extent of protein charge, protein ion charge state distributions, and hydrogen−deuterium exchange for studying these biomolecular aspects are clearly described. MS-based techniques used for studying protein−ligand and protein−protein interactions are discussed in Chapter 7.

In Chapter 8, the authors explain the advantages of using MS as a technique complementary to other biophysical methodologies for obtaining data that is either confirmatory or completely unique. Applications of MS for studying conformation and dynamics of large molecules other than proteins, including oligonucleotides, polysaccharides, and other natural and synthetic polymers, are covered in Chapter 9. Chapter 10 focuses on solution and gas phase structural and dynamical differences of large biomolecules. Chapter 11 covers exciting and highly advanced applications of MS, such as studying intact cellular components (exemplified by ribosome) as well as whole organisms such as viruses.

The authors conclude the book with a discussion of current limitations and the future of MS as a powerful tool in molecular biophysics. In conclusion, the authors have succeeded in producing a valuable resource for the targeted audience.

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Antifungal Agents. Methods and Protocols. Edited by E. J. Ernst and P. D. Rogers (University of Iowa and University of Tennessee, respectively). Humana Press, Totowa, NJ. 2005. x + 209 pp. 6 × 9 in. $99.50. ISBN 1-588-29-277-0.

This book is a good compilation of testing methods and protocols. It has been laid out in four parts: a brief Introduction, Antifungal Resistance, Antifungal Development and Evaluation, and Host Responses and Immunotherapy. Each chapter is systematically formatted to include Materials, Data Analysis, and Notes and References.

Surprisingly, a majority of the articles are dedicated to *Candida*. Thus, one significant omission is any discussion of higher fungi. The title is, therefore, somewhat deceiving, and readers will be surprised to find no mention of higher fungi, particularly if one expects to see articles on emerging human fungal pathogens, an area in need of novel methods and protocols. For example, there is an immediate need to develop new methods for detecting pathogenic molds, as they are emerging as new human secondary pathogens among immune-compromised people. Environmental exposure to *Stachybotrys chartarum* has been associated with multiple adverse health effects in humans. Several mold species—*Penicillium* spp., *Aspergillus* spp., *Stachybotrys* spp., *Paecilomyces*, and *Fusarium* spp.—are known to colonize indoor spaces and cause human diseases. They also produce harmful mycotoxins, or poisons; this phenomenon has resulted in some referring to these organisms as toxic mold, the next asbestos.

Part I is a brief introduction by one of the editors; the article is very brief and does not offer anything new except emphasizing the importance of animal models.

Part II is comprised of six articles focused on antifungal resistance, the use of DNA fingerprinting, CARE (*Candida albicans* specific repetitive DNA element 2) fingerprint, DNA-microarray analysis, proteomic analysis, and biofilms. Interestingly, all these chapters deal with *C. albicans*. Most of the methods are brief, yet very descriptive and easy to follow. The SOPs are well written, but most of the articles fail to illustrate the protocols with appropriate examples.

Part III, with five articles, is dedicated to antifungal development and evaluation. The first reviews the role of natural products in antifungal drug discovery and development; this article does a good job of reviewing most of the available methods with appropriate examples. Surprisingly, the whole book has only one article based on natural products. Two articles are on animal models, both well written with appropriate analysis. The last two chapters deal with interesting aspects of antifungal combination therapy for immuno-compromised hosts and post-antifungal effect, respectively.

Part IV, with three articles, deals with host response and immunotherapy, focusing on three human pathogens, *Candida*, *Histoplasma*, and *Cryptococcus*.

In summary, this book pitches a strong case that its practical, concise, and detailed compilation of methods will be a worthwhile contribution as a laboratory manual. It will be a good resource for entry-level technicians and researchers who work exclusively on *Candida*, but may not find much use in other fungal research. In the antifungal area, we cannot ignore the higher fungi that are emerging as a major threat. The price seems to be reasonable for the comprehensive compilation.

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Natural Products: Drug Discovery and Therapeutic Medicine. Edited by L. Zhang (SynerZ Pharmaceuticals Inc.) and A. L. Demain (Health and Drew University). Humana Press, Totowa, NJ. 2005. xiv + 382 pp. 7¼ × 10 in. $135.00. ISBN 1-588-29-383-1.

