Book Reviews*

Liquid–Liquid Equilibrium Extraction. Part A. By J. Wisniak and A. Tamir (Ben Gurion University of the Negev, Israel). Elsevier Scientific Publishing Co., Amsterdam and New York. 1980. xxii + 1252 pp. $183.00.

The subtitle, "A Literature Source Book", accurately identifies the nature of this work as a bibliography. Nearly 5000 references are included. With this amount of material, it is not feasible to include titles or annotations, and accordingly the book is constructed as tables with entries in formula-index order. If one is interested in, for example, the distribution of *tert*-butylamine between water and tetraisopropyl orthosilicate, one locates the entries under $C_4H_{11}N$ and follows down the column until the desired compound is reached, following which are the solvent systems for which distribution data have been published. There one finds simply a reference number to the list found at the back of the book.

The table and the bibliography are presented in computer print-out form, without subscripts or capital and lower-case letters. The result is hard on the eyes and irritating to sort through, but it must have lowered costs significantly. Fortunately, this is not the sort of book in which one does a lot of reading.

The authors point out that extraction as a method of separation requires much less energy than distillation, evaporation, or fractional distillation, and the availability of this key to the literature should encourage the search for methods of reducing energy consumption in industrial processes.

Kirk-Othmer Encyclopedia of Chemical Technology. Volume 11. Edited by M. Grayson and D. Eckroth. John Wiley & Sons, New York. 1980. xxvi + 995 pp. $145.00.

This volume begins with the completion of the section on organic fluorine compounds begun in Vol. 10, and continues through foams, food chemistry, formaldehyde, fuels, fungicides, and fusion energy, among other topics, to complete the letter "F". The "G" part is also begun in this volume, from gas subjects, gasoline and gelatin through gems, genetic engineering, and germanium to glass, glue, glycols, and gold. There are altogether 40 entries, in the form of comprehensive reviews written by recognized experts and including large amounts of concrete information in text, tables, and diagrams, all documented with substantial bibliographies. The chemistry included is rigorous and correct, and is not subordinated to the engineering aspects, although the balance varies with the subject. Adequate sections on economic aspects are included when appropriate. The high standard of the earlier volumes of this major resource work is maintained.

Organic Electronic Spectral Data. Volume XVI. 1974. By U. P. Phillips, D. Bates, H. Fever, and B. S. Thyagarajan. John Wiley & Sons, New York. 1980. xiii + 1126 pp. $90.00.

The compiling of the endless stream of published data on ultraviolet/visible spectra of organic molecules goes on steadily, year by year producing these volumes. The established pattern of formula-index order of presentation is followed, and the medium, the wavelength maxima, the extinction coefficients, and the literature references are set out in tabular form. There is thus no text beyond a page on Organization and Use of the Data, and an index is not necessary. An enormous quantity of information is thus presented succinctly and economically (bearing in mind the fact that the probable sales of the book will amount to only 650 copies, virtually entirely to technical libraries).

Rearrangements in Ground and Excited States. Volume 1. Edited by P. de Mayo. Academic Press, New York. 1980. xiv + 480 pp. $84.00.

The Foreword to this book begins, "This volume had an elder sibling, but that was by another sire."—having reference to "Molecular Rearrangements", published by John Wiley & Sons in 1963–1964. It is offered as a collection of essays that are "intended to be critical, stimulating, personal and creative". The subjects have been chosen to reflect the major areas of growth of chemistry over the past 15 years, and particularly the phenomenal resurgence of photochemistry, as implied in the title.

This volume contains six essays, embracing rearrangements of carbocations, carbanions, free radicals, carbenes and nitrenes, gas-phase ions, and biradical pathways in thermal unimolecular rearrangements. They are contributed by 12 chemists from the United States, Canada, United Kingdom, and the Federal Republic of Germany. They have tried to avoid unnecessary duplication of material available elsewhere, including the "elder sibling", but the result is much more than a set of simple supplements. Viewpoints have changed, and understanding has progressed, so that it is now possible to present subjects with fresh insight, reflecting contemporary scientific sophistication. It is indeed a stimulating volume, and it is independently indexed, so that it can be used without recourse to the other volumes. There are, in fact, three volumes to this work; Vol. 2 and 3 will be reviewed separately.

