Book Reviews

Methods in Cancer Research. Volume XVI. Cancer Drug Development. Part A. Edited by V. T. DeVita, Jr., and H. Busch. Academic Press, New York. 1979. 456 pp. 16 × 23 cm. $39.50.

This and the subsequent volume of this important series of treatises on cancer research are devoted to a systematic, up-to-date review of the development and present status of cancer chemotherapy and of the drug development program conducted in a large measure under the auspices, or with the cooperation, of the National Cancer Institute, Division of Cancer Treatment (NCI, DCT). It is an excellent, remarkably well conceived, informative, and easily readable volume, which, despite its multiple authorship, presents a unified, well-coordinated picture of the present state of the art, its achievements, problems, and methodologies available for future progress.

Chapter I (by J. A. Montgomery), on synthetic chemicals as anticancer agents, focuses on the roles of empiricism and rational design in the development of those drugs which are in clinical use today. Most of these are grouped into two major classes, i.e., "chemically reactive compounds" and "antimetabolites that interfere with the synthesis or function of DNA". With respect to the future development of new and better synthetic agents, the author, in general, appears to favor the approach of "enlightened empiricism" and, in particular, stresses the importance of the application of an increasing understanding of the pathways of biosynthesis and drug metabolism, including the processes of metabolic activation and deactivation of chemically reactive compounds. It is an interesting, eminently readable treatise and an up-to-date, though limited, overview from the author of several previous, more detailed reviews of this field. In the similarly concise Chapter II, H. Umezawa outlines the development of the antitumor antibiotics as cancer drugs. The structures, modes of action (binding or reaction with DNA, effects on DNA or RNA synthesis and on cell cycle, etc.), metabolism, and side effects of the most important clinically active antibiotics, i.e., actinomycin D, mitomycin C, neocarzinostatin, and particularly the bleomycin and anthracycline groups, are discussed, with ample references to review articles as well as to the most recent research papers; thus, despite the relative brevity of this chapter, it provides a wealth of the essential, up-to-date information on the subject. A brief section on noncytotoxic microbial products with immunological activities that are potentially useful for cancer treatment (e.g., bestatin) is also included in this chapter. Chapter III (by Suffness and Douros) describes the procedures developed and currently used by the NCI for the synthetic screening of plant extracts and for the isolation and developement of anticancer drugs of plant origin. This is followed by an up-to-date summary of the structures, antitumor spectra, and current status of clinical development of the most promising new plant-derived drugs, most of which belong to the major classes of terpenes, ansa macrolides, and alkaloids. Chapter IV (by Kozarich, Stubbe, Griffith, and Sartorelli) deals with two different aspects of analogue development as the sources of new anticancer drugs: (1) the various techniques of structural variations based on the QSAR approach and (2) the use of the catalytic mechanism of target enzymes of designing transition-state analogues and suicide inhibitors.

Under the general heading, "Screening of Anticancer Drugs", Goldin, Schepartz, Venditti, and DeVita devote the longest and extremely well-documented Chapter V to the historical development and the current strategy of the National Cancer Institute Drug Development Program (77 pages, 29 tables, about 130 references). We feel that any investigator deciding to establish an up-to-date screening program for anticancer agents, from the stage of the primary screen to that of the final evaluation before going on to clinical studies, will find in this review all that he will need to avoid the pitfalls of "false negatives" and "false positives"; he will also be able to choose, in accordance with the nature and the number of the substances which he has to test, the systems with the highest reliability and the best predictive value. No one concerned with the discovery of potentially useful anticancer drugs can hope to be successful without relying on the long and extensive experience of the NCI's Division of Cancer Treatment, even though he might wish to use somewhat different systems and approaches for his own screening. Medicinal chemists who have been submitting their new compounds over the years to the NCI for antitumor screening, and who may have wondered about the rationale and significance of the test systems used, will find this chapter most illuminating. In Chapter VI, M. T. Hakala and Y. M. Rustum present a comprehensive review of the potential value of in vitro screening of anticancer agents, a method which offers the advantages of economy of samples and relative rapidity of performance, while admittedly providing little information on actual tissue selectivity of the agents. Important technical aspects are discussed in detail (use of mouse cells vs. human cells, rapidly vs. slowly growing cells, cells growing in suspension vs. monolayers, nature of the media, use of primary cultures, use of mutant sublines, length of exposure of cells to compound), followed by a thorough discussion of the relevance of in vitro tests to the situation in vivo and by a description of the information which in vitro methods can provide with respect to combination of agents, drug retention and, of course, mechanisms of action. The conclusion is that screening in vitro, whether concerning unknown agents or predictive parameters, is an invaluable step in cancer drug development.

