Book Reviews

Aromatic and Heteroaromatic Chemistry. Volume 4. Edited by C. W. Bird and G. W. H. Cheeseman. The Chemical Society, London. 1976. xiv + 513 pp. £28.00.

This Specialist Periodical Report surveys the literature in the terse, rapid-fire manner for which these reports have become known. As the series title indicates, these reports are designed to help chemists maintain pace with the literature in a very specific area. They are at best a noncritical guide to the literature. Since papers are summarized in a phrase or, at most, a sentence, use of the reports requires very careful reading rather than scanning.

The literature covered in Volume 4 of the aromatic and heteroaromatic series is that abstracted by Chemical Abstracts, in Volumes 81 and 82 (July 1974 to June 1975). This volume follows the same format as that adopted for previous volumes. Most of the 14 chapters are organized by reaction types. There are chapters on cyclization, cycloaddition, and other ring-forming transformations. Substitution, addition, cleavage, and substituent reactions are the subjects of other chapters. Information about a particular compound type may be obtained by searching through each chapter using the detailed table of contents as a guide. There is an author index but not a subject index.

There are, however, four chapters which are organized according to compound type. For example, Chapter 1 covers polybenzenoid systems, helicenes, cyclophanes, annulenes, azulenes, ions, and homoaromatic systems. Fortunately, many of the compounds of particular interest to medicinal chemists are also surveyed in these chapters. Chapter 12 covers porphyrins and related compounds including their synthesis, biosynthesis, reactions, and properties. The section on the porphyrins themselves is particularly valuable.

The chapter on "Naturally Occurring Oxygen-ring Compounds" contains 234 references to isolations, syntheses, analyses, or metabolic studies of furans, chromenes, cannabinoids, coumarins, flavanoids, and miscellaneous. The final chapter reports on naturally occurring quinones, napthoquinones, anthraquinones, tropolones, depsidones, lignans, and related compound types. Mention is made of some of the pharmacological properties of these compounds but the primary emphasis is on structure and biosynthesis.

This report is a thorough, 1-year collection of references on the subject of aromatic chemistry. It also provides an excellent method for following the direction of research in this field. Its usefulness to most medicinal chemists will be limited to the last three chapters. A scan of the table of contents would probably be sufficient to allow a decision on the value of further perusal.

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Antibiotics. A Critical Review. Edited by W. Kurylowicz and translated into English by E. Paryski. Polish Medical Publishers, Warsaw. 1976. (Distributed in the U.S.A. and Canada by the American Society for Microbiology, Washington, D.C.) 204 pp. $6.00.

Professor Kurylowicz and the International Programs Division of the National Library of Medicine (in Poland) have prepared this survey of antibiotics through the support of the National Library of Medicine (Bethesda, Md.) under PL-480 agreement with the Coordinating Commission for Polish–American Scientific Collaboration.

Among the topics included are "Historical Interpretation"; "Antibiotics in Microbial Metabolism"; "Comments on Attempts to Classify Antibiotics"; and "Antibiotics as Therapeutic Agents". The treatment focuses on principles and these are illustrated with a number of examples. For instance, section 2.2 summarizes "Antibiotics as "excessive" metabolites" and illustrates the overproduction with mention of experiments on lincomycin, rifamycin, and tetracycline. In discussing the therapeutic aspects, attention is given to toxicity and side effects (3 pp), antimicrobial spectrum and resistance (11 pp), and pharmacokinetics (12 pp) before focusing on antibiotics currently used in medicine (50 pp). The bibliography (34 pp) contains approximately 600 references with only a few taken from the literature since 1971.

The value of this volume to the Medicinal Chemist lies in the scope of information presented. In this respect, it does not have the exact information of the type found in Reiner's "Antibiotica und Ausgewählte Chemotherapeutica" (Georg Thieme Verlag, Stuttgart, 1974) or the older "Biology of Antibiotics" by Zähner and Maas (Springer-Verlag, New York, N.Y., 1972). Thus, it may not be of very much use to the chemist who has already some knowledge of antibiotics and wants some specific information about certain compounds and their use in therapy.

The volume contains very few typographical errors and the subject index is excellent and very carefully arranged for those who are looking for chemical aspects of the antibiotics mentioned.

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Taurine. Edited by Ryan Huxtable and Andrê Barbeau. Raven Press, New York, N.Y. 1976. xiv + 398 pp. 15 × 23 cm. $35.50.

Taurine was first discovered about 150 years ago as a constituent of ox bile, and it has been understood since then principally as a bile salt constituent. In recent years it has become apparent that taurine is present in very significant concentrations in most tissues of the body and that it appears to play a remarkable role in the regulation of nervous and muscular function.

This volume contains 37 papers presented at the First International Symposium on Taurine in 1975. In addition, it contains a bibliography on taurine which includes papers into the year 1975. The papers are organized in four sections: biochemistry and metabolism, cardiac action, electrophysiology, and neuropharmacology. While most of the papers represent the results of individual research efforts, there are within each section one or more larger papers of a review nature which set the stage for the other material.

In any collection of research papers such as this there is inevitably a great deal of duplication and, in some cases, confusion due to different systems and interpretation of data. This may prove somewhat confusing to the individual not familiar with the field. On the other hand, for those already possessing a familiarity with the general field, the experimental detail presented may be very valuable.