Formation of C–C Bonds. Volume II. Introduction of a Carbon Chain or an Aromatic Ring. By J. Mathieu and J. Weill-Raynal. Georg Thieme Publishers, Stuttgart. 1975. Distributed in the USA by Heyden & Son, Inc., Philadelphia, PA. xiv + 639 pp. $125.00.

Volume I of this work, "Introduction of a Functional Carbon Atom", was favorably received, and created anticipation for its continuation. The present subject is explained as "reactions allowing a carbon chain or an aromatic ring to be attached to a carbon skeleton by alkylation, arylation, or alkylidenation". Reactions accomplishing these conversions are organized systematically, using the concept that the nucleophilic molecule is the substrate and the electrophilic one is the reagent. However, the Table of Contents in seven pages lays the whole subject before the reader in both words and structures, such that it can be very quickly scanned for what is wanted.

This book is essentially a group of annotated tables, in which representative examples of reactions are displayed with essential conditions and yields. The added structural parts are shown in red on the product side of the equations, making it very easy to follow. Alongside the reactions are notes, ranging from short sentences to substantial paragraphs, giving information on scope, with references. In this way it has been possible to present over 1500 reaction schemes in an efficiently retrievable form. The references are mostly recent, up to 1974, but some as far back as the 19th century are included where appropriate.

The work has some of the character of a cumulative "Theilheimer" in a narrowly defined area; it is easier to use because of its organization by subject rather than year, and it presents a more integrated perspective. It may seem expensive, but it is a large book and very well-produced. Chemists with a particular synthetic interest might find it better value for the money than, say, three cheaper (and smaller) books. Library copies are likely to be heavily utilized.

Formation of C–C Bonds. Volume III. Introduction of an α-Functional Carbon Chain. By J. Mathieu and J. Weill-Raynal. Georg Thieme Publishers, Stuttgart. 1979. Distributed in the USA by Heyden & Son, Inc., Philadelphia. xii + 563 pp. $172.00.

This volume follows the same pattern as Vol. II, and the remarks in the accompanying review apply equally well here. There are 1235 formula schemes in 300 tables. The title is chosen to encompass such staple reactions as α-haloalkylation, α-hydroxyalkylation, acylation, etc., and thus includes many classical reactions. The examples are chosen to illustrate the range of experimental methods, including the many new reagents and catalysts that have been introduced in more recent years. The literature sources cited span the world of chemistry equitably from east to west, and include many obscure journals, but a casual perusal suggests that the patent literature has been neglected. However, reviews and books are cited where they exist.

The authors do not indicate whether this is a final volume or if others are planned. It surely has been an exhausting effort for the authors, and they may understandably be unsure how long their energy will hold out. It is to be hoped that they will continue, for these books constitute a convenient, efficient means of systematic literature retrieval, and are also full of gems for the browser to uncover. Libraries serving organic chemists should certainly have this set.

Annual Reports in Medicinal Chemistry. Volume 15. Edited by H.-J. Hess. Academic Press, New York. 1980. xiii + 346 pp. $22.50.

This series, sponsored by the Division of Medicinal Chemistry of the ACS, has become an important means of keeping abreast of the field. As usual, it consists of contributed reviews, organized into six categories: CNS Agents; Pharmacodynamic Agents; Chemotherapeutic Agents; Metabolic Diseases and Endocrine Function; Topics in Biology; and Topics in Chemistry and Drug Design. There are altogether 31 reviews, and many well-known researchers can be recognized among the contributors. Access to specific content is facilitated by an index of com-

*Unsigned book reviews are by the Book Review Editor.

pound names and code numbers, and access to previous volumes is aided by a cumulative index of chapter titles. The chapters are more than bare reviews, and have a critical function that aids the reader in assessing the information given. The quality of presentation is high, and the chemistry is generally accurately presented, except for an occasional unfortunate lapse, such as use of the term "pyridyl diazonium ion" for a species that is neither diazonium nor an ion, but a neutral diazoalkane, and a few other nomenclatural horrors. This will continue to be a well-used work.

