

Page 6868, column 2, line 13: the phrase "... while bands of symmetry A lead to positive $\Delta\epsilon$ " should be omitted. This part of the sentence was printed twice.

Page 6869, ref 36 should read as follows: "Note that $G = 7.6$ corresponds to an angle $\phi \approx 40^\circ$, while x-ray determinations²⁶ show ϕ to be 63° ...".

Crystal and Molecular Structure of Perfluorobenzof[1,2:3,4:5,6]tricyclobutene [*J. Am. Chem. Soc.*, **99**, 6916 (1977)]. By RANDOLPH P. THUMMEL,* JAMES D. KORP, IVAN BERNAL, RICHARD L. HARLOW, and R. L. SOULEN, Departments of Chemistry, University of Houston, Houston, Texas 77004, University of Texas, Austin, Texas 78712, and Southwestern University, Georgetown, Texas 78626.

We would like to point out that a parallel study [R. E. Cobblestick and F. W. B. Einstein, *Acta Crystallogr., Sect. B*, **32**, 1908 (1976)] on the same system carried out at room temperature shows an excellent agreement of structural parameters.

New Synthetic Reactions. Stereoreversed Cyclobutanone Formation Utilizing Selenoxide as a Leaving Group [*J. Am.*

Chem. Soc., **99**, 7601 (1977)]. By BARRY M. TROST* and PAUL H. SCUDDER, Department of Chemistry, University of Wisconsin, Madison, Wisconsin 53706.

Table I, last entry should read <2 (Normal) and >98 (Reverse).

On p 7604 (2nd column, 4th and 5th lines from bottom) and in Table VI, compound no. **9** and **10** should be **29** and **30**. **7** should be



On the Regioselectivity of the Catalyzed and Uncatalyzed Diels-Alder Reaction [*J. Am. Chem. Soc.*, **99**, 8816 (1977)]. By BARRY M. TROST,* JOACHIM IPPEN, and WILLIAM C. VLADUCHICK, Department of Chemistry, University of Wisconsin—Madison, Madison, Wisconsin 53706.

Page 8117, Table I: The ratio for entries 3, 4, and 6 in the last column should have appeared as $>50:<1$ not as $>50:<31$.

Book Reviews*

Advances in Heterocyclic Chemistry. Volume 21. Edited by A. R. KATRITZKY and A. J. BOULTON. Academic Press, New York, N.Y. 1977. ix + 486 pp. \$49.00.

The selection in this latest addition to the series consists of four chapters on structures not reviewed before, three on classes that have been reviewed before (in this series or elsewhere) and are thus updating contributions, and one on a reaction type.

Tellurophenes and thienopyridines are relatively new subject areas and thus have required only short reviews. The cyclic peroxides, 1,2-dioxetanes, and cyclic hydroxylamines, isoxazolidines, are almost as new to the research world, and also needed only short chapters for thorough review. Another chapter reviews pyrrolopyrimidines, the chemistry of which has burgeoned in the last 20 years. A short chapter on oxazolones brings that subject up to date since it was originally reviewed in this series in 1965. The chemistry of tetrazoles, the last major review of which appeared in 1965 in Elderfield's "Heterocyclic Compounds" series, requires over 100 pages to bring the subject abreast of the times. Finally, [2 + 2] cycloaddition and cycloreversion is the subject of a substantial chapter which concentrates on those examples in which a heterocyclic nucleus is itself one partner in cycloaddition.

The chapters have been contributed by thirteen experts from six countries. They have done a generally fine job, although unfortunately not all of them have disclosed the date on which their literature searches terminated.

Analysis of Essential Oils by Gas Chromatography and Mass Spectrometry. By YOSHIRO MASADA (Kyoto College of Pharmacy). Wiley/Halsted Press, New York, N.Y. 1976. ix + 334 pp. \$37.50.

This is actually a second, revised edition of a book first published in Japanese in 1968. The bulk of the book (90%) is in English this time. The author's prime motivation for this edition was the large amount of new information that has accumulated, and the greatly increased application of the methods. Most of the book takes up individual essential oils, such as sage oil, in arrangement according to botanical source. For each is given a one-page general description, including origin, significance, use, etc., tables of physical constants, mass spectra

of some components, a full-page gas chromatogram taken by the author, and an extensive bibliography. This part is all in English with a short Japanese summary for each oil. Part Two of the book consists of short, general discussions of essential oils, gas chromatography, and mass spectrometry in Japanese. An untitled appendix lists a large number of component compounds by name and structure, in no discernible order, with their boiling points and relative retention times (limonene = 1.00).

Analysis and Testing of Adhesive Bonds. By G. P. ANDERSON, S. J. BENNETT, and K. L. DEVRIES. Academic Press, New York, 1977. xviii + 255 pp. \$21.00.

This book is oriented toward engineering and is primarily concerned with fracture mechanics. Of interest to chemists is Chapter 5, "Chemical and Physical Aspects of Adhesive Fracture."

Analytical Aspects of Mercury and Other Heavy Metals in the Environment. Edited by R. W. FREI and O. HUTZINGER. Gordon and Breach, New York, N.Y. 1976. vii + 196 pp. \$19.50.

This book is a response by analytical chemists to the rise in concern with contamination and the many questions that it has raised about validity of past results, reliability and precision of present methods, suitability of methods to a particular application, sampling methods, etc. It is a collection of reviews contributed by an international assortment of chemists. In addition to the assessments of different analytical methods, there is an attempt to place the subject in perspective. In the opening chapter, for example, it is pointed out that the earth receives an estimated 100,000 tons of mercury in rain and snow annually, arising largely from the natural transport of surface deposits of mercury ores. There are extensive bibliographies, and some experimental directions. The lack of an index is noticeable.