Under the general heading "Rational Design of Anticancer Agents", Chapter VII (by Kurt W. Kohn) presents the recently developed techniques for the measurement of macromolecular DNA damages produced in mammalian cells by anticancer agents and carcinogens. It contains a very informative critical discussion of novel modifications of the sedimentation techniques for the determination of single- and double-strand breaks, alkali-labile lesions, and interstrand cross-links caused in the very large DNA molecules which are investigated without isolation from the gently lysed cells. Other techniques involve strand separation kinetics and viscoelastometry; furthermore, the very useful alkaline elution method developed by the author is discussed in particular detail. In Chapter VIII, Zaharko, Przybylski, and Oliverio discuss various approaches aimed at increasing the selectivity of anticancer drugs via binding them to "carrier" molecules. The latter include low-molecular-weight carriers, such as various amino acids, pyrimidines, sugars, etc., used in the search for more selective alkylating agents; however, some of the promising current approaches involve macromolecular carriers, such as DNA (Trouet and DeDuve), antibody proteins, synthetic polymers, or encapsulation into liposomes. Finally, in Chapter IX, Sirotnik, Chello, and Brockman present an interesting treatise on the potential for exploitation of the cellular membrane transport systems in anticancer drug design. Comparative aspects of the structural specificities of the membrane transport of folates, nucleic acid precursors, and their analogues are discussed in particular detail.

On the whole, this book is an invaluable aid to all those scientists who are engaged or interested in either the chemical or biological aspects of cancer chemotherapy research.

State University of New York at Buffalo **Thomas J. Bardos**
Rhône-Poulenc, France **Georges H. Werner**

Biosynthetic Products for Cancer Chemotherapy. Volume 3. By George R. Petit and Richard H. Ode. Plenum Press, New York and London. 1979. 16 × 23.5 cm. viii + 197 pp. $32.50.

This is the third in yet another series of small volumes designed, it is proposed, to keep the scientist aware of current literature in a specific field (the literature covered here is that between April

1976 and July 1977). It is divided into two parts. The first (43 pages) tabulates the additions to the literature of those compounds of natural origin with cytotoxic or antineoplastic activity, although in several instances the bioactivity data are not given. The second and larger section (135 pages) consists of a tabulation of the source, structure, and physical properties of compounds known to have been isolated from marine organisms over the last 100 years, whether they possess cytotoxic activity or not. It is this section which may have more general appeal to the medicinal chemist for its inclusion of a number of unusual structures of potential pharmacological interest. Much of this information, however, is available in greater detail from other recent sources.

Northeastern University **Robert F. Raffauf**

Advances in Cancer Chemotherapy. Volume 1. Edited by Andre Rosowsky. Marcel Dekker, New York and Basel. 1979. vii + 297 pp. 15.5 × 23 cm. $29.75.

The initial volume of this new series contains five chapters on timely topics of cancer chemotherapy. The first review, by Herbert S. Schwartz, describes the biochemical action and selectivity of intercalating drugs, including the aminoacridines, ethidium, actinomycin D, the anthracycline glycosides, ellipticine, echinomycin, and bifunctional intercalating agents. The mechanism of DNA binding, biochemical effects, cellular responses and cytotoxicity, and animal and human studies are covered with particular attention to cardiotoxicity, a common problem with most, if not all, intercalacting agents.

The second chapter, by William D. Ensminger, Gerald B. Grindey, and Judith A. Hoglind, is concerned with antifolate therapy, including mechanism of action of methotrexate, high-dose methotrexate with leucovorin or thymidine rescue, and modulation of methotrexate toxicity by concurrent administration of thymidine. The following chapter, by Norman Jaffe and Stephen Howell, also deals with methotrexate, specifically with the use of high-dose methotrexate and citrovorum factor rescue.

The fourth chapter, by Orrie M. Friedman, Arthur Myles, and Michael Colvin, and dedicated to Dr. Arnold M. Seligman, details the current status of and future prospects for cyclophosphamide and related phosphoramide mustards, including chemistry, pharmacology, animal studies, clinical studies, and projections for the future.