Advances in Heterocyclic Chemistry. Volume 26. Edited by A. R. Katritzky and A. J. Boulton. Academic Press, New York. 1980. ix + 247 pp. $32.00.

The indefatigable editors of this respected series have once again produced a useful addition to the review literature, with the collaboration of four contributors: C. A. Ramsden (Heterocyclic Betaine Derivatives of Alternant Hydrocarbons); O. Meth-Cohn and B. Tarnowski (Thiocoumarins); and W Friedrichsen (Benzo[*c*]furans). None of these subjects has been reviewed in this series before.

Ramsden must have had a difficult time in settling upon a suitably descriptive yet brief title for his contribution, which deals with a class of heterocycle very little known until recently. The substances considered are dipolar molecules for which a conventional covalent structure cannot be written; a simple representative is *N*-methylpyridinium-3-olate. The treatment stresses the importance of the molecular orbital approach in considering the chemistry of such systems.

By thiocoumarins is meant benzothiopyrones, sulfur replacing the ring oxygen. They have a wide application as pharmaceuticals. The benzo[*c*]furans, also known as isobenzofurans, are formally derived from the orthoquinone structure, and are accordingly highly reactive. The chemistry of these seldom-encountered substances is surprisingly extensive.

One of the chapters is stated to review the literature to Decemeber 1979, another to mid-1978, but the third one does not give this help to the reader (some references to 1977 can be found, however).

Organization for Radiation Protection: The Operations of the ICRP and NCRP 1928–1974. By Lauriston S. Taylor. National Technical Information Service, U.S. Department of Commerce, Springfield, VA. 1979. xvii + a 4-inches thick stack of pages. $25.00.

Although records on the subject have not been kept, it seems entirely safe to say that this book is the largest (i.e., thickest and heaviest) book to have been handled by the book review section of this journal. It is quite extraordinary that such work is the product of one man's efforts.

The entire book is a narrative account of the "inner process of the development of the recommendations and standards" for the protection of people from harmful effects of ionizing radiation, derived largely from the personal archives of the author, who has been an active participant in the deliberations of the International Commission on Radiological Protection and the National Council on Radiation Protection and Measurements since 1928. The account is chronological, and begins with 1895, when the potential danger of X-rays was first recognized. Notes made at meetings, memos, and letters provide much of the material, and give a vivid picture of the back-and-forth, give-and-take nature of evolution of the subject. If one is not daunted by the sheer size of this book, one will find the content fascinating and frequently entertaining, improbable as that sounds. Since radiation as an environmental pollutant is perhaps the earliest instance of formal concern about such matters, the development of present rules and recommendations for protection from radiation has much to teach us with respect to regulation of the many other types of pollution which society has in recent years begun to deal with.

There is a subject index, but it is only one page longer than the detailed table of contents. A glossary of acronyms is thoughtfully provided to help the reader sort out the references to the many societies, commissions, boards, agencies, etc.

Survey of Progress in Chemistry. Volume 9. Edited by A. F. Scott. Academic Press, New York. 1980. x + 271 pp. $35.00.

This series is "an attempt to improve the transmission of new material to the college chemistry teacher". The four contributions that comprise the present volume are well-chosen for current significance. Two-phase Reactions in Organic Chemistry, by M. Makosza, presents phase-transfer catalysis, interfacial reaction, etc., but does not include conventional heterogeneous catalysis. Intercalation Chemistry, by M. S. Whittingham and M. B. Dines, deals with aluminsilicate minerals, graphite compounds, etc. Solar Photochemical Fuel Formation, by P. R. Payson, concentrates on decomposition of water into hydrogen and oxygen and the chemistry of the various ways in which the photoprocess has been catalyzed. Heterocyclic Compounds in Alkaloid Synthesis, by V. Snieckus, is by far the largest chapter. It makes use of alkaloids and their synthesis as a means of organizing and presenting the chemistry of the most important nitrogen heterocycles other than purines. Mechanism and description are presented in a balanced, critical way.

There is a short subject index, the majority of the entries in which appear to be names of alkaloids, in all their nearly unpronounceable arcane manifestations.