Despite contributions to improved quality of life and extended life span, natural products have fallen out of favor in the pharmaceutical industry in recent years, with a downturn in the number of large pharmaceutical companies doing research in this area of drug discovery. Drug discovery strategies have been rapidly evolving, employing technologies such as proteomics, genomics, high-throughput screening, and bioinformatics. Economic challenges, the high cost of acquiring these new technologies, the perception that natural products have been exhausted as a source of new, developable drugs, and the perceived tedious and old-fashioned nature of natural product research are among the reasons for this trend. One of the theses of this book is that the de-emphasis of natural product research is in part related to a decrease in the output of new drugs from the industry and that renewed interest and success will ultimately come from integrating newer technologies with conventional approaches to natural products drug discovery.

Molecular-based diversity generation, culturing of "unculturable" organisms, and high-throughput profiling and testing are among those newer "integrated approaches" being applied to modern natural product discovery. The editors have assembled contributions from a knowledgeable group of researchers on some past successes in natural products, current and emerging methodologies, specific groups of natural products, various environmental sources, and work currently ongoing in the researchers' laboratories. This book, aimed at researchers, industry administrators, and opinion leaders, attempts to inspire a resurgence of interest in natural products drug discovery research.

This compilation of selective reviews is divided into five parts. The first, "Fundamental Issues Related to Natural Product-Based Drug Discovery", provides a historical perspective on the health and economic contributions of natural products. The authors noted that antibiotics have contributed to the "increase in average life expectancy in the United States from 47 yr in 1900 to 74 yr for males and 80 yr for women in 2000". Most notable among the antibiotics highlighted are the cephalosporins, penicillins, tetracyclines, macrolides, aminoglycosides, ansamycins, and glycopeptides, which together capture a significant portion of the estimated $35 billion current worldwide antibiotic market. This part also examines some of the reasons (e.g., a shift to combinatorial chemistry approach) for the downgrading of natural product research, remaining challenges, and future prospects in pharmaceutical research involving natural products.

The next part, "Strategies", covers approaches for increasing efficiency in natural products drug discovery. Included are a method for automating the comparison of HPLC profiles of microbial extracts in order to build and assess a chemically diverse library, techniques for increasing chemical diversity by engineering changes in genes that regulate the biosynthesis of natural products, and the use of genomic and bioinformatic tools to identify genes and predict the structure of their encoded metabolites. The use of genome or pathway shuffling to enhance genetic diversity in progeny natural-product-producing organisms with simultaneous selection for increased compound production was also covered in this section. A chapter on integrated approaches reviewing topics such as sample collection, ecosystem choices, organism isolation strategies, culture selection, and compound expression, among others, ties other chapters in this section together well.

Part III, "Specific Groups of Drugs", provides overviews of certain compound classes including an up-to-date review of anticancer compounds from natural sources that was notable for its thoroughness. Other notable chapters include a review of the constituents of *Taxus brevifolia* and *Catharanthus roseus*, the respective producers of paclitaxel and the vinca alkaloids, reviews of terpenoids, traditional Chinese medicine, and arsenic trioxide.

The fourth part, "Microbial Diversity", covers various approaches for generating microbial diversity that can ultimately result in chemical diversity. The chapter entitled "New Methods to Access Microbial Diversity for Small Molecule Discovery" discusses approaches for isolating and cultivating diverse organisms or for accessing the genetic material from organisms that are "unculturable". The authors discuss new cultivation methods, including microencapsulation of individual organisms. Also discussed is the cloning of genes encoding for natural products from the isolated organisms or from metagenomic DNA, which are then expressed in a heterologous host. Another chapter further explores cloning and expressing metagenomic DNA in order to access the estimated 99% of soil microbes that are difficult to culture. The approach here stresses prescreening of clone libraries in order to identify clones capable of producing natural products in heterologous hosts.

In the last part, "Specific Sources", natural products from marine actinomycetes and endophytes are discussed, in addition to the topic of bioprospecting in developing nations.

This book is primarily a review of some successful natural products, important specific compound classes, old and new sources, and traditional and emerging approaches to natural products drug discovery, with special emphasis on the integration of these approaches. This book will provide students, academicians, industrial researchers, and decision makers with a reasonable perspective on these topics. Evidence for the central thesis that an integrated approach of traditional and modern methods, combined with investigating both established and new organism sources, can revitalize interest from the pharmaceutical industry in reinvesting in natural product drug discovery is currently evolving.

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Reagents for High Throughput Solid-Phase and Solution-Phase Organic Synthesis. Edited by Peter Wipf (University of Pittsburgh). John Wiley & Sons, Ltd., Chichester. 2005. xii + 380 pp. $8^1/_2 \times 11$ in. $140.00. ISBN 0-470-86298-X.