The Chemistry and Technology of Leather. Volume 4. Edited by F. O'FLAHERTY, W. J. RODDY, and R. M. LOLLAR. Robert E. Krieger Publishing Co., Huntington, N.Y. 1977. viii + 440 pp. Price ?

This volume originally appeared in 1965 as part of the ACS Monograph Series. It has been out of print, but has now been reprinted by a new publisher. It is largely devoted to analytical aspects of leather and its processing.

* Unsigned book reviews are by the Book Review Editor.

Biomedical Applications of Polymers. Edited by H. P. GREGOR. Plenum Press, New York, N.Y. 1975. xii + 227 pp. \$22.50.

This is the proceedings of an ACS symposium held in 1973. The papers are reproduced from typescript and include tables, figures, and references. There is a two-page index.

Fundamentals of Fire and Explosion. By DANIEL R. STULL (Dow Chemical Co.). American Institute of Chemical Engineers, New York, N.Y. 1977. iv + 124 pp. \$10.00.

This paperbound book was written to bring together information on the technology of explosions from the standpoint of safety and avoidance of catastrophe. In twelve chapters, augmented by appendices, the author discusses the thermodynamics and kinetics of explosions, ignition and flames, different types of explosions, evaluation of hazard potential, blast effects, and protection and prevention. There are many figures, and the appendices contain much tabulated information, especially on auto-ignition temperatures.

In these times of increased consciousness of safety, this work is most appropriate. Although its emphasis is on industrial situations, much of its content is directly pertinent to academic research and classroom laboratories, and it can be profitably read by those in charge of them. It is unfortunate, however, that the book is flawed by the occasional appearance of chemical structures that have been known to be wrong for 50 years or more, such as the cyclic structure of diazine for diazomethane, a tetracoordinate, heptacovalent structure for potassium chlorate, and, inexplicably, "diazobenzene" paired with the structure of azobenzene.

Geochemistry of Iron. Edited by H. LEPP. Wiley/Halsted, New York, N.Y. 1975. xv + 464 pp. \$28.00.

This is Volume 18 of Benchmark Papers in Geology, produced by Dowden, Hutchinson and Ross, Inc. It is a collection of 37 papers reproduced directly from the original literature, with comments by the Editor. The earliest paper included dates from 1948, but there is an additional bibliography of nearly five pages which includes some earlier papers. The selection was made with emphasis on the surface cycle of iron.

Parent Compounds Handbook. Produced by Chemical Abstracts Service. American Chemical Society, CAS Accounting Department, Box 3012, Columbus, Ohio 43210. 1977. Thousands of pages. \$200.00, including supplements issued in 1977 and 1978.

This almost overwhelming work is "Son of Ring Index" (or is it "Grandson"?). The new title takes into account the inclusion of some acyclic "stereoparents", natural products with index names that imply their stereochemistry. The content is still 95% devoted to ring compounds, however.

The great amount of growth in the number of ring systems has increased the difficulty of finding them in the literature to the point of frustration. To meet this hazard to the mental health of chemists, the compilers have put together six indexes, of quite different types: a ring-analysis index, in formula-index order; a ring-substructure index, in which the composition of each component ring of polynuclear systems is the key; a name index, using the familiar (?) CA Index Names; a molecular formula index; an index of Wiswesser line notations; and an index of CAS Registry Numbers. With such a choice, access is remarkably easy, and one does not need to know proper nomenclature in order to find a compound. In fact, one of the happy features of this work is that it enables one to ascertain the systematic name of a complex ring system with very little pain (the pain comes when one sees what the name is; some of them require six lines to write, even without any substituents!).

Any of the six indexes yields an access code, consisting of five letters. These codes have no other function or obvious relationship to structure, but they provide an alphabetical position for the compound in the main list, so that one can quickly flip the pages and turn to the right entry. There one finds the structural formula plus the identifiers, such as name, line notation, etc., corresponding to each of the six types of index. The structural formula is also numbered. One can now go directly to the CA Cumulative Indexes and find the system or any derivative of it that may have been reported. If the parent compound was mentioned in a CA abstract later than Volume 78 (1973), the CA reference is also given.

All this requires much space, and thus the main work occupies four volumes. Supplements, included in the price, appear bimonthly. To

accommodate them, one of the volumes is in the form of a loose-leaf binder, with adequate space for expansion; the other volumes are paperbound.

This is a very versatile work, and it shows the result of much thought and ingenuity in making it so easy to use. The Supplements perform a current-awareness function as well. The price is low in relation to the quantity of information and the service provided. It can be expected to see very heavy use, and busy libraries might well consider ordering multiple copies, especially if their copies of the last Ring Index look ready for the junk heap.

The Physical Chemistry of Dye Adsorption. By I. D. RATTEE (Leeds University, England) and M. M. BREUER (Unilever Research Laboratory, Isleworth). Academic Press, London and New York. 1975. xiv + 323 pp. \$22.25.

This engagingly written book begins with an Introduction that is, in fact, a concise history of dyeing. One of the many pithy statements in it is worth quoting: "One of the benefits employed by members of a profitable 'mystery' is freedom from external criticism of standards. This freedom still enjoyed by the medical and legal professions was lost by dyers in the 17th century."

This book is an attempt to give "the present state of thinking in relation to the topic", without being encyclopedic. Dyeing of different types of materials (e.g., wool, cotton) is presented in a unified way. The physical chemistry involved is not presented comprehensively but is restricted to the context. All this makes for a more readily digestible and usable book. It concludes with a short chapter entitled "Relating Theory and Practice" that begins with a two-page essay "The Practical Value of Theory", and proceeds to more specific examples. The book is well provided with references, figures, tables, indexes, and even organic structures that are properly written.