The final chapter, by Howard E. Skipper, Frank M. Schabel, Jr., and Harris H. Lloyd, is a discussion of dose–response and tumor-cell repopulation rate in chemotherapeutic trials with sections on integration analyses, the problem of unknown variables, retrospective analyses of therapeutic trial results, the rate of selection of leukemic cells resistant to specific drugs and the implication thereof, and a prospective application of integration analyses.

All five chapters are excellent in their coverage and exposition of their subjects. One might question the percentage of the book devoted to antifolate rescue, but this bias is due no doubt, at least in part, to the interests of the editor and is certainly not a significant fault. Chapter 5 may appear to be of more interest to experimental chemotherapists and clinicians than to medicinal chemists, but the latter would do well to digest the implications of this analysis, which focuses on a major problem to the further advancement of cancer chemotherapy and the possible role of the medicinal chemist in its solution.

This well-presented book—at $29.75—is a must for anyone sincerely interested in cancer chemotherapy and desired informative reviews on important recent advances in the field.

Southern Research Institute **John A. Montgomery**

Modern Organic Elemental Analysis. By T. S. Ma and Robert C. Rittner. Marcel Dekker, New York. 1979. xiv + 518 pp. 16 × 23.5 cm. $45.00.

"Modern Organic Elemental Analysis" organizes in a single volume the method of organic elemental analysis applicable to different sample sizes and the techniques for the determination of all the elements in organic materials. The book is specifically geared to answer a wide variety of needs, such as those of (a) chemists in small laboratories who occasionally perform organic analysis; (b) practicing analysts in large establishments who may encounter difficult samples; (c) research analysts who wish to have a comprehensive review of the existing methods; (d) graduate students in analytical and organic chemistry who should have some knowledge of the evolution and current status of organic analysis; (e) teachers of advanced quantitative techniques who need a textbook containing a large variety of experiments; and (f) organic chemists who do not analyze their samples but wish to know how the analysis can be done.

Staff

Reagents for Organic Synthesis. Volume 7. Edited by Mary Fieser and Louis F. Fieser. Wiley, New York. 1979. 487 pp. 16 × 23.5 cm. $32.50.

This volume covers literature on reagents published in 1976 and provides references to new reagents as well as those the Fiesers had included in previous volumes. This excellent series on reagents is a handy reference to synthetic chemists, and this book is certainly a very valuable addition to previous volumes. This volume is the last to bear both authors names.

Staff

Synthetic Methods of Organic Chemistry. Volume 33. 1979 Yearbook. Edited by W. Theilheimer. S. Karger AG, Basel, Switzerland. 1979. xvi + 595 pp. 16.5 × 23 cm. $324.75.

This is the third volume of the seventh series containing mostly abstracts of papers published between 1976 and 1978. New references to material in the preceding volumes have, however, been included in the text. The index is cumulative for volumes 31–33 and also contains additional and revised entries to previous volumes.

Staff

Arzneimittelentwicklung. Grundlagen, Strategien, Perspektiven. Edited by E. Kutter. George Thieme Verlag, Stuttgard. 1978. xiii + 194 pp. 17.5 × 24.5 cm. DM 110.00.

The stated purpose of this book is to provide scientists with the broad background necessary to understand the design and actions of drugs. Toward this end, the author has selected concise authoritative reviews on recent developments and applications of techniques in pharmaceutical research, without the customary description of various drug classes. However, where necessary, specific compounds are presented and discussed in detail, as representative members of major drug categories, and numerous illustrations enhance the clarity of the ongoing discussion. Chapters dealing with strategies of drug design and the inherent "pharmacopolitical" considerations and long-term perspectives are particularly interesting and provide a wealth of informative insight.

Although this book is introductory in scope, a large amount of information is packed into a relatively small number of pages. Unfortunately, the small print and format employed make this book difficult to read.

In summary, the author has succeeded in fulfilling the prefatory promises of "Arzneimittelentwicklung" in a refreshingly new fashion; however, price and language requirements will limit the expected readership in this country.