New Synthetic Methods. Volume 4. Verlag-Chemie, Weinheim and New York. 1979. 270 pp. $40.00.

This volume in small format consists of eight articles reprinted and repaginated from recent numbers of *Angewandte Chemie*. The subject matter varies widely, from heteroaromatic betaines to phosphinidenes, from bridgehead olefins to radical-anions in substitution reactions, and most chemists are therefore likely to be interested in only one or two of the reviews. these hard-bound books put these articles in more readily storable and retrievable form, and they are certainly useful, but the price nevertheless seems rather stiff for reprinted material.

Elsevier's Dictionary of Pharmaceutical Science and Techniques. Volume 2. Materia Medica. By A. Sliosberg. Elsevier Scientific Publishing Co., Amsterdam and New York. 1980. x + 552 pp. $122.00.

This is a dictionary in six languages: English, French, German, Spanish, Italian, and Latin. The basic half of the book is arranged in alphabetical order of the English term with the foreign equivalents under each. There are then six sections, one for each language, containing only the terms in that language plus a numerical reference to the reference in the basic section. Thus one can quickly identify a term no matter in which of the six languages it is encountered. In the basic section, various equivalents are given where appropriate, such as "abscess root; American Greek Valerian; false Jacob's Ladder; sweat root". Natural products dominate the entries, but terms from absolute alcohol and absorbent gauze to zinc tannate and zolamine are included. There are no definitions and no structural formulas: only translations.

Quantum Biology Symposium No. 5. 1978. Proceedings. Edited by P.-O. Löwdin and J. R. Sabin. John Wiley & Sons, New York. 1978.

This softbound volume of proceedings of the symposium held at Sanibel Island contains the texts of 37 papers plus introductory remarks and an opening lecture by Henry Eyring, About Linus Pauling, to whom the symposium was dedicated. The papers deal with such subjects as carcinogenicity, self-organization, theoretical approaches to the interactions of large molecules, and other topics pertinent to the relation between chemical structure and biological activity. The frontispiece is a fine photograph of Professor Pauling, and the first paper, appropriately, is titled Confirmation of Pauling's Theory that Vitamin C Improves Immunity to Infections.

Structure and Properties of Amorphous Polymers. Edited by A. G. Walton. Elsevier Scientific Publishing Co., New York and Amsterdam. 1980. viii + 231 pp. $53.75.

This volume is the Proceedings of the Second Cleveland Symposium on Macromolecules, held in 1978. It consists of the texts of 13 lectures, including figures, tables, and references. The topics are of a physical nature: viscoelasticity, deformation, relaxation, fracture, thermodynamics, compatibility. It is good to find a subject index, a helpful feature not always provided in volumes of proceedings.

Triazoles: 1,2,3. By K. T. Finley (SUNY Brockport). John Wiley & Sons, New York. 1980. ix + 349 pp. $100.00.

This is a volume in the series "Chemistry of Heterocyclic Compounds". It covers a subject that has been reviewed five times in the last 30 years, but activity in the field has been pronounced, and the author states that over 9000 monocyclic triazoles have been indexed by Chemical Abstracts in the past seven years alone. The author's purpose is to give "an essentially complete coverage of syntheses through Chemical Abstracts 1976". Indeed, it would not have been inappropriate to title the book, "Synthesis of 1,2,3-Triazoles", for properties are not discussed and are rarely even given, and reactions are deemphasized. This fits the pattern of publications, however, for most published research on triazoles is directed toward their synthesis rather than subsequent transformation.

The book is divided into chapters according to structural type, and embraces triazolines and triazolium compounds as well. Each chapter has a narrative section in which the various synthetic methods are described, with plentiful equations and set in perspective. The bulk of each chapter consists of tables in which specific compounds are listed with literature references to their synthesis (yields and properties are not included). The author's aim has been to enable the reader to determine from this book alone if a given compound has been prepared and to provide a reference to the best method for its preparation. This approach assumes that the user will make use of the more recent existing reviews

to complement the present volume, and it is certainly an efficient way of providing a useful literature resource without requiring a huge expenditure for coverage of material that may already be available in most technical libraries.