Polymers in Medicine and Surgery. Edited by R. L. KRONENTHAL, Z. OSER, and E. MARTIN. Plenum Press, New York, N.Y. 1975. x + 335 pp. \$27.50.

This volume contains the proceedings of the Johnson and Johnson Symposium held in 1974. The papers are, as to be expected, largely surgical or pharmaceutical in outlook. They are partly review papers and partly reports of original research. A brief index is provided.

Quantitative Mass Spectrometry in Life Sciences. Edited by A. P. DE LEENHEER and R. R. RONCUCCI. Elsevier Scientific Publishing Co., Amsterdam and New York. 1977. vii + 253 pp. \$30.25.

The first International Symposium on Quantitative Mass Spectrometry in Life Sciences was held in Belgium in 1976 and gave rise to the four plenary lectures and twenty short communications included in this volume of proceedings. The plenary lectures, each 15 to 20 pages long, deal with determination of drugs and steroids, with techniques for quantitative measurements, and with mass fragmentography in evaluation of metabolic pathways. The short papers are accounts of original research and include experimental details. With the relatively rapid publication of this book, these proceedings may well have appeared before journal publication, which would in any case be redundant. There is no index.

Reagents for Organic Synthesis. Volume 6. By MARY FIESER and LOUIS F. FIESER. Wiley/Interscience, New York, N.Y. 1977. vii + 765 pp. \$29.50.

The content of this volume is about equally divided between reagents that have been discussed in earlier volumes and those that appear for the first time. The citations are drawn from the literature from August 1974, through December 1975. It is a fascinating work to browse in and serves a most useful function as an alerting means. Many interesting and potentially useful reagents are rescued from obscurity by the Fiesers' diligence, so that their possibilities are more likely to be explored. The usual multiplicity of indexes makes it easy to find an entry of interest. At its price of only three cents per page, this book is hard to beat in terms of information returned for a modest investment.

Research in Surface Forces. Volume 4. Surface Forces in Thin Films and Disperse Systems. Edited by B. V. DERYAGIN. Translated from the Russian by R. K. JOHNSTON. Plenum Press, New York, N.Y. 1975. ix + 341 pp. \$45.00.

This paperbound volume contains the proceedings of the Fourth

Conference on the title subject, held in 1969. It consists of 46 papers, which appear to be abbreviated reports of original research. They are grouped into five sections: Thermodynamics and Stability of Disperse Systems; Electrophysics and Electrochemistry of Disperse Systems; Mass Transport in Thin Films and Pores; Properties of Thin Layers of Liquids; and Liquid Properties in Boundary Films and in Bulk.

Structure-Solubility Relationships in Polymers. Edited by F. W. HARRIS and R. B. SYMOUR. Academic Press, New York, N.Y. 1977. xiii + 271 pp. \$13.00.

A symposium, held at the San Francisco ACS National Meeting in 1976, and dedicated to Professor Joel H. Hildebrand, provided the contents of this volume of proceedings. It is notable particularly for the stimulating opening paper, "Operations on Swollen Theories with Occam's Razor", presented by Dr. Hildebrand in his 94th year. A brief index is included.

Synthetic Methods of Organic Chemistry. Volume 31. Edited by W. THEILHEIMER. S. Karger A.G., Basel. 1977. xvi + 624 pp. \$191.75.

The usefulness and importance of this nearly indispensable literature tool continue to grow with the increasing rate of appearance of new information. A new volume of "Theilheimer" is as much an aid to current awareness as a reference work. The familiar and successful program of listing in very succinct form the new reports from the previous year of reactions of synthetic interest is, as in the past, augmented by a multifaceted index system that makes access easy.

The series is now available in microfilm or microfiche, as a whole, or as individual volumes. They are very inexpensive—one-quarter to one-fifth of the book price—but they are available only to those who buy, or have bought, the books themselves. This is an economic necessity, for a substantial part of the high price of a volume must go to the support of the compiling effort. However, one is permitted to buy multiple copies of the microform versions, and the second and subsequent copies cost only one-tenth of the original book price. It is impressive that the complete series of books, Volumes 1 through 30, costs \$2620.25.

Tabulation of Infrared Spectral Data. By DAVID DOLPHIN (University of British Columbia) and ALEXANDER VICK (Hoffmann-La Roche). Wiley/Interscience, New York, N.Y. 1977. xvi + 549 pp. \$19.50.

This is the sort of book that will see nearly constant use by the practicing organic chemist, for it presents in more quickly reachable form just the sort of detail that is most often needed. In it are tabulated the frequencies of important functional groups, as numbers rather than as complete spectra. This allows a much larger number of examples to be shown than are to be found in the well-known compendia of IR spectra, and enables the user to make comparisons of variations that are beyond the scope of applied theory.

The section on enamines serves as an example. It begins with a part page of text to focus the reader's attention on the essence of the subject, and then presents just the C-C double bond stretching vibrations of 35 enamines, each of which is shown by clear structural formula rather than name. For each is given the solvent used, the wave numbers, and the literature reference. One can take in at a glance the structures that come closest to that one has in hand, and can make comparisons at once.

There are some complete spectra, 60 of them, of common solvents. There are also a useful detailed interconversion table for wave numbers and microns on the end papers, and an index which lists types of compounds as well as individual ones. The scope is broad and includes phosphorus and sulfur compounds, inorganic anions, and transition metal complexes.