The papers cover the formation of taurine from cysteine in detail and discuss the regulation and turnover of taurine in the body. Taurine acts generally as an inhibitor of smooth and cardiac muscle function and of neurotransmission. Possible mechanisms of this inhibitory action and interaction of taurine with other components of the system such as calcium, sodium, and potassium ions, cyclic nucleotides, and catecholamines are discussed in detail. The role of taurine and taurine peptides as "inhibitor transmitters" in the central nervous system is discussed from several points of view. It is not clear from the data presented whether taurine is functioning as a neurotransmitter per se or whether it is regulating the function of cells activated primarily by some other neurotransmitter, such as acetylcholine, catecholamines, or serotonin. At the present time taurine can probably best be placed in the latter category along with γ-aminobutyric acid and glycine.

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Advances in Mass Spectrometry in Biochemistry and Medicine. Volume 1. Edited by A. Frigerio and N. Castagnoli. Spectrum Publications, New York, N.Y. 1976. xi + 566 pp. 15 × 24 cm. $40.00.

It is always difficult to review the proceedings of a symposium due to the great variation which is commonly found from chapter to chapter. The volume, "Advances in Mass Spectrometry in Biochemistry and Medicine", resulting from an international symposium held in Milan in 1974, is no exception to this observation. Some chapters are merely short abstracts, others are reviews of a broad area of research, and yet others describe briefly a new method or a specific application. Some chapters seem not to have been proofread; others lack structures for complex molecules; abbreviations abound for methods and compounds. No references are given to work published later than 1974, which takes away some of the topicality which undoubtedly was felt at the symposium.

Nevertheless, if the reader is sufficiently acquainted with research in biochemistry and medicinal chemistry and with the fundamentals of mass spectrometry to follow the presentations, he will find plenty of interesting reading. Many chapters discuss the use of instrumental techniques, such as chemical ionization, field ionization, and field desorption, pyrolysis, gas chromatography combined with mass spectrometry, and the use of computers in data acquisition and handling. From other chapters, two important applications of mass spectrometry in biochemistry and medicine emerge: (1) identification of structure of natural products and metabolites, an application well known by now, and (2) the quantitative determination of levels of drugs in plasma. In the latter application, peaks characteristic of the drug are continuously detected and recorded as the effluent from a gas chromatograph is introduced directly into the mass spectrometer. Internal standards and calibration curves are generally used to give quantitative data at a sensitivity which ensures that this technique will become increasingly important in medical research.

This book is not intended to be used as a textbook and will have limited value as a reference book. However, it does provide a good general view of those techniques of mass spectrometry which are particularly useful in research in biochemistry and medicine. These techniques are illustrated with many applications, in studies of metabolism, natural products, biosynthesis, and pesticides.

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Solute–Solvent Interactions. Volume 2. Edited by J. F. Coetzee and Calvin D. Ritchie. Marcel Dekker, New York, N.Y. 1976. 15 × 23 cm. xi + 459 pp. $38.50.

The preface to this book is taken largely from the preface to "Solute–Solvent Interactions" (1969), by the same editors, but it surprisingly makes no reference to the earlier book. The 1969 book was not subtitled Volume 1. The editors do not comment about the possibility of a Volume 3, so we do not know if this is a continuing series or if it is now a completed work. Fortunately these lapses in the front matter treatment are not indicative of the body of the book, which is generally a valuable contribution to the physical chemistry of solutions.

C. V. Krishnan and H. L. Friedman ("Enthalpies of Transfer for Solutes in Polar Solvents") have written a chapter that is for reference rather than for reading. It consists primarily of tabulations of experimental data and derived quantities, with supporting discussion of assumptions, conventions, and limitations. Their treatment of linear enthalpy–entropy relationships I find rather uncritical in view of the considerable literature that has developed about the artifactual nature of some of these correlations (though some of them are certainly real). R. L. Kay, D. F. Evans, and M. A. Matesich ("Evaluation of Ion–Solvent Interaction from Transport Properties") give a very readable and critical survey of this classical experimental approach to solute behavior. The chapter "Selective Solvation of Ions in Mixed Solvents" by H. Schneider is essentially a "second edition" of his chapter with the same title in the 1969 volume, with most of the text and figures repeated, and more recent studies and references added. C. D. Ritchie ("Solvent Effects on Some Simple Organic Reactions") has, however, treated his chapter as a continuation of his contribution to the earlier volume; he has chosen for detailed discussion the effects of solvents on equilibrium acidities, proton transfer rates, and electrophile–nucleophile combination reactions. (The difference of approach by these two authors is another example of the casual editorial style; I want to add, however, that the technical editing—the book is printed from camera-ready typescript—is excellent.)

A. Popov ("The Use of Alkali Metal Nuclear Magnetic Resonance in the Study of Solvation and Complexation of Alkali Metal Ions") has given a good review, pointing out that NMR can distinguish between contact ion pairing and solvent-separated ion pairing on the basis of the concentration and counterion dependencies of chemical shifts for the former process. Popov emphasizes the result that selective solvating power in binary solvents is not simply deduced from the properties of the pure solvents because of their mutual effects. He also summarizes NMR studies on complexes with the crown ethers and cryptands. (On p 323 the section heading should be "Quantitative..." rather than "Qualitative...".) J. F. Coetzee ("Ligand Substitution Kinetics of Labile Metal Complexes in Nonaqueous Solvents") has provided a well-written chapter with critical assessments of theory and experiment. He properly gives considerable attention to some of the pitfalls in interpretation of kinetic data, particularly activation energies.