There is an index which contains entries for types of compounds and processes, and for all the authors cited.

Spectroscopic References to Polyatomic Molecules. By V. N. Verma (University of Khartoum). IFI/Plenum Press, New York. 1980. 126 pp. $75.00.

By "polyatomic molecules", the author means "organic ring compounds", and by "spectroscopy", he intends infrared, Raman, ultraviolet absorption and emission, fluorescence, and phosphorescence spectroscopy. Thus, neither NMR nor mass spectroscopy is included. For each of about 900 compounds there is given a list of references, each identified as to the kind of spectroscopy contained in it. The entries are in alphabetical order, from acenaphthene to xylidine, and include derivatives of benzene, naphthalene, polynuclear hydrocarbons, and many nitrogenous heterocycles, but not sulfur-containing ones (i.e., neither thiophene nor thiazole is included). The references are drawn from a very broad range of sources, some of which are not easy to obtain or find, and the compilation has special value on this count. The latest references seem to be from 1978; they do not include references to compilations, such as the Sadtler spectra, but only to primary sources. One has come to expect high prices for reference books, but this one, at 60¢ per page of photoreproduced typescript, is a real shocker, and it cannot be recommended as a fair value for the price.

Compendium of Organic Synthetic Methods. Volume IV. By L. G. Wade, Jr. John Wiley & Sons, New York. 1980. xvi + 497 pp. $22.50.

This series was begun in 1971 by Ian and Shuyen Harrison, who retired after the second volume in favor of a new team, Hegedus and Wade, one member of which has hung on to give us this latest volume. It deals with the literature of 1977, 1978, and 1979, following the successful style of the earlier volumes. Three-fifths of the book is devoted to 14 chapters, each concerned with a single functional group, from arctylenes to olefins; other than the familiar C, H, and O functions, amines, amides, nitriles, halides, and sulfonates are included. The remaining two-fifths deals with difunctional combinations.

Most readers are probably familiar with the nature of this series: equations of structural formulas, including essential reagents and conditions, with yields and the literature reference, all presented in a form suited to quick visual comprehension. Apart from the preface and 4-page introduction, there is no discursive text. The organization, according to type of functional transformation, is logical and easy to follow. Those who have used the three previous volumes will not only know at once how to get the most out of this one, but will appreciate the great help of this series to the synthetic chemist wishing either to keep abreast of recent developments, or to retrieve a specific piece of information. The price must be considered exceptionally reasonable, and makes the book freely available for individual purchase.

The Biosynthesis of Mycotoxins. A Study in Secondary Metabolism. Edited by Pieter S. Steyn (National Chemical Research Laboratory, Council for Scientific and Industrial Research, Pretoria, South Africa). Academic Press, New York. 1980. xv + 432 pp. $44.00.

In his Preface to "The Biosynthesis of Mycotoxins", the editor, Dr. Pieter Steyn, points out that fungal mycotoxins are inherently a heterogeneous group of metabolites of diverse structure and biogenesis. This heterogeneity of topics is both a strength and weakness of the resulting collection of essays: The strength is reflected in the variety of experimental approaches which are illustrated and the excellence of a number of the reviews, particularly those of Dr. Heinz Floss on ergot alkaloids, Dr. Christoph Tamm on trichothecene antibiotics, and Dr. Steyn himself on the highly carcinogenic aflatoxins. The weakness stems from the lack of any unifying conceptual theme, other than the toxic properties of the metabolites themselves, and the tendency to repeat certain material unnecessarily. For example, the use of ^{13}C NMR is reexplained several times throughout the book. As in most currently published reviews few of the authors have gone to the trouble of pointing out errors or deficiencies in the literature, such as the ill-conceived cyclopropyl cation mechanism for farnesyl pyrophosphate isomerization shown on p 88. By contrast Dr. Steyn's own detailed description of the techniques used to assign the ^{13}C NMR spectra of averufin and sterigimatocystin is a valuable guide to the potential pitfalls of work in this challenging area. In spite of the above reservations Dr. Steyn and his collaborators have produced an excellent source work which is both authoritative and thoroughly referenced for the use of investigators in the fields of natural product biosynthesis and mycotoxin research.