Biochemical and Biophysical Perspectives in Marine Biology. Edited by D. C. MALINS (U.S. National Marine Fisheries Service) and J. R. SARGENT (National Environment Research Council). Academic Press, London-New York-San Francisco. 1975. xv + 359 pp. £11.60 (\$30.00).

This review, the second in the series, contains five articles in the biochemical area and one in biophysics. The first by Istin discusses the structure and formation of calcified tissue. The second on Chemoreception is well handled by Mackie. Hochachka explores meta-

bolic and enzyme mechanisms in marine life in the absence of oxygen. Fontaine critically reviews hormones in fishes and Augusti-Tocco and Monroy examine the roll of gene-controlled processes in the development of marine creatures. In the biophysics portion (Cetacean Biosonar), Norris reviewed anatomical and behavioral concepts, and Malins and Varanasi treat the role of lipids in the acoustic organs.

This compendium examines six significant topics, but their relations to one another are not obvious to the reviewer. Each is by a competent authority who has reviewed topics in his area of interest creditably and fairly. The references are current to the time of publication (1975). Literature coverage is thorough.

The authors seem to cover the topics comprehensively, but they might in some cases have drawn more definite conclusions. In some cases terminology is unusual although it is not incorrect.

The reviewer is somewhat puzzled by the audience to whom this book is addressed, although the aim of the editors presented on the front dust cover was re-read with the greatest care. It is a volume which libraries interested in marine biology should have, and it will be beneficial in providing both a critical review and extensive references for scholars who wish to examine any of the topics. However, in view of the price in the U.S. (\$30.00), it is unlikely that many individual scientists will elect to purchase it. The careful preparation of volumes of this type and their acceptance by the professional community clearly demonstrates the need for well-indexed, convenient, and economic information-handling systems which admit a rapid and comprehensive search across a number of disciplines.

A. D. Suttle, Jr. *Marine Biomedical Institute, University of Texas*

Handbook of Chemical Lasers. Edited by R.W.F. GROSS and J.F. BOTT (Aerospace Corp.). John Wiley & Sons, Inc., New York, N.Y. 1976. x + 744 pp. \$39.95.

A chemical laser is a laser which derives its inversion from the nonequilibrium product distribution in a chemical reaction. Lasers of this type have played an important role in chemical dynamics, both in providing an impetus for fundamental kinetic studies, and in furnishing useful radiation sources for pumping and diagnostics. The hydrogen halide chemical laser, in particular, with its enormously high available energy (greater than 100 kJ per pound of fuel) has been of great technical importance. This book, edited by Gross and Bott, both experts in this field, brings together a large amount of useful information on lasers of this type, not otherwise available in such a convenient form.

The first of the thirteen review articles is an introductory chapter by George Pimentel and Karl Kompa, who together invented the HF chemical laser. Kinetics important to hydrogen halide systems are reviewed by Norm Cohen and Jerry Bott. R. A. Chodzko and A. N. Chester discuss optics, including resonator configurations and far-field propagation. Continuous-wave hydrogen halide lasers are reviewed by Gross and D. J. Spencer. Such devices generally operate as gas-dynamic flow systems; the gas dynamics pertinent to such systems is reviewed by G. Grohs and G. Emanuel. Pulsed hydrogen halide lasers are dealt with in a chapter by Steve Suchard and Dick Airey, while Terry Cool reviews transfer chemical lasers, particularly DF-CO₂. A chapter on "Numerical Modeling of Chemical Lasers", by G. Emanuel, includes a great deal of useful data. Roger Wilkins contributes a chapter on classical dynamics of bimolecular reactions which would be useful in any course on chemical kinetics. The same could be said for the chapter by A. Ben-Shaul and G. L. Hofacker, which treats population inversion from an Information-Theoretical standpoint. The CO chemical laser is the subject of a chapter by Barry Bronfin and Bill Jeffers, while K. Hohla and K. Kompa discuss the photochemical iodine laser, which may be important in laser-fusion experiments. Finally, Reed Jensen describes lasers produced by oxidation of metal vapors.

One of the most useful features of the book is the extensive listing of such data as line position, Einstein coefficients, and the like. The rate constant data presented in Chapter 2, for example, have hitherto been available only in Aerospace technical reports. This book has, by now, found its way into all laboratories actively engaged in chemical laser research and development. It should also be considered by physical chemists for an addition to departmental libraries, since the price probably precludes personal acquisition. There is a twelve-page subject index, but an author index would also have been useful for cross-referencing purposes.

J. I. Steinfeld, *Massachusetts Institute of Technology*

Herbicides: Chemistry, Degradation, and Mode of Action. Volume 2. Edited by DONALD B. KAUFMAN and PHILIP C. KEARNEY (Agricultural Research Center, Beltsville, Md.). Marcel Dekker, Inc., New York, N.Y. 1976. 456 pp. \$37.50.

This volume surveys several major and some minor classes of phytotoxic chemicals that have found commercial application as selective and total vegetation control herbicides. The treatment of each of these classes is done by recognized experts in the field and falls into the categories of history, chemistry, formulation, metabolism, mode of action, and degradation in the environment. In addition, the photodecomposition and volatility of herbicides are the subject materials of two chapters. An extensive, up-to-date bibliography accompanies each chapter.

"Herbicides" appears to be a successful attempt at a synthesis of the disciplines of chemistry, plant science, and toxicology, and a coordination of these specialized talents is the theme of each chapter. The book is an exceptionally well-organized documentation of the quantity and quality of the effort necessary to develop a commercial herbicide in an increasingly complex and highly regulated area. The reviewer feels that this book (and its counterpart in Volume 1) belongs in the library of both research administrator and scientist.