In their preface (in fact in both prefaces) the editors claim, as justification for this multiauthor volume, that it is not possible for a single author to master this field. This cannot be correct. There appears to be no subject so broad or so deep that it cannot form the basis of a book, often a very good book, by a single writer, as any library or bookstore will reveal. "Solute–Solvent Interactions" is a field waiting for such a book. In the meantime, and helping to make it possible for such a book to be written, this volume edited by Coetzee and Ritchie will be extremely valuable to anyone studying solvent effects on rates and equilibria.

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Methodicum Chimicum. Volume 8. Preparation of Transition Metal Derivatives. Edited by K. Niedenzu and H. Zimmer with 29 contributors. Academic Press, New York, N.Y. 1976. x + 579 pp. 18.5 × 26.5 cm. $110.00.

Volume 8 of this series, designed to present short, critical descriptions of chemical methods of synthesis, is concerned with the preparation of the organic and inorganic derivatives of the transition elements, including their complexes. The attempt of these volumes is to describe proven procedures rather than an exhaustive compilation of all reported methods; detailed descriptions of experimental procedures are not included, however. As a guide for the selection of a suitable, reliable, and practical method of synthesis of transition metal derivatives, this volume succeeds very well.

Each chapter is concerned with the preparative chemistry, and limited reference to its utility, of a given transition element, or type of element (yttrium and the lanthanides, for instance, are included in one chapter). The discussion starts with the lowest oxidation state and the hydrogen derivatives and proceeds to the higher oxidation states. In addition, four chapters are devoted to important compound types, including the carbonyls, ferrocenes, other sandwich compounds, and heteropoly ions. The discussions are brief and lucid, very well referenced, and include a significant amount of tabular data. Equations and structures are presented copiously, and some three-dimensional representations of structures are included, although sparingly. The material is well organized, the sectional headings are well delineated, and the book has an adequate index. The literature is covered through 1970.

The organic, medicinal, or biochemist concerned with the preparation of transition metal compounds as models for enzyme systems, or for direct biological action, will find this volume of use. Although some reference is generally made to the present state of understanding of reaction mechanism, those requiring

full discussions of mechanism and structure should consult other works. With the greater involvement of transition metals in current organic synthesis, and the greater realization of metal ion involvement in certain classes of drug action, this volume should be available to practicing organic and medicinal chemists. The price, and brief description of methods, should effectively preclude it from individual ownership, however.

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Determination of Organic Structures by Physical Methods. Volume 6. Edited by F. C. Nachod, J. J. Zuckerman, and E. W. Randall. Academic Press, New York, N.Y. 1976. xiii + 453 pp. 15.5 × 23 cm. $47.00.

The present volume is devoted to the review of six topics of structure determination by physical procedures.

Chapter 1 provides a comprehensive critical review of the application of mass spectroscopy to amino acid sequencing of oligopeptides. An evaluation and comparison of the MS and Edmand degradation procedures used in amino acid analysers are provided. Several representative examples of MS analysis of oligopeptides are discussed.

The need for sophisticated and rapid data retrieval and processing methods is recognized by users of mass spectroscopic analytical procedures. The MS can produce enormous amounts of data within a short period of time which cannot be practically analyzed by conventional manual methods. This led to the development of computer-based programs of MS data analysis. Chapter 2 is devoted to the evaluation of several such programs.

Flash photolysis as a tool of study of transient, short-lived intermediates is the topic of Chapter 3. The application of the method to the studies of photobiological transformations of chlorophyl, retinene, and rhodopsin is discussed.

The remaining three chapters are devoted to different aspects of NMR spectroscopy. Developments in the use of NMR in ^{29}Si studies are reviewed in Chapter 4. The nuclear Overhauser effect and NMR in liquid crystals are discussed in Chapters 5 and 6, respectively.

The book is authoritatively written, and the topics are well covered. References to literature published up to 1975 are included.

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Fluorocarbon and Related Chemistry. Volume 3. Specialist Periodical Reports. R. E. Banks and M. G. Barlow, Senior Reporters. The Chemical Society, Burlington House, London. 1976. ix + 491 pp. 13.5 × 21.5 cm. £35.00 (£26.25 to members of Chemical Society).

This third volume in a series of biennial reviews on the chemistry of organic, organometallic, and organometalloidal fluorine-containing compounds continues the high standards of its predecessors. The book provides a veritable treasure-trove of information on a wide spectrum of fluorinated substances containing carbon. As in the previous volumes, the emphasis is on compounds with a relatively high proportion of C–F bonds.

The review covers developments in the field which were published during 1973 and 1974. The book is 50% larger than Volume 1, despite the omission, primarily for reasons of economy, of a chapter on progress in NMR spectroscopy, which was a feature of the earlier volumes. The style, which resembles the *Annual Reports of the Chemical Society*, remains unchanged, with the text liberally interspersed with easily readable reaction schemes and structures of compounds. While an author index is included, a subject index, which would have further increased the cost, is absent. This omission is partially offset by limited overlap between chapters and effective cross-referencing. Perfluoro terminology is used in preference to the F system of nomenclature [J. A. Young, *J. Chem. Doc.*, 14, 98 (1974)]. The review consists of six chapters (each with subheadings), viz., saturated fluorocarbons, fluorocarbon hydrides and halides; per- and polyfluorinated olefins, dienes, heterocumulenes, and acetylenes; aliphatic per- and polyfluorinated carbonyl and thiocarbonyl compounds; per- and polyfluorinated aliphatic derivatives of the main-group elements (120 pp); per- and polyfluorinated aliphatic derivatives of the transition elements; and per- and polyfluorinated aromatic compounds, including derivatives of transition and main-group elements, and heterocyclic compounds (111 pp). Once again, a brief, but valuable appendix of recent books and major reviews is included. Occasional mention is made of compounds having medicinal applications or of biological interest, but no attempt is made to collate such information. As in the previous volumes, there is relatively little critical evaluation of the results reported, although I noted several examples of brief critiques. Especially noteworthy is the appendix at the end of chapter 3, which covers the titles of papers and references involving (1) trifluoroacetic acid (solvolysis and mechanistic studies, organic syntheses, analytical methods, and polymerization studies), (2) complexes derived from fluorinated β-diketones, and (3) NMR studies involving fluorinated chemical shift reagents.

