

## Book Reviews

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## BOOK REVIEWS

*A Field Guide To Medicinal Plants: Eastern and Central North America.* S. FOSTER and J. A. DUKE. Houghton Mifflin Company, 2 Park Street, Boston, MA 02108. 1990. xiv + 366 pp. 11.5 × 18 cm. \$15.95 (paper). ISBN 0-395-46722-5.

*A Field Guide to Medicinal Plants* is an affordable, well illustrated layman's guide to the most commonly encountered plants in the eastern half of the United States. As is typical of the Peterson Field Guide Series, the brief plant descriptions, accurate line drawings, and over 200 excellent color photographs make the initial plunge into the identification of medicinal plants a rewarding experience. Traditional and official medicinal uses are given for almost 500 plants. The inclusion of a large number of plants in a diversity of habitats ensures that the amateur naturalist will discover a plant medicine on even the briefest expedition.

Even with the size constraints of a pocket field guide, the authors report such an extensive diversity of traditional therapeutic uses for American and related Chinese species that phytochemists should be stimulated to conduct research on these North American plants. For researchers, the index by medical topics (anticancer, asthma, colds, etc.) makes the location of plants for specific therapeutic areas an easy task. The text is so thorough in noting potential adverse reactions of the plants (allergies, dermatitis, internal poisons) that the guide will be very useful for health professionals in identifying poisonous plants. This field guide will be useful to professors who teach undergraduate courses in plant medicines, naturalists who do interpretive nature walks, and indeed, anyone who has a budding interest in learning the medicinal plants of the eastern and central parts of the United States.

EDWARD M. CROOM JR., *University of Mississippi*

*Progress in Physical Organic Chemistry. Volume 17.* Edited by R. W. TAFT. Wiley-Interscience, John Wiley and Sons, 605 Third Avenue, New York, NY 10158. 1990. xi + 313 pp. 15.5 × 23.5 cm. \$79.95. ISBN 0471-50912-4.

This volume contains several thorough and well-written review articles pertaining to physical organic chemistry. Dedicated to L. P. Hammett (1894–1987), the unifying theme of these reviews centers on correlation analysis and linear free energy relationships in organic chemistry. The volume opens with the "Hammett Memorial Lecture," written by J. Shorter, which traces the career of L. P. Hammett and particularly the circumstances and background which led to the Hammett's most notable contributions, the acidity function and the Hammett equation.

Two reviews by E. Grunwald follow, entitled "The Thermodynamics of Molecular Species" and "Reaction Coordinates and Structure-Energy Relationships." The first review derives the relationships between the thermodynamics of formal components and that of molecular species, subspecies, and solvates. The second Grunwald contribution describes mathematical models for treatment of rate-equilibrium data: a complex potential energy surface is projected into lower dimensional space where it is described in terms of several "progress variables." Assignment of values to these progress variables allows characterization of the transition state. The results and conclusions of several mechanistic studies are analyzed by these models.

Two chapters consider solvent effects on acidity and basicity. "Theoretical Studies of the Effects of Hydration on Organic Equilibria" by R. D. Topsom describes the use of ab initio methods to correlate gas phase and aqueous acidities/basicities by considering the effect of solvent in terms of three mechanisms: direct interaction at the reaction site, interactions with substituents which alter their electronic properties, and a general medium effect on the interaction between the reaction site and substituent. As the title implies, "Correlation Analysis of Acidity and Basicity: From the Solution to the Gas Phase" by J.-F. Gal and P.-C. Maria attempts to reconcile condensed and gas phase acidity/basicity data. The chapter is rich with examples and experimental data, and the authors demonstrate the unique insight that gas phase experiments provide to our understanding of intrinsic structural effects on acidity and basicity in solution.

In "Y<sub>X</sub> Scales of Solvent Ionizing Power," T. W. Bentley and G. Llewellyn review recent extensions of the Grunwald-Winstein "Y-scale" of solvent polarity, originally based upon the rate of solvolysis of *t*-BuCl in a variety of solvents. Discussed are the development and utility of the Y<sub>X</sub> scale, based upon rate of solvolysis of R-X (where X is a specific leaving group). This solvent polarity scale accounts for differences in solvation of specific leaving groups.

The final contribution, by T. M. Krygowski, "Correlation Analysis in Organic Crystal Chemistry," shows how substituent effects are manifested in terms of the geometries of molecules in the solid state.