Riaz F. Abdulla, *Lilly Research Laboratories
Eli Lilly & Company*

Applied Spectroscopy Reviews. Edited by EDWARD H. BRAME, JR. (E. I. duPont de Nemours & Co.). Marcel Dekker Inc. New York, N.Y. 1976. xv + 305 pp. \$32.50.

Volume 10 is a collection of six reviews covering topics ranging from ^{29}Si NMR to spectroscopic observations of the sun. The reviews are quite informative and several could form the basis for useful monographs themselves.

The first review by R. T. Bailey and F. R. Cruickshank entitled "Applications of Infrared Fluorescence" is a good introduction to the applications of laser excited infrared fluorescence spectroscopy. In addition to a discussion of theoretical and instrumental considerations, the results for some simple molecules are discussed.

The second review by F. C. Falkner, B. J. Sweetman, and J. T. Watson entitled "Biomedical Applications of Selected Ion Monitoring" is an excellent introduction to the use of the selected ion monitoring mass spectral technique and is worthy of expansion to monograph form. The authors discuss the experimental and computational techniques involved in SIM as well as discussing large numbers of specific applications of biochemical and medical importance.

The third review by R. K. Harris and B. J. Kimber is entitled " ^{29}Si NMR as a Tool for Studying Silicones". The article discusses NMR techniques and Fourier transform ^{29}Si NMR studies of the structure of silicone polymers. The review itself is good but, being only 20 pages long, is too short to adequately cover a field which shows so much potential. This review could have been expanded considerably even at this early stage in the development of ^{29}Si NMR.

The review by G. K. Oertel and G. L. Epstein entitled "Current Solar Spectroscopic Research" is a long and detailed analysis of current solar observations using a variety of spectroscopic techniques. The article provides a great deal of information in a very concentrated form and is not easy to read. I would question the inclusion of this review in the book because it is less likely to be of general utility to a working scientist than the other reviews chosen.

The fifth review by P. J. Slevin and W. W. Harrison entitled "The Hollow Cathode Discharge as a Spectrochemical Emission Source" is an extremely useful discussion of hollow cathode discharge techniques. The article stands on its own and could serve as an introduction to HCD techniques at the graduate level.

The sixth review by G. K. Schweitzer entitled "Elevated Temperature Vapor Photoelectron Spectroscopy" is an extremely short review of recent advances in vapor phase PES for organic and inorganic vapors at moderate and high temperatures.

This volume should be useful for organic chemists and spectroscopists as well as being an excellent general teaching volume.

Wayne C. Appleton, *Velsicol Chemical Corporation*

Electroanalytical Chemistry. Volume 10. Edited by N. W. NURNBERG (Central Institute of Analytical Chemistry, Federal Republic Germany). John Wiley & Sons, Inc. New York, N.Y. 1974. xi + 609 pp. \$49.50.

This volume of the series deals with three branches of electroana-

lytical chemistry. These are voltammetry and polarography, coulometry, and pH measurements. Chapter I, by Dale J. Fisher (158 pp + 306 references), deals mainly with instrumentation for d.c. polarography. Chapter II, by G. W. C. Milner and G. Phillips (38 pp + 74 references), deals primarily with polarographic analysis of the actinides, U, Pu, Np, and Am. Chapter III, by Philip J. Elving (90 pp + 260 references), considers voltammetric analysis of organic compounds. Chapter IV, by H. Hoffmann (48 pp + 313 references), is concerned with polarographic analysis of certain pharmaceuticals. Chapter V, by Janine Badoz-Lambling and Georges Cauquis (86 pp + 259 references), considers voltammetry in nonaqueous systems. Chapter VI, by B. Kastening (74 pp + 416 references), deals with coupled electrochemical ESR techniques. Chapters VII, by K. Schwabe (92 pp + 148 references), concerns itself with pH measurements.

The literature references go through 1972, and, based on their number (1776), this volume seems to represent a fairly extensive coverage of the intended subject matter.

M. C. Banta, *Sam Houston State University*

Organic Compounds: Reactions and Methods. By B. A. KAZANSKII, I. L. KNUNYANTS, M. M. SHEMYAKIN, and N. N. MEL'NIKOV (Moscow State University). Plenum Publishing Corp., New York, N.Y. 1975. viii + 492 pp. \$57.50.

Volume 23 in this series is concerned with the reactions of various trivalent phosphorus compounds with electrophilic reagents. The original text, published by Khimiya Press in Moscow in the year 1973, has been revised and corrected by the editors for this edition.

The work can be considered to have its origins in the classical Arbuzov reaction of phosphite esters with alkyl halides. However, in the present volume only nonhalogenated electrophilic reagents are considered such as alcohols, ethers, esters, and peroxides. The scope of the phosphorus-containing nucleophiles has also been expanded and encompasses phosphoramidites and halophosphines as well as phosphites.

Almost 400 pages of the text are devoted to a very extensive compilation of some 1,918 reactions of trivalent phosphorus compounds with an assortment of electrophiles. This tabulation, replete with literature references, reaction conditions, products, and yields is arranged according to the empirical formulas of the electrophilic reagents. There is also a useful formula index for the products obtained in these reactions which appears at the end of the book. Unfortunately, only 53 pages of text are devoted to discussion of this multitude of chemical reactions.

The present volume will be of interest only to specialists who are engaged actively in this particular area of chemistry. Even the aficionados will be disappointed by the fact that the most recent reference is of 1970 vintage.

Alan H. Cowley, *The University of Texas at Austin*

Topics in Stereochemistry. Volume 9. Edited by N. L. ALLINGER (University of Georgia) and E. L. ELIEL (University of North Carolina). John Wiley & Sons, New York, N.Y. 1976. xi + 399 pp. \$27.50.