The printing is very good and I noted only a few minor errors (N.B., formula **38**, p 369). The authors and their able reporters merit our commendation for a remarkably thorough and stimulating presentation of progress in this burgeoning field of chemistry. Despite the high cost, those active in the field will have this book available as a valuable resource. Those with peripheral interest should have ready access in a library.

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Magnetic Resonance of Biomolecules. By P. F. Knowles, D. Marsh, and H. W. E. Rattle. Wiley, New York, N.Y. 1976. 343 pp. 15 × 22.5 cm. Cloth $23.00, paperback $9.95.

In the past few years magnetic resonance techniques have been used successfully to study some important problems in biology. As a result of these applications, several reviews and books on magnetic resonance, intended for the life scientist, have appeared recently. Among these, R. A. Dwek's "NMR in Biochemistry" and, more recently, a book by T. L. James bearing the same title have given comprehensive coverage of the biochemical and biophysical applications of NMR. The ESR applications can be found in a book entitled "Biological Applications of Electron Spin Resonance" edited by Swartz, Bolton, and Borg with most of its chapters contributed by specialists.

The text under review gives a less rigorous account of the biological applications for both forms of magnetic resonance and is intended for the beginner. In an attempt to illustrate the complementary nature of the information which can be obtained by the two methods, the authors have divided the book into two equally weighted sections and have adopted a parallel chapter layout with corresponding chapters on NMR and ESR in each section. There is one common chapter giving a brief introduction to the physical basis of magnetic resonance. Chapters 2 and 6 provide a general background necessary for spectral interpretation. Chapters 3 and 7 deal with the experimental considerations and provide the reader with information on the spectrometers and on sample handling. The uses of magnetic resonance in biological systems are covered in Chapters 4 and 8. Examples are given showing how the two methods can be used to study a great variety of problems such as the conformations of peptides and nucleic acids, ligand–protein interactions, the fluidity of biological membranes, and the study of free radicals in neoplastic tissue. The last chapter in each section is reserved for a discussion of some of the less straightforward and more recent techniques in the field. The reader will find here brief sections dealing with such items as methods for NMR resolution enhancement, internuclear double resonance (INDOR), electron–nuclear double resonance (ENDOR), electron–electron double resonance (ELDOR), etc. These two chapters are by no means comprehensive and will provide the reader only with a taste of the large variety available in the menu of magnetic resonance techniques.

On the whole this book fares well as an introductory text. The writing is lucid and the illustrations are very good. The authors have paid special attention to the student by including a number of special didactic features such as short summaries for each chapter, reading lists following the references at the end of each chapter, and a short glossary at the end of the book. The book is not completely free of shortcomings. The chapters dealing with the applications of magnetic resonance in biology are rather short, especially the one on NMR. They should, maybe, have received more emphasis. Also, the indexing is inadequate.

This book is recommended to the biochemist and the biologist who may have very little knowledge of spectroscopy and to the medicinal chemist who wishes to start using NMR on molecules with a molecular weight >1000.

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Advances in Neurology. Volume 11. Complex Partial Seizures and Their Treatment. Edited by J. K. Penry and D. D. Daly. Raven Press, New York, N.Y. 1975. xiv + 486 pp. 16.5 × 24.5 cm. $30.00.

Some epileptic attacks are characterized by abnormal bodily sensations, distorted perception or hallucinations, and complex involuntary motor movements. The association of such attacks with lesions in the temporal lobe led to their being called "temporal lobe seizures". In 1970, an International Committee proposed that such attacks should be described as "complex partial seizures". The first 200 pages of this volume present clinical descriptions of this illness and its pathology. The subsequent 250 pages are concerned with its treatment. The book derives from a workshop held in 1974 but in quality and level is nearer to an advanced textbook than a Conference Proceeding.

The clinical accounts are generally informative and sometimes stimulating (as in the section on interictal manifestations). Readers of this journal will be disappointed at the very sparse discussion of causal mechanisms.

The principal drugs used in therapy are diphenylhydantoin (introduced in 1938), primidone ("Mysoline", introduced in 1952), and carbamazepine ("Tegretol", introduced in Europe in 1962 but not made available for treating epilepsy in the U.S. until 1974).

The mode of action of these drugs at the molecular level is not understood. This volume aims to acquaint physicians with the clinical use of carbamazepine. A rather brief chapter describes its chemistry, determination, and metabolites. The chapter on the mechanism of action of carbamazepine stresses its pharmacologic similarity to DPH; carbamazepine also shares with DPH some dramatic neurotoxic side effects.