Harvard Medical School **Werner P. Dafeldecker**

Aliphatic and Related Natural Product Chemistry. Volume 1. Specialist Periodical Reports. By F. D. Gunstone, Senior Reporter. The Chemical Society, Burlington House, London. 1979. xi + 308 pp. 15 × 22.5 cm. $55.00.

With this volume the specialists become subspecialists. This is the first in a new series of literature reviews which will give

natural products of aliphatic nature separate consideration. The older series "Aliphatic Chemistry" will continue under the new title "General and Synthetic Methods". Clearly, "keeping up with the literature" has become a profession in its own right.

The book includes chapters on natural olefinic and acetylenic compounds exclusive of those of marine origin, marine products, acyclic terpenoids, insect pheromones and other insect behavior-modifying substances, olefinic microbial metabolites, the prostaglandins, fatty acids, and lipids. The literature reviewed is that which appeared during 1976–1977. Thus, it is inevitable that much of what appears here will have been mentioned in other recently published reviews or books, as well as in volumes of some of the other series of "Specialist Periodical Reports" of the same vintage.

Coincidentally, it was noted through reference to the author index that the citations on pages 86, 91, and 150 are referable to S. Hashimoto not Y. Hashimoto who is correctly cited on pages 211 and 212.

Staff

Advances in Inorganic Biochemistry. Volume I. G. Eichorn and L. Marzilli, Eds. Elsevier, New York. 1979. xiv + 261 pp. $24.50.

The rapid growth of bioinorganic chemistry has spurred a flood of books of variable quality. Of these, the original volume "*Inorganic Biochemistry*" (edited by Eichorn) is virtually unparalleled in its breadth and depth of treatment of the subject. The present volume, "Advances in Inorganic Biochemistry", is the first of a series designed to accompany and update the justifiably popular original treatise. This standard has been upheld. The topics of the current volume are similar to the original, although covering limited subjects omitted earlier. Topics (and authors) include "Alkaline Phosphatase" (J. Coleman and J. Chlebowski), "Superoxide Dismutase" (I. Fridovich), "Copper Oxidases" (B. Reinhammer), "Cyt P450" (J. Groves), "B12 Methyl Transfer" (J. M. Wood et al.), "Inert Metal Nucleotide Probes" (W. Cleland and A. Mildvan), "Na^+,K^+ ATPase" (M. Grisham), and two reviews of "Hemerythrin" (L. Stenkamp and L. Jensen; J. Loehr and T. Loehr). All the authors are recognized experts in their fields. The reviews are generally well documented and clear, though some suffer from "advocacy" positions of the authors.

To preserve "timeliness", the book has been printed in camera-ready form. The overall quality is remarkably mistake free for such a format; Marzilli and Eichorn are to be congratulated.

While the limited scope of the present volume will limit its private ownership to "cognoscenti", its quality makes it (and probably the entire series) a must for any serious chemistry library. Further volumes in the series are in preparation, including a potentially excellent reference on techniques (edited by Wilkins and Darnall).

University of Rochester **George McLendon**

Mammalian Metabolism of Plant Xenobiotics. By R. R. Scheline. Academic Press, London, New York, and San Francisco. 1978. 16 × 23.5 cm. xi + 502 pp. $28.50.

Over the past several years the medicinal chemist, particularly the natural products chemist, has had at his disposal a voluminous literature on the biogenesis, isolation, characterization, and the possible biological roles of the secondary metabolites of higher plants. Here, after a lapse of some 20 years, is a new compilation dealing with the metabolic fate, in mammals, of these compounds, many of which constitute our useful drugs and known toxic substances. Thus, detailed studies of the metabolism of the cardiotonic glycosides, cannabinoids, opium alkaloids, and the antileukemic *Vinca* alkaloids, to mention a few examples, are reviewed along with those relating to a large number of other alkaloids, hydrocarbons, hydroxy and carbonyl compounds, O- and N-heterocycles, and sulfur derivatives.

Clearly, the book will be of interest to those whose specialties are drug metabolism and pharmacokinetics. It should also appeal to the medicinal chemist, the pharmacologist, the toxicologist, and to the natural products chemist whose interests go beyond mere isolation. The book is typeset, cleanly printed, well illustrated, and a welcome change from photoreproduced typewritten material. The publishers are to be congratulated for producing an attractive volume at an attractive price.