All the reviews contained in this volume are rich with literature citations, extremely readable, and free of major errors. Consequently, as with its predecessors, this volume will be an excellent resource for anyone whose interests coincide with any of these topics.

JAMES M. TANKO, *Virginia Polytechnic Institute and State University*

*Organic Chemistry of Drug Synthesis. Volume 4.* DANIEL LEDNICER and LESTER A. MITSCHER with GUNDA I. GEORG. John Wiley & Sons, 605 Third Avenue, New York, NY 10158. 1990. xiv + 253 pp. 15 × 23 cm. \$44.95. ISBN 0-471-85548-0.

The present volume is a continuation of a series that brings together the published syntheses (from patents as well as journals) of compounds which have been granted a United States Adopted Name (USAN) between 1983 and 1987 (approximately 300 compounds). The book provides a brief overview and discussion of the synthetic routes which have been used to access each class of therapeutic agents. The authors have continued the format of organizing the volume by structural class instead of biological activity. For example, the antiviral compounds are discussed in six different sections. This separation of subject matter presents no problem to the user, as the book is well indexed by both compound and pharmacological class. The biological activities for all compounds are tersely discussed with an occasional droll comment concerning drug design (e.g., the chemical search for utopiasporin). The quality of this series continues to improve, and the current volume is almost flawless. This series is a valuable resource and is a useful addition to any library used by medicinal, organic, and analytical chemists interested in the synthesis of potential therapeutic agents.

WILLIAM H. SOINE, *Virginia Commonwealth University*

*Rodd's Chemistry of Carbon Compounds, Second Edition. Volume IV. Heterocyclic Compounds, Part IJ.* Edited by S. COFFEY and M. F. ANSELL. Elsevier Science Publishing, 655 Avenue of the Americas, New York, NY 10010. 1989. xxii + 552 pp. 16 × 23 cm. \$315.75. ISBN 0-444-87322-8.

The second edition of *Volume IV, Heterocyclic Compounds, Part IJ* of the continuing series, *Rodd's Chemistry of Carbon Compounds*, maintains its high standard of clarity and thoroughness of articles presented. This volume completes the massive second edition of this multivolume compendium. The original format and organization, as in previous volumes of *Rodd*, have been retained. This volume contains six chapters of varying lengths on six-membered ring heterocycles that have either two (first five chapters) or more (last chapter) ring-heteroatoms from group V of the periodic table.

The first chapter (Chapter 42, R. N. Hunston, J. Patrick, and C. J. G. Shaw) is the second largest (153 pages) and deals with heterocycles with N-N bonds (pyridazines, cinnolines, benzocinnolines, and pathalazines). Syntheses are logically organized according to reaction types. Biological properties of several cinnolines are included. The second chapter, by R. T. Walker, reviews recent developments in the chemistry and biological aspects of pyrimidines and quinazolines (heterocycles with an N-C-N bond) and is fairly extensive. It also includes a useful note to clarify the confusing nomenclature of pyrimidines that has been used over the years. Syntheses, properties, and reactivities are categorized in an extremely useful manner. The third chapter, by K. T. McCullough, is an exhaustive review on pyrazines and related compounds (heterocycles with N-C-C-N bonds). It is the longest (161 pages) in the volume and is divided for sake of simplicity into various sections (1,4-diazines, quinoxalines, and phenazines, including their various derivatives). There seems to be a minor discrepancy on p. 247 in nomenclature in the use of  $\alpha$ , $\beta$ -carbonyl instead of  $\alpha$ , $\beta$ -dicarbonyl.

The fourth chapter (no. 45), by N. Hughes on organic dyes, updates progress in the chemistry of phenazines (eurhodines, eurhodols, aposafranines, safranines, fluorindines, indulines, nigrosines, aniline black, phenoxazines, and sulfur dyes). The fifth chapter (no. 46) of the volume, on quinazoline alkaloids, is the shortest (19 pages) and covers the literature that appeared between 1967 and 1985. Several new naturally occurring quinazolines, which include those of the arborine type (from *Glycosmis arborea*), vasicine alkaloids (from *Adhatoda vasica* and *Anisotes sessiflorus*), new febrifugine and isofebrifugine skeletons [from *Dichroa febrifuga* (which is misspelled in the index and is cited for the wrong page)], and indoloquinazolines from the Rutaceae family are reviewed, along with their synthetic and biological aspects. The last chapter (no. 47, D.G. Neilson and D. Hunter) comprehensively describes recent progress in the synthesis of six-membered heterocycles with three and more heteroatoms (triazines, thiaziazines, oxadiazines, dithiazines, dioxazines, oxathiazines, tetrazines, pentazines, thiatriazines, oxatriazines, tetrathianes, and related compounds).