This book should not mislead any medicinal chemists into thinking that the problems of epilepsy are solved. Better drug therapy for partial seizures and for generalized seizures is urgently required in terms of both efficacy and toxicity.

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Adamantane. The Chemistry of Diamond Molecules. By Raymond C. Fort, Jr. Marcel Dekker, New York, N.Y. 1976. 400 pp. 16 × 23 cm. $39.50.

This is the fifth volume in the series "Studies in Organic Chemistry" (Paul Gassman, Ed.) and in general is an excellent, comprehensive review of the chemistry of adamantane and related molecules.

Perhaps reflecting the author's own research interests, the 284 pages of actual text are somewhat unevenly distributed over the seven chapters: Structure and Physical Properties (1; 25 pp), Rearrangements Leading to Adamantanes (2; 26 pp), Classical Synthetic Approaches to Adamantanes (3; 60 pp), Carbonium Ion Chemistry (4; 72 pp), Free Radical Chemistry (5; 27 pp), Heteroadamantanes (6; 51 pp), and Pharmacology of Adamantanes (7; 23 pp). The three longest chapters (3, 4, and 6) form nearly two-thirds of the text, 784 of the 1266 primary literature references, and 88 of the 159 "selected bibliography" citations. Literature coverage is complete only through the third quarter of 1973—somewhat surprising and disappointing in view of the 1976 publication data and the use of direct photoreproduction. Therefore, the book is already at least 2 years out of date. For example, McKervey's 1974 review on adamantane rearrangements (*Chem. Soc. Rev.*) is not cited.

Nevertheless, Fort has done a tremendous job of organizing and presenting a myriad of material, most of it published in the decade since the 1964 Fort–Schleyer review (*Chem. Rev.*), which cited fewer than 150 references compared with the more than 1400 references cited in this book. Fort's writing style is smooth, clear, and fresh (p 186, "Adamantanes are by no means immune to these self-destructive impulses, ..."), and this reviewer found his book easy and pleasurable to read.

Chapters 4 and 5 are easily the best in the book. They are not only written very well but the material presented in these two chapters is carefully and incisively evaluated with a consistency that is infrequently found in reviews. Fort invariably presents possible alternative explanations for reaction mechanisms that to him seem questionable; and, for example, in chapter 5 he hammers home the point that "there is no necessary connection between the stability of a radical and its selectivity in abstraction processes." This critical thinking is prevalent in chapters 3–6 and this material should be of great benefit to fledgling graduate students. Fort's style is not without biting frankness (p 66, "An egregious contribution to the mechanism..."; p 289, "...has been reported by a Russian group who repeated the work of...without acknowledging it") but he is also quick to cite good work (p 306: "the Swedish group has shown great patience and skill in studying these compounds").

The double-spaced photoreproduced pages (36 lines/page) are easy to read and the numerous structural formulas are vivid. The tables of substituted adamantanes, NMR data, and solvolytic rate data are very good. The references and bibliography follow each chapter and most "selected bibliography" citations are briefly (sometimes caustically) annotated. These latter references appear to refer to tangential material and other miscellaneous studies on adamantanes, but, regrettably, these bibliographies are not incorporated into the subject/author indices and are thus much less useful than they otherwise could be.

Several minor criticisms of the format should be mentioned: reference and formula numbers should be more differentiated (perhaps this is a necessary evil of photoreproduction); the structural equations and formulas do not always follow the corresponding discussion; a more liberal use of arrows to indicate electron movement would have clarified some of the less obvious rearrangements (eq 4-7, 4-13, 6-6) for the nonexpert; reference numbers could have been put adjacent to reaction equations; and (most importantly) structural formulas are often inexplicitly turned around in going from reactants to products, making it difficult for the general reader, without resorting to pencil and paper, to decipher a given transformation (eq 3-71, 4-6, 4-53, 6-23, 6-30). In view of the delay between cessation of writing and publication, it was disturbing to find so many typographical and other errors: p 122 (missing CN); p 134 (ref 191 is missing); p 191 (protonated lactam?); p 280 (Rassat's reference is missing); p 287 (6-20 should be 6-21); p 302 (sulfone in 6-52); p 308 ([*112*] is missing); p 309 (extra [*112*] in 6-60); misspellings were noted on pp 33, 124, 157, 161, 194, 233, 234, 256, 269, 302, 309, and 310.

The only disappointing feature of this book—heightened by the misleading claims on the rear cover—is the lack of any discussion of the pharmacology of adamantanes. Chapter 7 instead consists solely of a 22-page table listing biologically active adamantanes, references, and a few words about each compound's activity. The author's apology that "reports of adamantane pharmacology for the most part are fragmentary, hidden in obscure journals, or buried in generalities in the patent literature" is weak; an attempt should have been made to collate and summarize the material contained in the 155 references cited at the end of this chapter. For example, some discussions of the merits and faults of "Symmetrel" and the toxicity of the diazaadamantanes could have been included and a comparison of

the efficacy of antitumor adamantyl derivatives with other antitumor agents would have been interesting.

Finally, the unreasonable price of this book—$40 for less than 300 pages of photoreproduced typed text—will preclude the beautiful chemistry in the middle chapters, portrayed so well by Fort, from ever being discovered by most graduate students and professional chemists.

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Mechanisms of Oxidation by Metal Ions. By D. Benson. Elsevier Scientific, Amsterdam. 1976. 225 pp. 14.5 × 22 cm. $32.50.