This volume's topics are "The Foundations of Classical Stereochemistry" by S. F. Mason; "Mass Spectrometry and the Stereochemistry of Organic Molecules" by M. M. Green; "The Lanthanide Induced Shift Technique: Applications in Conformational Analysis" by O. Hofer; "Multistep Conformational Interconversion Mechanisms" by J. Dale; and "Crystal Structures of Steroids" by W. L. Duax, C. M. Weeks, and D. C. Rohrer. There is a Subject Index and a Cumulation Index to Volumes 1-9. The literature is covered through 1975.

Each topic, except for the first one, is written to the advanced student, teacher, and specialized research scientist. Mason's hagiographical treatment of the polymaths who prepared the way for van't Hoff, LeBel, and Werner is misplaced; it is more suitable for *Chemical Reviews* or *Journal of Chemical Education*. Could it have been selected to honor Cornforth and Prelog (1975 Nobel laureates in chemistry) to whom the volume is dedicated?

Green acknowledged, p 100, a preprint of a chapter with the same title by Asher Mendelbaum to appear in "Handbook of Stereochemistry", H. Kagan, Ed. (George Thieme Verlag, Stuttgart, 1975). The editors do not explain this exception to their policy of avoiding duplication of topics appearing in other related monograph series.

Hofer gives 158 references to LIS techniques. All but the first which appeared in 1969 come from the literature of 1970–1975. Although this chapter will capture the attention of a wide audience, it is already considerably out of date.

Dale's superb account of interconversion mechanisms for monocyclic (5 through 18 members) saturated compounds, cyclic acetylenes and olefins, and bicyclic and multicyclic compounds is the highlight of the volume. To all scientists who need to know about the stereochemistry of rings this chapter is strongly recommended.

The least significant topic deals with "Crystal Structures of Steroids". The Introduction covers steroid functions, nomenclature, and crystal and molecular structures (6 pp) and serves here no purpose other than to consume space; it gives the impression of being the "pitch" in a proposal for financial support (two NIH grants are acknowledged). The Summary claims that "crystal structure determinations provide precisely the information most useful for the development of models describing the action of steroids on a molecular level." Not everyone will agree with this self-opinion (of seven publications cited to support the claim five carry Duax authorship). No less than 60% of the references (total of 182) are found in journals on crystallography and thereby directed to a specialty group. Perhaps this topic belongs in the series but its contribution is minimal.

Libraries are expected to maintain subscriptions to many series publications. Perhaps the time has come when this can no longer be afforded. If this present volume appeared as an isolated book, rather than as a member of a series, I would not recommend that a library purchase it. Would editors give us better series if each volume were published on the basis of individual evaluation?

J. H. Boyer, *University of Illinois*

Progress in Analytical Chemistry, Volume 8. Edited by I. L. SIMMONS (M & T Chemicals, Inc.) and G. W. EWING (Seton Hall University). Plenum Press, New York, N.Y. 1976. viii + 336 pp. \$29.50.

This eighth volume in the series is a collection of 14 papers presented at the 1975 Eastern Analytical Symposium. Each paper presents an overview on the state-of-art and applications of selected instrumental techniques to problems of analysis. Five papers deal with flame emission and atomic absorption spectrometry, including nonflame techniques, in the specific areas of metals and alloys (14 pp), clinical chemistry (14 pp), glasses, refractories and ceramics (22 pp), characterization of incinerator effluents (28 pp), and trace element levels in drinking water (18 pp). Chromatography is represented by four papers: the use of bonded microparticle ion exchangers (18 pp), problems in liquid sampling in GLC (30 pp), GC-MS techniques for therapeutic agents in blood (16 pp), and what is virtually a mini-monograph (44 pp) on all aspects of gas-solid chromatography. The volume concludes with four spectroscopic papers. A thorough review (28 pp) of coherent anti-Stokes Raman spectroscopy and its analytical applications describes this tool and compares it with related techniques. Two other lengthy papers review measurement and applications of fluorescence lifetimes in the nanosecond range using the time correlated single photon technique (36 pp), and luminescence techniques in drug analysis (46 pp).

The engaging and explanatory style of the papers found the reviewer reading rather than merely scanning the contents of these diverse topics. Extensive bibliographies accompany all but one of the papers. The book is reproduced from typewritten copy.

John A. Dean, *University of Tennessee—Knoxville*

Reviews of Physiology, Biochemistry and Pharmacology (formerly *Ergebnisse der Physiologie, biologischen Chemie und experimentellen Pharmakologie*). Volume 71. Springer-Verlag, Berlin-Heidelberg-New York. 1974. iv + 164 pp. \$40.20.

Volume 71 of this series contains three unrelated reviews. The first review of 76 pages, with 32 figures and 293 references, is entitled "Temperature Regulation: The Spinal Cord as a Site of Extrahypothalamic Thermoregulatory Functions", and was prepared by Prof. Dr. E. Simon (Max-Planck Institut für Physiologische und Klinische Forschung). The second review of 30 pages, with 18 figures and 79 citations, was written by Prof. Dr. K. Decker and Prof. Dr. D. Keppler, both of the Biochemisches Institut der Universität, and is entitled "Galactosamine Hepatitis: Key Role of the Nucleotide Deficiency Period in the Pathogenesis of Cell Injury and Cell Death". The final review of 40 pages, 20 figures and 119 references, is entitled "Recent Concepts of Intestinal Fat Absorption". This review was prepared by

Dr. R. K. Ockner (Department of Medicine, University of California School of Medicine) and Dr. K. J. Isselbacher (Harvard Medical School).