As in the other volumes of *Rodd*, physical and spectral data of all the new compounds are included, and, in many instances, these are tabulated for useful comparative studies. The index section is more elaborate in this volume than in those of the previous edition, and also included is a brief, useful index guide to assist the reader. This volume is definitely an important addition to the series and a valuable reference book for heterocyclic chemists.

JAHANGIR AND DAVID C. BAKER, *University of Tennessee*

*Handbook of Natural Products Data, Volume 1. Diterpenoid and Steroidal Alkaloids.* ATTA-URRAHMAN. Elsevier Science Publishing, P.O. Box 882, Madison Square Station, New York, NY 10159. 1990. vii + 962 pp. 16.5 × 24 cm. \$353.75. ISBN 0-444-88173-5.

This volume purports to be a handbook reporting data till the end of 1988 on diterpenoid (343 pages) and steroidal (517 pages) alkaloids. Indexes include a compound index (16 pages), a molecular formula index (17 pages), a molecular weight index (16 pages), a compound-type index (14 pages), a plant source index (25 pages), and an index of numbering systems for structures (10 pages).

This volume is a great disappointment, for it contains many dozens of errors in structural formulas and data. For example, in the chapter on diterpenoid alkaloids the configuration at C-1 is shown incorrectly in the structural formulas for thirty alkaloids: dihydromonticamine (p. 10), cammaconine (p. 14), excelsine (p. 14), homochasmanine (p. 45), crassicaulidine (p. 47), chasmaconitine (p. 86), chasmanthine (p. 102), bikaconitine (p. 118), diacetylpsuedaconitine (p. 127), demethyleneeldelidine (p. 160), browniine (p. 170), delbiterine (p. 171), delcaroline (p. 182), delphatine (p. 182), 14-acetylbrowniine (p. 191), tricornine (p. 192), ambiguine (p. 194), 14-benzoylbrowniine (p. 202), delectine (p. 203), anthranoyllycoctonine (p. 206), *N*-acetyldelectine (p. 211), *O*-acetyldelectine (p. 212), ajacine (p. 214), ajadine (p. 216), lycaconitine (p. 219), avadharidine (p. 221), septentriodine (p. 226), septentriionine (p. 230), ajacusine (p. 232), and pyrochasmanine (p. 233). Another incorrect structure in this chapter is that of 14-dehydrodelcosine (p. 152); the hydroxyl group is located incorrectly on C-3 rather than on C-1. Similarly in error are the structures for 14-benzoyldelcosine (p. 200) and denudatine (p. 302), which shows hydroxyl groups at C-1 and C-12, instead of at C-11 $\beta$  and C-15 $\beta$ . Dictyzine acetone should have been drawn to correspond with the structure on p. 257. The structure of ajaconine (p. 263) incorrectly contains an extra bond between C-14 and C-20. A long-discarded structure with an oxygen bridge connecting C-1 and C-12 is given for excelsine (p. 14). The correct structure involves a C-3-C-4  $\beta$ -epoxide.

The chapter on steroidal alkaloids is likewise riddled with errors. Some errors are fairly obvious, such as the displacement of all substituents on the rhamnose group by one carbon atom [e.g., the C-5" methyl is at C-4", etc.] in hapepunine-3-*O*- $\alpha$ -L-rhamnopyranosyl-(1 $\rightarrow$ 2) $\beta$ -D-glucopyranoside (p. 633), whereas others such as the representation of galactose as glucose in capsicastrine (p. 626) and solaradixine (p. 523) will mislead the reader. The author's decision to rotate the sugar structure about the glycosyl-aglycone bond has led to many of the sugars being represented as their enantiomers, i.e., D-glc often appears as L-glc and L-rha as D-rha. A particularly unfortunate example is that of solashabanine (p. 524), whose structure misrepresents the galactose directly attached to the aglycone as glucose and whose data contain the following errors: 74.6 is listed as C-5" instead of C-5', 74.6 is listed as C-5", -2", -2"" instead of C-5", -2"', -2""; 104.5 is listed as C-1" instead of C-1"', 77.7 is listed as C-3" instead of C-3"', 75.2 is listed as C-5" instead of C-5"', 69.3 is listed as C-6" instead of C-6"', and 71.6 is listed as C-4" instead of C-4'''.