This volume is No. 10 of the monographs entitled "Reaction Mechanisms in Organic Chemistry". As the titles imply, this volume is most useful to the physical organic chemist, the physical inorganic chemist, and possibly the bioinorganic chemist. The strong points of the book are its treatment of complex kinetic data, metal–metal electron-transfer reactions, and a good collection of pertinent references. Some of the strange but interesting new oxidizing species like ruthenium tetroxide, nickel peroxide, and ferrate are not covered. Oxidations with thallium and silver(II) are discussed, however.

The synthetic organic chemist who wishes to perform a metal ion oxidation would find more useful information in Fieser and Fieser's *Reagents in Organic Chemistry* (Vol. I–V) or Wiberg's *Oxidation in Organic Chemistry*. Unfortunately, the former is often too brief and the latter is becoming dated.

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Methods in Receptor Research. Part I. Edited by M. Blecher. Marcel Dekker, New York, N.Y. 1976. xiii + 383 pp. 23.5 × 16 cm. $36.50.

It is impossible for the biologist who works in the microscopic world of cells, organelles, and macromolecules to escape an awareness of a truth which has plagued chemists and physicists for years, namely, that the process of observation frequently distorts the object(s) of scrutiny, sometimes beyond recognition. This truth is especially troublesome to those engaged in membrane receptor research.

Several interesting observations on membrane receptors (i.e., determination of receptor size, shape, chemical composition, etc.) can only be made if the receptor is removed from the membrane environment into a test tube. As is true for any cell component (e.g., organelle, enzyme), removing the receptor from the cell is a process of breaking the fabric of the cell and separating the receptor from other cell components by physical methods and, since the receptor like other submicroscopic things cannot be seen, plans must always be made to distinguish the receptor from other cell components during the process of cell fractionation. A receptor is identified by two criteria: (a) by the hormone evoked physiological event which the receptor mediates and (b) by the receptor's unique binding properties (i.e., receptors bind only the hormone, its congeners, and the direct acting receptor antagonists), of which the former (a) is always and the latter (b) is usually abolished somewhere in the process of isolation and purification of the receptor. Receptorologists have struggled mightily with the dual problems of the isolation of the receptors and the identification of the receptor in the course of isolation. "Methods in Receptor Research. Part I (MRR)" is a milestone collection of accounts of successful struggles with the problems of receptor identification, separation, and purification.

MRR is No. 9 in the series of edited volumes entitled "Methods in Molecular Biology". Each of the 11 chapters relates the work of a single laboratory. The catalogue of receptors (and authors) covered by MRR includes one chapter each on acetylcholine (Karlin, McNamee, Weill, and Valderamma), β-adrenergic (Lefkowitz), cholera toxin (Bennett and Cuatrecassas), ACTH (Finn and Hoffman), and insulin (DeMeyts) receptors and three chapters each on the glucagon (Goldstein and Blecker; Levey, Fletcher, and Ramachandran; Pohl) and gonadotropin (Reichert; Catt, Keterslegers, and Dufan; Saxena) receptors.

As is true of the methods series genre, MRR is no mere recipe book. The methods described have been successfully applied and the fruits of the research are also presented, among which there are several notable features.

As it has long been recognized that the receptor is best identified in broken cell preparations by its selective binding characteristics, methods are now available for radioactivity labeling (to a high specific activity) practically any receptor ligand, for preparing an acceptably pure (receptor-containing) cell membrane preparation, and for measuring the binding of the radioactive ligand to the receptor. The chapters of MRR give specific details for performing such work for several different receptors in a variety of tissues.

While most laboratories use the radioactive ligand–receptor binding assay as a means of receptor identification, one (Karlin et al., acetylcholine receptor) has used the affinity label, i.e., a radioactively labeled compound which reacts covalently with the receptor. The affinity label technique shows great promise in that the covalently bound label does not come off the receptor, even when the receptor's selective binding properties are abolished by the methods employed in subsequent receptor isolation and purification.

There are few critical discussions of radioactive ligand–receptor binding assays as a receptor identification technique. Among those that do appear, Lefkowitz (β-adrenergic receptor) recites some of what have come to be the "minimum accepted criteria" for receptor identification by binding assay [i.e., (1) rapid association, dissociation of the ligand–receptor complex; (2) stereoselectivity of binding; (3) identical dissociation constants for ligand calculated from binding and physiological studies]. Historically these criteria (or expectations) were derived from a consideration of a simple receptor model [e.g., agonist and receptor $\rightleftharpoons$ agonist–receptor (physiologically active complex)]. In view of De Meyt's (insulin receptor) evidence that this simple model does not appear to obtain, at least in the case of the insulin receptor, perhaps the accepted general criteria for receptor identification in broken cell preparations ought to be revised. As a second issue, enzymatic degradation of the radioactive ligand by membrane-bound catabolic enzymes is a perturbation which occasionally arises in the course of receptor-binding studies. Catt et al. (gonadotropin receptor) detail kinetic methods for dealing with this problem.

Unlabeled receptor agonist and its congeners and receptor antagonists all compete with the radioactive ligand for the receptor. Several authors suggest using this property of radioactive ligand–receptor binding to assay hormone levels in blood and cerebrospinal fluid. This suggestion, already jargonized as the "radio receptor assay", is essentially a radioimmunoassay where the antibody has been replaced by a receptor. The principle advantage of the radioreceptor assay over the radioimmunoassay is that the receptor occasionally appears to have a higher specificity for the hormone than does the corresponding antibody. Saxena (gonadotropin receptors) has already successfully applied the radioreceptor assay clinically to diagnose pregnancy and to predict spontaneous abortion. Another obvious application of the radioreceptor assay is the in vitro evaluation of synthetic receptor agonists and antagonists prior to expensive animal trials.