In keeping with the excellent standards of this review series, complete author and subject indexes are included at the end of the bound volume.

Clarence H. Suelter, *Michigan State University*

Reviews of Physiology, Biochemistry and Pharmacology (formerly *Ergebnisse der Physiologie, biologischen Chemie und experimentellen Pharmakologie*). Volume 72. Springer-Verlag, Berlin-Heidelberg-New York. 1975. 175 pp. \$48.20.

Volume 72 of this series contains four unrelated reviews. The first review of 54 pages, with 21 figures and 205 references, is entitled "Neuronal Organization and Synaptic Mechanisms of Supraspinal Motor Control in Vertebrates", and was prepared by A. I. Shapovalov (Sechenov Institute of Evolutionary Physiology and Biochemistry, Leningrad).

The second review of 28 pages, with 5 figures and 80 citations, was written by G. K. Moe (Masonic Medical Research Laboratory, Utica) and is entitled "Evidence for Reentry as a Mechanism of Cardiac Arrhythmias".

The third review, by Nobuhiko Katunuma, of the Institute for Enzyme Research, Tokushima University, is entitled "Regulation of Intracellular Enzyme Levels by Limited Proteolysis", and contains 16 figures and 31 citations in 22 pages.

The final review of 54 pages, 18 figures and 163 references, is entitled "Lactose Biosynthesis". This review was prepared by Keith Brew, University of Miami, and Robert L. Hill, Duke University.

In keeping with the excellent standards of this review series, complete author and subject indexes are included at the end of the bound volume.

Clarence H. Suelter, *Michigan State University*

Introduction to Liquid Crystals. Edited by E. B. PRIESTLEY, P. J. WOJTCWICZ, and P. SHENG (RCA Laboratories). Plenum Press, New York, N.Y. 1975. xi + 356 pp. \$22.50

This latest volume introducing liquid crystals to the general reader began as a series of in-house lectures in RCA laboratories. Studies of liquid crystals have been made from the viewpoints of many disciplines and the reader should not be surprised, therefore, at the strong interdisciplinary flavor of this volume. The 18 chapters contained in the volume discuss such topics as "Structure-Property Relationships in Thermotropic Organic Liquid Crystals", "Generalized Mean Field Theory of Liquid Crystals", "Electrohydrodynamic Instabilities in Nematic Liquid Crystals", "Liquid Crystals Displays and Addressing Techniques", and "Electrochemistry in Nematic Liquid Crystal Solvents". This short list is not meant to be a table of contents but illustrative of the topics covered. The volume does contain chapters discussing most of the areas of current interest to workers in the field of liquid crystals, especially those interested in applications. In their preface the editors state their aim of providing a "... useful primer for those interested in the physics of liquid crystals and those contemplating the use of liquid crystals in practical devices." Their aim is well served by the volume. Anyone interested in not only learning the basic principles of liquid crystals display devices but also finding literature references for details, will find this volume an inestimable aid. Those readers more interested in the chemistry of liquid crystals per se are likely to be disappointed with this volume. Though the first two chapters are devoted to molecular structure-mesomorphic behavior correlations, both of these chapters are essentially reviews of monographs to which the reader primarily interested in such is better advised to turn. The volume's last chapter discussing lyotropic liquid crystals, a class of materials that chemists will find increasingly more important, is too brief and almost appears to be an afterthought. However, several valuable comments are presented in this chapter on the quantification of the forces responsible for the formation of lyotropic phases, and the chapter stands as a contribution to the literature on lyotropic liquid crystals even though it is not the best introduction to this important area. Moreover, chemists would be interested in the excellent expositions provided in this volume on the various Maier-Saupe mean field statistical theories of the nematic mesophase that are so often mentioned in the liquid crystal literature. To the editors' and author's of individual chapters great credit, each chapter is self-contained and clearly written with very few leaps in the mathematical

arguments, even in the more theoretical chapters. Such diligence is of great usefulness to the beginning reader trying to comprehend, for example, the chapters on the elastic continuum theory of liquid crystals and electrohydrodynamic instabilities. The continuity of the 18 chapters is very good and the symbol nomenclature is uniform throughout the text. Because each chapter is self-contained, some repetition of necessity occurs but it is easily tolerated. References are sufficient and allow the reader new to the area to pursue further in-depth studies.

All in all this is a very readable, informative volume whose acquisition is a must for libraries, workers in the applications areas, and readers seriously interested in increasing their knowledge of this expanding field of interest.

Gerald R. Van Hecke, *Harvey Mudd College*

Biochemistry. The Chemical Reactions of Living Cells. By D. E. METZLER (Iowa State University). Academic Press, New York, N.Y. 1977. xxxii + 1129 pp. \$24.95.

Knowledge of those aspects of nature which are encompassed by the term biochemistry is doubling every ten years, and this growth, while exhilarating, is making many biochemists nervous. Fortunately, good textbooks appear at intervals to help alleviate this anxiety by organizing and summarizing the findings of experimental biochemists.

Metzler has written a comprehensive and sophisticated general biochemistry text which places particular emphasis on the chemical and physicochemical aspects of biochemistry. Mechanisms of enzymic reactions are described in detail. Structures of many interesting natural products and pharmacological agents are included. The chapter on bioenergetics is quite good. Much useful physical data are compiled in tables, including the innovative free energy of combustion of metabolites by NAD^+ ; SI units are used throughout the book. Metzler's treatment of macromolecules, including allosteric proteins and nucleic acids, is excellent and is aided by superior illustrations. The comprehensive chapter on light in biology brings together material often widely dispersed in other texts. The chapters on membranes and biochemical genetics are up to date and well referenced. The opening and closing chapters serve as strong reminders of the biological questions which provide biochemistry's *raison d'être*. At intervals the author has included, in green boxes, interesting asides on vitamins, antibiotics, trace elements, genetic diseases, and other topics which might otherwise interrupt the narrative flow. More than 2,300 references are given to review articles, key original papers, and the recent literature, including a large number of 1975 and 1976 papers.