In addition to various data errors which were noted [e.g., the sign of optical rotation of both verat-

ramine (p. 569) and *O*-acetylsolasodine (p. 489) is negative, not positive; veracintine's C-27, -19 should be C-26, -19 (p. 779); C-26 in solanopubamine (p. 541) has 58.7 ppm, not 56.7; C-25 in chuanbeinone (p. 364) has 31.1 ppm, not 37.1; and C-8 and C-16 in regholarrhenine B (p. 463) should be 34.7 and 37.4, respectively, instead of the values listed], structures containing stereochemical inaccuracies were prevalent throughout the *Handbook*. Tomatine is shown (p. 522) having the 22*R* configuration proposed in the late 1950s; the correct 22*S* configuration was established by physical methods in the mid-1960s. Although the author has reproduced the incorrect structure of jurubidine (p. 494) shown in references 2 and 3 (p. 495), the correct structure which bears an axial C-27-methyl group has been known since 1965. The wrong stereochemistry at C-4 of cyclomicrophylline B (see below for other *Buxus* alkaloids) is shown on p. 700, an assignment that was corrected in the 1975 citation (ref. 7 on p. 701) from which the author extracted the <sup>13</sup>C nmr data. The structure shown for teinimine (p. 586) is actually that of isoteinimine (p. 583); teinimine (deacetylmuldamine) was proved in 1982 to possess 22*S*, not 22*R*, stereochemistry.

<sup>13</sup>C-nmr data that have been published for several steroidal alkaloids listed in the *Handbook* have been ignored, e. g., baleabuxine (p. 711), cevadine (p. 430), isojurubidine (p. 493), Δ<sup>3,5</sup>-solasodiene (p. 482), teinimine (p. 586), veratridine (p. 437), baleabuxidine (p. 717), cyclobuxoxazine A (p. 708), and cyclorolfoxazine (p. 689), with the latter three *Buxus* alkaloids shown having the wrong stereochemistry at C-4. Unassigned <sup>13</sup>C-nmr data are listed for solacallinidine (p. 579), *O*-acetylsolacallinidine (p. 579), and diacetyl-25-isosolafloridine (p. 581); Collins *et al.* assigned these signals to specific carbon atoms in 1979. Data for the same compound have been reported under two different names: sinpeinine A (p. 376) and delavinone (p. 365). The <sup>13</sup>C-nmr signals for conessine (p. 473) are clearly not in ppm downfield from TMS; <sup>13</sup>C-nmr data for several compounds (p. 645, 655, 667, and 680) are reported in hundredths of ppm.

The indexing is poorly done. Thus in the compound index, pp. 872–873, *N*-acetylcycloprotobuxine-D through (+)-*N*-demethylcycloprotobuxine (4 entries) are indexed under the letter "N". Likewise on p. 873, *N*-benzoyl-16-acetylcyclobuxidine through *N*-demethylmitiphylline are indexed under the letter "N" (23 entries); likewise for *N*-formylchoneomorphine through *N,N*-tetra-methylholarrhimine (18 entries). Compounds *O*-acetyldelectine through 6-*O*-demethylneoline are indexed under the letter "O" (6 entries); likewise for 3-*O*-methylbatrachotoxine through *O*-vanilloylcyclovirobuxine-D (7 entries). On p. 914, 14-*O*-acetylsachaconitine through 8-*O*-methylalatzamine (5 entries) are indexed under the letter "O"; *N*-deacetylappaconitine through *N*-deethyldestaphidine (4 entries) are indexed under the letter "N". Similar incorrect entries are found on pp. 916, 920, 924, 925, and 926. On p. 918 denudatine is incorrectly listed under alkaloids of the veatchine type.

The above errors do not exhaust the list in this *Handbook*. Clearly the Handbook was compiled by individuals (clerks?; fourteen are acknowledged on p. v) who were not familiar with the fields they were surveying and the author (whose name is the only one to appear on the volume) appears not to have checked their work. The result is a volume which is highly unreliable and therefore of greatly impaired usefulness; it is also very expensive (\$0.365 per page). In my opinion this volume cannot be recommended for purchase either by libraries or individuals.

S. WILLIAM PELLETIER, *The University of Georgia*