The inclusion of the cholera toxin receptor (Bennett and Cuatrecasas) in a book along with the (teleologically more reasonable) hormone and neurohormone receptors makes one a bit uneasy. What sense does a cholera toxin receptor make? Can it really be true that the torment of disease is embraced (as the word receptor suggests) rather than inflected? The very existence of a cholera toxin receptor serves to remind us that the grand organismic design we sometimes think we see in the existence of hormones and hormone receptors is perhaps an illusion.

Some laboratories have solubilized receptors with detergent compounds, separated the solubilized receptors from other membrane components, and briefly characterized them. The progress made by three such groups has been truly remarkable. The acetylcholine receptor (Karlin et al.) has been isolated from *Electropherus* and purified by affinity chromatography. Its molecular weight (200 000) and tissue density (10^{-6} mol/g net weight) have been estimated and rabbit antibodies have been

produced to the *Electrophorus* receptor which appear, remarkably, to be cross reactive with the acetylcholine receptor of the rabbit's skeletal muscle motor end plate. Attempts have also been made to reconstitute the acetylcholine receptor in the membrane to measure transmembrane ^{22}Na flux increases with carbocholine stimulation. However, these have proved to be disappointing. The gonadotropin receptor (Saxena) has been isolated from bovine corpus lutea and purified by a variety of techniques. Its molecular weight (200 000–300 000) and amino acid composition have been estimated. Again, rabbit antibodies have been raised to the isolated receptor which are cross reactive with the corresponding in vivo receptors. Finally Catt et al. have isolated gonadotropin receptors from rat testes and rat ovaries, purified them, and estimated the molecular weight (224 000) and fractional (1.56) and axial (10.2) ratios of the testicular gonadotropin hormone–receptor complex. In summary, physical measurements which were first made on enzymes 15–20 years ago are now beginning to be made on receptors in several laboratories.

It needs to be stressed that while the reported progress of individual laboratories varies from chapter to chapter in MRR, each chapter is in and of itself a well-written, thoughtful accounting of what appears to be a carefully executed study.

Unfortunately, the impression left by MRR taken as a whole is not one characterized by "thoughtful, painstaking and care". Regarding the overall organization of MRR, the editor prefaces the volume with ..."The reader will note a certain amount of seeming redundancy and overlap among the chapter titles and methods employed." "Seeming redundancy and overlap" indeed. Reading the chapters on the peptide hormone receptors was like sitting through eight consecutive performances of LaBoheme (a magnificant opera) in which only the lead singers had changed from performance to performance (in all, not an edifying nor an amusing experience). All peptide hormone receptor workers labeled receptor ligands by the chloramine T or lactoperoxidase methods. Membrane preparations varied from chapter to chapter in minor details (number of strokes with such and such a homogenizer, centrifuge speed, etc.). Receptor binding assays were virtually identical, as were membrane solubilizations and component separation techniques employed. The redundancy is not "seeming". It is blatant, the result of a botched editing job. The overall result is that one reads the eight peptide hormone receptor chapters with increasing exasperation and declining interest, a fate which none of the chapters, taken alone, really deserves.

The Series editors (Laskin and Last) ought to consider organizing methods books on a one method per chapter basis. MRR would have been better organized by having one chapter on radioligand preparation, another chapter on methods of membrane preparation, another chapter on hormone binding and receptor identification, etc. The author of each chapter would have had to review the general theory and several examples of the practice of the subject method of the chapter, not as easy as writing about one's own methods perhaps, but far more useful to the reader.

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Subunits in Biological Systems. Part C. Edited by Serge N. Timasheff and Gerald D. Fasman. Marcel Dekker, New York and Basel. 1975. vii + 343 pp. 15.5 × 23.5 cm. $39.50.

This book, the third in a series on biological macromolecules seen as subunits of larger complexes, is chiefly directed to the physicochemical model builder. Three of the articles included here deal primarily with blueprints for the invisible. The fourth and longest, however, is a fine discussion of immunoglobulin subunits which includes the biological implications wherever possible.

The article on the Structure of Polyribosomes by Leonard Malkin is very brief and consists primarily of the evidence for a ribosome model in which the protein chain under construction starts from a growing point in the interior of the larger of the two ribosomal subunits and issues from the surface of this subunit some 35 amino acid residues further on. This article follows a more lengthy and inclusive discussion of ribosome structure by Spirin and Bakh in Part B of this series.

The contribution by George Nemethy is molecular biology at its purest. It deals with allosteric regulatory effects in proteins and the part that subunit interactions play in these effects. Analyses based on thermodynamic considerations and descriptions of activity according to the protocol of statistical mechanics are used as the bases for models and these models are compared. As is frequently found in this kind of molecular biological prose, life would be considerably easier for the reader if there were more explanations and fewer definitions.

Glutamate dehydrogenase is discussed by Sund, Markae, and Koberstein. Its importance in the setting of this book is that it forms association complexes consisting of several subunits, each of which, in turn, comprises several polypeptide chains. The association of subunits, which is dependent on the concentration of the enzyme, is discussed in detail from a structural point of view. No evidence for a biological role for the more highly associated particles is put forward, though it is suggested that the forces responsible for the self-association of subunits may be similar to those involved in the binding of this enzyme to membranes.