Northeastern University **Robert F. Raffauf**

Foreign Compound Metabolism in Mammals. Volume 5. Specialist Periodical Reports. Edited by D. E. Hathway. The Chemical Society, Burlington House, London. 1979. 14 × 22 cm. xv + 567 pp. $70.00.

This volume of the "Specialist Periodical Reports" series reviews literature published during 1976–1977. Although similar to its predecessor in overall content, the format of this volume has been changed to emphasize an organization based on various pharmacological classes of xenobiotics, as well as the more objective topics. One of the striking effects of this reorganization is the development of 13 separate chapters having 14 contributing authors, compared to the 4 chapters with only 5 authors contributing to the prior volume. Chapter titles (authors) are: 1. "Drug Kinetics" (P. G. Welling); 2. "Enzymic Mechanisms of Oxidation, Reduction, and Hydrolysis" (P. Bentley and F. Oesch); 3. "Enzymic Mechanisms of Conjugation" (P. C. Hirom and P. Millburn); 4. "Species, Strain, and Sex Differences in Metabolism" (J. D. Baty); 5. "Mechanisms of Chemical Carcinogenesis" (D. E. Hathway); 6. "Effect of Drugs on the Central Nervous System" (B. E. Leonard); 7. "Cardiovascular Drugs" (C. Rhodes); 8. "Sympathetic Agents and Bronchodilators" (L. G. Dring and P. Millburn); 9. "Anti-infective Agents" (P. Johnson and J. D. Coombes); 10. "Prostaglandins and Steroids" (G. R. Bourne and D. E. Hathway); 11. "Food Constituents" (D. E. Hathway); 12. "Agricultural Chemicals" (C. T. Bedford); 13. "Industrial Chemicals and Miscellaneous Organic Compounds" (C. T. Bedford).

Each chapter is again replete with structural diagrams and presents a comprehensive review (tabulation reveals a total of 3010 references) of pertinent literature in a concise and factual dialogue. An attempt has also been made by many of the authors to quickly develop background information relevant to a specific topic, making this volume more easily readable than its predecessor. However, the volume still seems most appropriate as a library reference book or as a personal copy only to those specifically working in the area of drug metabolism. The compound and author indexes are again an asset in this volume.

Arnar-Stone Laboratories **Paul W. Erhardt**

Drug Toxicity. Edited by J. W. Gorrod. Taylor and Francis Ltd., London. 1979. x + 326 pp. 16 × 24 cm. $32.50.

The material contained in this volume was originally presented at the Pharmaceutical Society's Easter School in 1978 on Aspects of Drug Toxicity. In the first chapter, J. W. Gorrod presents a textbook-like review of biotransformation processes as they relate to toxication reactions. Another chapter by D. V. Parke considers the toxicological consequences produced via enzyme induction or inhibition. There are several chapters indicating how these reactions can be modified due to physiological or pharmacological factors. Among the topics considered are age (W. R. Jondorf), genetics (A. R. Boobis), and diet (M. Angeli-Greaves and A. E. McLean). Several chapters are devoted to the effect of drugs and foreign compounds on specific organs or systems. The organs covered are the liver (T. F. Slater), the lung (M. Orme), blood and blood-forming systems (R. H. Girdwood), the nervous system (P. Jenner and C. D. Marsden), the fetus (F. Beck), the optical system (A. J. Bron), and the skin (R. H. Felix). The side effects associated with the formulation of drugs (M. J. Groves) and with the use of radiopharmaceuticals (D. H. Keeling) are topics of two other chapters. F. Beck discusses the terminology and general issues of teratogenesis in his chapter. C. I. Levene presents data which show how chemicals toxic to connective tissue have the potential to develop into useful therapeutic drugs in fibrosis.

The stated purpose of this book is to "enable practicing pharmacists and others to assess the likelihood of an adverse reaction having occurred, to propose mechanisms for its initiation, and to suggest means for preventing toxic reactions". However,

most chapters are too short (10–20 pages) and too general in nature, presenting some basic concepts and a few examples, to meet these goals. Several of the chapters are oriented principally toward biochemical mechanisms or animal models of toxicity and offer no clinically relevant information regarding diagnosis or antidotal therapy. In the preface, the editor remarks that in a world where we are increasingly exposed to small amounts of chemicals in our environment and food, the implications of the presented material go far beyond drugs and yet none of the chapters hint at such concerns. While each section is clearly written, the wide diversity of often minimally related topics leaves the reader with no clear focus on biochemical or clinical toxicology.