This single volume is a selection of ca. 140 entries from the original 8 volume *Encyclopedia of Reagents for Organic Synthesis* (*EROS*), published in 1995, along with some more recent additions and updates from an electronic version of the series (*e-EROS*). The main body of the work is preceded by an extensive six page listing of recent review articles and monographs relating to the general theme of parallel synthesis/combinatorial chemistry. An alphabetical listing of reagents follows, with entries ranging from the original resins, linkers, and coupling agents developed for solid-phase peptide synthesis, to solid-supported and fluorous-phase reagents intended for the synthesis of smaller molecules. Indeed, it is interesting to see silica- and Celite-supported reagents "rediscovered" for use in parallel solution-phase synthesis, where streamlined purification is a major goal.

As for a book in the encyclopedia style, the net result of ca. 160 contributors is a heterogeneous mixture of treatments for each reagent; a helpful section on "Related Reagents" is frequently missing from many entries. Inevitably, any work of this size will have some errors in the schemes, but with direct reference to the primary literature for each transformation shown, these mistakes are not too serious. Although many practitioners may find some of their favorite reagents/resins/linkers excluded from the editor's selection, some of the newer reagents included have yet to demonstrate their usefulness to the wider synthetic community. There are a few glaring omissions: the amide coupling agents HOBt and HOAt are mentioned only within the entries of other amide coupling reagents. Thankfully, the entries for many of the most widely used

reagents are quite comprehensive, generally with good discussions of the advantages and disadvantages of each reagent, along with comparisons to other reagents for the same transformation. There is a lack of editorial uniformity in the selection of entries, with minor variations sometimes described as discrete entities; for example, two entries are devoted to the BAL/PAL trialkoxy-benzylamine linker system, yet all four versions of the trityl linker system are described together in a single entry. The lack of a listing of reagents for functional group transformations is a deficiency, but this is remedied with extensive entries in the index for amidation, oxidation, and reduction, etc. Coverage in the subject index though can be spotty; for example, although seven carbodiimide reagents are described in the handbook, the index lists only three.

Overall, the book should serve as an excellent starting point to someone wishing to use the tools of parallel synthesis in medicinal chemistry or natural products synthesis, or as a solid ready-reference source for the more experienced practitioner. At $140, the hardcover edition should be readily affordable for a corporate or academic library, but is a bit expensive for casual addition to a personal collection.

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Amines: Synthesis, Properties and Applications. By S. A. Lawrence (Mimas, Ltd.). Cambridge University Press, Cambridge. 2004. x + 371 pp. 7 × 9 in. $180.00. ISBN 0-521-78284-8.

The intent of this book, as stated in the Preface, is to provide a broad and more particularly recent overview of the chemistry of amines: their synthesis, reactivity, physicochemical properties, and industrial uses.

The first chapter is mainly devoted to nitrogen and the simplest amine, ammonia. Chapters 2−5 are devoted to aliphatic, fatty and cyclic, aryl, heterocyclic, and inorganic amines, respectively. Each of these chapters follows the (1) synthesis and (2) properties subdivision method. In Chapter 6, laboratory scale syntheses of several amine derivatives are described. Protection of the amine function is the specific topic of Chapter 7, and industrial uses of amines are reported in Chapter 8. In addition, theoretical data are compiled in Appendices 1 and 2 (melting points, boiling points, and pK_a), and Appendix 3 lists 200 named reactions involving amines.

As can be anticipated, this book presents a large number of reactions involving nitrogen-containing compounds and, in some cases, the author adds personal and practical comments, probably useful to avoid difficulties in the laboratory, particularly if the reactions have to be carried out by unskilled chemists. Industrial applications are also frequently reported, emphasizing the importance of amine chemistry in our everyday life.

However, whereas this book is promoted as an up-to-date resource book, most of the reactions depicted can already be found in common chemistry textbooks. Consequently, the large majority of the references are old, whereas only a few references are given for recent insights brought to amine chemistry. Furthermore, some recent references seem to emphasize the author's work rather than report new, useful information.

The general value of the book could have been improved by addition of a few more reaction schemes; however, a greater flaw is that the structures of many compounds are erroneous. Overall, this book contains valuable information but can hardly be considered as a genuine reference book. It can be useful for undergraduate students considering an industrial chemistry carrier and for those interested in the applications of amine chemistry, rather than its precise details.

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