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The Systematic Identification of Organic Compounds. Sixth Edition. By R. L. Shriner, R. C. Fuson, D. Y. Curtin, and T. C. Morrill. John Wiley & Sons, New York. 1980. xviii + 511 pp.

Few texts in chemistry have been in use over 40 years and the most recent update of this classical text, the 6th edition, suggests that it will be an invaluable reference text for undergraduate and graduate students alike for a number of years to come. The latest edition provides a useful blend of practical information with modern techniques and separation methodology. Thus the 6th edition includes the distinction between "yellow" and "red" nitric acid between the same covers that discuss HPLC. In general all the useful chemical and solubility classifications and related characterizations of many of the previous editions are included. Much of this valuable material tends to be slighted in other laboratory manuals, where the emphasis is on modern instrumentation and as a result students often lose sight of the value of the art of basic chemistry. This text certainly corrects that gap.

This edition does not repeat fundamental theory of IR and ^1H NMR that is found in basic undergraduate texts, but puts its emphasis on special spectral simplification techniques and applications as appropriate throughout the book. For example, the potential of lanthanide shift reagents and ^{13}C NMR in solving structural problems is discussed.

Furthermore, this text includes useful data on hazardous materials as well as methods for avoiding potential problems, i.e., a procedure for testing for peroxides, etc., and makes it easier for an independent student or researcher to work more safely.

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Advances in Lipid Research. Volume 17. Edited by Rodolfo Paoletti (Institute of Pharmacology, Milan) and David Kritchevsky (The Wistar Institute). Academic Press, New York. 1980. xi + 308 pp. $31.00.

This is another in a series of volumes containing authoritative reviews on various aspects of lipid research. The first two chapters, by A. R. Tall and D. M. Small and by A. Nicoll, N. E. Miller, and B. Lewis, respectively, discuss the role and metabolism of high-density lipoproteins (HDL), a subject of much current interest because of evidence that HDL protect against atherosclerotic cardiovascular disease. The authors provide good coverage of the composition, structure, and metabolism of HDL, as well as their role in cholesterol and triglyceride transport in relation to cardiovascular disease. Because the two chapters deal with similar themes, there is inevitably some overlap of subject matter.

The third chapter, by H. S. Sodhi, B. J. Kudchodkar, and D. T. Mason, is concerned with cholesterol metabolism and clinical hyperlipidemias. The approach taken by the authors was to use data from the literature to compare various aspects of cholesterol metabolism in subjects with elevated plasma levels of cholesterol and/or triglycerides, and those with normal plasma cholesterol and triglyceride levels.

Although it has been known for nearly 30 years that the level of cholesterol in plasma can be lowered by feeding polyunsaturated fat, the mechanism is still unclear. This topic is discussed in the next chapter by R. Paul, C. S. Ramesha, and J. Ganguly. The possibilities considered include: reduced absorption of cholesterol; redistribution of cholesterol from blood to tissues; reduced synthesis of cholesterol; and increased excretion of cholesterol and its metabolites. The authors conclude that the weight of evidence favors the latter possibility.

The next chapter, on lipid peroxidation in mitochondrial membrane, is by a group of Russian authors, Y. A. Vladimirov, V. I. Olenev, T. B. Suslova, and Z. P. Cheremisina, who include in their review a summary of publications from the Russian literature. The chapter deals with the initiation, propagation, termination, and control of lipid peroxidation, its effects on structure and function of biological membranes, and its possible role in various disease states and cellular control mechanisms.

The final chapter, on membrane cooperative enzymes as a tool for investigation of membranes, is by an Argentinian scientist R. N. Farias. The discussion is concerned with three enzymes, acetylcholinesterase and $(Na^+ + K^+)$-ATPase of rat erythrocytes and (Ca^{2+})-ATPase of *E. coli*. These enzymes occupy different positions in the membranes and the author describes evidence that various factors, such as diet, pesticides, or hormones, which alter the fluidity or other properties of membranes, also influence the cooperative behavior of these enzymes.

The book contains an author index, a subject index, and a summary of the contents of previous volumes in this series.

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