Northeastern University **Jeffrey B. Blumberg**

Encyclopaedia of Antibiotics. Second Edition. By John S. Glasby. Wiley, New York. 1979. 467 pp. 18.5 × 26 cm. $60.00.

As in the first edition, the author takes the broadest possible view of the term "antibiotic" to include substances which act as antibacterials, antifungals, antivirals, antitumor compounds, and anthelmintics having their origin in microorganisms, as expected, but in higher plants and marine fauna as well. Some of the listed compounds are synthetic or semisynthetic, though the distinction is not always made clear. In spite of these inclusions, only some 2000 compounds are listed, probably a third of those known from these several sources.

There are a number of inconsistencies in the presentation other than the absence of many well-known compounds. It is proposed that stereochemistry is now indicated where known, yet for many of the penicillins, cephalosporins, and tetracyclines it is not given. In some cases, detailed procedures for the fermentation and isolation techniques are given; in others it is not. For some of the lesser known compounds, a detailed antibiotic spectrum is given; not so for many of the more familiar compounds for which ready access to such data would be helpful.

A few of the more obvious errors, typographical or otherwise, may be cited: cloxacillin (p 177) is rendered as a free radical; phloroglucinol is rendered as "fluoroglucinol" (p 198); chromatographine (p 250) should be chromatographing; *Streptomyces hygroscopicus* and *S. hygroscopicum* are given on the same page (p 257); the structure for kalafungin (p 267) is given along with its stereochemistry, though the accompanying text states that the structure is not known; Professor Hassall's name (minomycins, p 305 ff.) is spelled correctly in the first reference and incorrectly thereafter.

The book is not an encyclopaedia; it is an abridged dictionary in which the medicinal chemist skilled in the art is invited to supply some of his own terms along with his own definitions. For the price, *caveat emptor*.

Northeastern University **Robert F. Raffauf**

The Politics of Contraception. By Carl Djerassi. Norton, New York. 1979. 384 pp. $10.95.

It is generally conceded that few drugs have had quite the impact on the mores of our society as have the oral contraceptives. The author of this book, Carl Djerassi, is closely identified with one of the two research groups which worked neck and neck in successfully bringing the first oral contraceptives to the market. Though his career has included many successes in unrelated fields, subsequent to that work, one gets the feeling that he has reserved a special place in his life to the pursuit of population control. As will be evident from the bibliography, he has published extensively on the subject in the general scientific press and has on occasion testified before Congress.

The volume at hand represents a general survey of population control and contraception, as well as how these are influenced by forces outside science and technology. Though the book is apparently aimed at the informed layman, it is written in such a manner as to be of interest even to one who has at one time been involved in the field.

Djerassi notes several times that it is unlikely that any new steroidal oral contraceptives will be introduced in the Western world in the forseeable future—the regulatory climate has shifted so far toward the side of safety that risk is inadmissible for a drug used to treat a nondisease. The impact of governmental and societal pressures on drug development form an underlying theme in the book. Through cast in terms of oral contraceptives, the chapters on the effects on drug development of regulatory agencies, the media, and the consumerists will be read with interest by all who face the frustrations of working in a no risk climate.

Since this is not in the strictest sense a technical book, it can be forgiven several chapters which can be read for sheer diversion. A reprint of the famous Armpitin article and a history of the origins of the Syntex Company come to mind immediately. In a different vein, but particularly appropriate in these Sinophillic times, Djerassi presents a fascinating account of current population control practices in China.

In sum, this book contains something of interest for almost all medical chemists. It is not often that a volume can be called a good buy in these pages—can you recall the last time you saw a review of a $10.95 book?

Mead Johnson Pharmaceuticals **Daniel Lednicer**

Encylcopedia of Chemical Technology. Third Edition. Volume 6. Edited by Kirk Othmer. Wiley, New York. 1979. xxiii + 869 pp. 19 × 26 cm. $120.00.