It is anticipated that Metzler's book will be used as a text in undergraduate biochemistry courses taught in chemistry departments and in many graduate biochemistry courses. Practicing biochemists will find this book useful as a reference and for entree into the recent current literature, and complementary to other excellent contemporary texts. Metzler is to be congratulated for his mastery of the many diverse areas of biochemistry.

James B. Walker, *Rice University*

Chemistry of the Non-Metals. By R. STEUDEL (Technische Universität, Berlin). Walter de Gruyter, Inc., New York-Berlin. 1976. 402 pp. \$15.90.

A brief, but thorough and up-to-date coverage of the nonmetallic elements is presented in this volume. Almost a third of the book, the first five chapters, is devoted to atomic structure and chemical bonding. The latter begins with the origin of modern atomic theory and continues through molecular orbital concepts. All the important modern structural ideas are covered in a clear and concise, but necessarily limited manner.

In the last two-thirds of this book the reader is taken on a tour of the fascinating world of the chemistry of the nonmetals on an element-by-element itinerary. The chapter on hydrogen includes information on hydrides, theory of protonic solvents, and hydrogen bonding. Oxygen, as is to be expected, is treated separately from the other group VI elements. In addition to the more classical coverage, positive chalcogen ions, the formation and cleavage of polychalcogenide chains, and the chemistry of S_4N_4 are included. Positive halogens and the lower oxidation states of the halogens are described in the coverage

of group VII. The chemistry of xenon, krypton, and radon compounds, the nature of solvated electrons in liquid ammonia, peroxyphosphates, and phosphazenes are included in subsequent chapters. The coverage of carbon and silicon includes an introduction to the chemistry of the covalent and ionic graphite compounds. The fundamentals of the three-center bond and many-centered bonds are presented in the discussion on boron hydrides and carboranes.

This book is recommended for junior or senior chemistry majors and for those who are interested in learning about what is new and interesting in the chemistry of the nonmetals. The book is well written and well translated.

Ralph A. Zingaro, *Texas A&M University*

Recent Developments in the Chemistry of Natural Carbon Compounds. Volume 7. Edited by R. BOGNAR, V. BRUCKNER, and CS. SZANTAY. Akademiai Kiadó (Publishing House of the Hungarian Academy of Sciences), Budapest. 1976. 256 pp. \$16.00.

Volume 7 of the continuing series consists of five chapters which differ considerably in scope and objective: Naturally Occurring Anhydro-Colour Bases (T. R. Seshadri), Recent Work on Some Natural Phenolic Pigments (K. Venkataraman), Structure and Chemical Topography of the Active Site of Aspartate Aminotransferase (E. S. Severin and N. N. Gulyaev), Asymmetric Syntheses of α -Amino Acids (Weinges and Stemmler), and Synthesis and Biological Activity of Adrenocorticotrophic and Melanotropic Hormones (K. Medzihradzsky). The first chapter presents a historical review with emphasis on the identification by classical methods of the components of carajura, dragon's blood resin, and sorghum and red sandal pigments. The majority of the 40 references are prior to 1966; however, the section on biogenesis of the santalins contains recent references to the author's work.

The second chapter is purported to be an update of the author's 1966 review describing spectroscopic methods of structure determination in relation to the natural phenolic pigments. The chapter actually is based upon a lecture presented to the Hungarian Academy of Sciences and represents a discussion of the author's work on Indian plants and insect pigments. Spectroscopic methods of structure determination are limited to 60 MHz proton NMR and mass spectrometry as applied to the structure elucidation of several flavone and anthraquinone pigments. The chapter does not attempt to review the literature and does not discuss C-13 or 100-MHz proton NMR.

The third chapter discusses the use of synthetic substrates and coenzymes as inhibitors to probe the active site of aspartate aminotransferase. The activities of isomeric cycloglutamates are used to infer the conformational requirements of the binding site and to propose a chemical topography for this site. The authors conclude that "the importance of interactions involving the coenzyme phosphate moiety has emerged, and the chemical topography of the internal aldimine and substrate aldimine of aspartate transaminase has been outlined". Some attempt is made to rationalize the active site model with other current experimental work. The references may be of some assistance to those not familiar with the Russian literature.

The fourth chapter is a review of the literature on α -amino acid syntheses for the period 1969-1974 and supplements the earlier reviews of Babievskii and Latov (1969) and Morrison and Mosher (1971). The chapter contains 93 references and covers asymmetric hydrogenations, additions, and name reactions such as the Ugi and Strecker syntheses. Syntheses with chiral metal complexes are considered also. The chapter concludes with a discussion of the asymmetric syntheses of a single amino acids.

The fifth chapter comprises almost one-half of the book and contains 367 references. The author states he has attempted "to demonstrate how efficient and successful peptide syntheses can be in the interpretation of relationships between chemical structure and biological activity". To this purpose the first 47 pages are devoted to a discussion of the synthesis of ACTH and melanotropic hormones, their fragments, and their analogues and to a discussion of their biological activities. The next 84 pages are devoted to a discussion of the relationship between chemical structure and biological activity. The discussion is well documented and should be of value to those interested in hormone structure and function.

William H. Watson, *Texas Christian University*