Volume 6 includes articles ranging from "Chocolate and Cocoa" to "Copper". There are several presentations of topics of particular interest to medicinal chemists, such as choline, cholinesterase inhibitors, coffee, and contraceptive drugs. The latter presentation by L. J. Chinn and F. B. Colton is particularly noteworthy and timely, including up-to-date information on such naturally occurring physiologically active substances as the prostaglandins, male contraceptive drugs, and a list of 129 components of contraceptive drugs and intermediary products together with their Chemical Abstracts Service registry numbers. Such articles make this encyclopedia a must for any reference library wishing to provide their readers with current chemical information.

Staff

Proceedings of the Second World Congress on Pain, Montreal, August, 1978. Advances in Pain Research and Therapy. Volume 3. Edited by John J. Bonica, John C. Liebeskind, and Denise G. Albe-Fessard. Raven Press, New York. 1979. xxvii + 956 pp. 16 × 24 cm. $75.00.

This latest volume in the "Advances in Pain Research and Therapy" series provides a comprehensive review of the current state of the field. Topics discussed include the neurophysiology of nociception, pain related to peripheral nerve lesions, orofacial and head pain (including headache), endogenous mechanisms of pain inhibition (both clinical and basic), modulation of pain by afferent simulation, low back pain, and measurement of pain in humans and animals.

This volume will be of interest to clinicians who manage patients with specific pain problems, as well as researchers in the areas bearing on the field, including neurophysiology, neurology, neurosurgery, and psychiatry.

Staff

Condensed Pyrazines. Volume 35. The Chemistry of Heterocyclic Compounds. By G. W. H. Cheeseman and R. F. Cookson. Edited by A. Weissberger and E. C. Taylor. Wiley-Interscience, New York. 1979. xii + 835 pp. 15.5 × 23.5 cm. $115.00.

This volume continues the subject matter of the fifth volume (authored by J. C. E. Simpson in 1953) of this series. Chapters 1–18 concern the quinoxaline nucleus as variously substituted and/or reduced; chapters 35–40 describe the pyrrolo-, imidazo-, pyrazolo-, benzo[H]-, and pyridoquinoxalines; chapters 19–34 survey systems containing fused heterocyclic rings—such as

pyrrolo, imido, pyrazo, furo, oxazolo, isoxazolo, thieno, thiazolo, and isothiazolo rings—with pyrazine.

Each chapter, preceded by a topical outline, is comprised of descriptive material, tables, and references. The descriptive material, divided and subtitled by topics, is a smooth liaison of text and diagrams; the tables include data on molecular formulas, substituent names, melting points, and reference numbers; the references cover the period 1949–1975 with "...additional material from papers published in 1976 and 1977...". The expertise of the authors is evident in this area of research, for their published works are cited 165 times.

The book is an account or description of published research, rather than a critical analysis, about the 40 chemical systems which are surveyed with a presentation that is a model of succinct precision, utilizing perfectly spaced and placed illustrative diagrams. The expert can scan many of the pages in a brief, all-absorbing glance; so skillfully are words and illustrations interwoven. A useful subtopic included in many chapters is "Uses", sections which list the utility of these fruitful compounds as analytical reagents, antioxidants, catalysts, dyes, fungicides, inks, insecticides, medicines, pigments, photosensitizers, and polymers.

A few errors were observed, such as a typo: p 276, **49** instead of **46**; lack of parallel construction: p 287, nitroso derivative of *cis*-decahydroquinoxaline, but dinitroso derivative of *trans*-decahydroquinoxaline; an incorrect reaction: p 268, Scheme 3 directly yields a tetrahydrodiazepine (p 273, **39**), not a tetrahydroquinoxaline derivative [G. H. Fisher and H. P. Schultz, *J. Org. Chem.*, **39**, 631 (1974)]. Missed references, two are noted [D. Gracian and H. P. Schultz, *J. Org. Chem.*, **36**, 3989 (1971) and G. H. Fisher and H. P. Schultz, *ibid.*, **39**, 635 (1974)], resulted in incomplete coverage of chiral centers in reduced quinoxalines.

The book ends with an author index, in which each of several authors of a paper is separately listed, and a subject index of substances described in the text, not of compounds appearing in the tables.

The volume is well done and is a worthy addition to the illustrious and useful series of which it is a member. Even at $115 the heterocyclic chemist needs this volume. The book certainly belongs in the library, available to other chemists. One hopes that less than a quarter of a century will elapse before the next update of the literature of quinoxaline chemistry occurs and that it will be as well executed as "Condensed Pyrazines".

University of Miami **Harry P. Schultz**