This book is much better produced than its predecessor, Part B of this series. It is primarily directed to those interested in the physical chemistry of biological macromolecules and, except for the chapter on immunoglobulins, does not offer much to the nonspecialist.

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Cancer Chemotherapy. ACS Symposium Series 30. Edited by Alan C. Sartorelli. American Chemical Society, Washington, D.C. 1976. x + 126 pp. 15.5 × 23.5 cm. $14.75.

The papers delivered at a symposium on cancer chemotherapy held on April 7, 1975, at the 169th National Meeting of the American Chemical Society (Division of Medicinal Chemistry) in Philadelphia are available in book form. The authors have updated their manuscripts so as to include a number of important references which appeared in 1976.

There are only five chapters in this slim volume and, though they hardly represent the kind of comprehensive review of cancer chemotherapy that one might be led to expect from the title, they nonetheless serve as eloquent testimonials to the role of synthetic medicinal chemistry in the development of new antitumor agents.

Chapter one (Sartorelli and Agrawal) deals with the α-(*N*)-heterocyclic carboxaldehyde thiosemicarbazones. This class of totally synthetic antineoplastic agents has been under development for a number of years but is not yet accepted for widespread clinical use. The best known member of the series, 1-formylisoquinoline thiosemicarbazone (IQ-1), blocks DNA synthesis at the level of ribonucleoside diphosphate reductase and shows an encouragingly broad spectrum of experimental antitumor activity. This chapter presents a lucid and stimulating account of the rational approach to the design of improved analogues of IQ-1.

Chapter Two (Henry) and Chapter Three (Bachur) are devoted to the chemistry and biochemical pharmacology of adriamycin and related anthracycline antibiotics. This is an area where great advances have been made in modifying the structure of an already potent natural product. The success of such analogues as *N*-trifluoroacetyladriamycin 14-*O*-valerate (AD32) illustrates the importance of systematic functional group modification in drug development—an approach that too many researchers unfortunately regard with scorn as being "pedestrian".

Chapter Four (Lee, Cosby, and Sartorelli) is an interesting exposition of the bioreductive latentiation concept as applied to alkylating agents. Although it has not yet generated clinically effective agents, the idea of making use of the high reducing potential of neoplastic cells to selectively activate a prodrug is an appealing one because it is an extension of the postulated mechanism of action of the mitomycin antibiotics.

Finally, Chapter Five (Wheeler) concerns itself with the nitrosoureas, a class of alkylating agents of which the best known are BCNU, CCNU, and MeCCNU. The development of these

potent and versatile antitumor drugs at Southern Research Institute probably constitutes one of the best available examples of a successful contract-supported cancer research program in this country at the present time.

This is an interesting group of papers and their publication in a modestly priced volume will undoubtedly be welcomed even by those who attended the meeting at which they were presented originally. It should be noted that the low cost of the book is due mainly to the use of camera-ready copy. Thus, there are some unavoidable typographical errors for which the editor is not entirely to blame. On page 4, for instance, in a figure showing the antitumor activity of IQ-1 the tumor is identified as "lymphoma L1210" (it is a leukemia); on page 28, compound 10 in Table III should be marked 16; and on page 71, the triazene alkylating agents are mistakenly referred to as "triazines (which are antimetabolites). A few trivial but amusing spelling errors also surface on occasion, e.g., "diasteriomeric" on page 41, "quininoid" on page 44 (presumably not referring to quinine), and "latenization" on page 71 (to "laten" means to grow late, so perhaps this is a permissible variation on the "latentiation" theme after all!).

A minor source of irritation was the choice of typography for the references (e.g., *1*) and chemical structures (e.g., 1) which this Reviewer happened to find confusing at times.

All in all, however, this attractive symposium volume will be useful to any medicinal chemist who is actively working on the development of new antitumor agents or who merely wishes to stay abreast of this very large field.

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Metal Ions in Biological Systems. Volume 6. Biological Action of Metal Ions. Edited by Helmut Sigel. Marcel Dekker, New York, N.Y. 1976. xiii + 452 pp. 14 × 22 cm. $39.50.

Like the five preceding volumes in the series this volume is a collection of chapters organized around a central theme, in this case the "Biological Action of Metal Ions". The chapters individually are useful reference works, although there is little overall sense of coordination toward the goal of the series, which is "to break down barriers between the historically separate spheres of chemistry, biochemistry, biology, medicine, and physics".

Volume 6 begins, appropriately enough, with a lengthy review of "Zinc and its Role in Enzymes" by J. Chlebowski and J. E. Coleman. It is thorough yet readable and may be highly recommended to anyone interested in metalloenzymes in general or one of the nine zinc enzymes discussed in detail. In Chapter 2 "Vanadium in Selected Biological Systems" is reviewed by W. R. Biggs and J. W. Swinehart, who note that nearly seven decades of work on the problem has not resulted in the elucidation of a biological role for vanadium. "The Chemistry of Biological Nitrogen Fixation" is reviewed by P. W. Schneider in Chapter 3. An overview of the occurrence, purification, and properties of nitrogenase is given, as are interesting discussions of "substrate analogs", the coupling of ATP hydrolysis to nitrogen reduction, and the relationship of models to the enzyme. D. W. Darnall and E. R. Birnbaum describe in Chapter 4 "The Metal Ion Acceleration of the Activation of Trypsinogen to Trypsin" and also provide an interesting and useful section on the chemistry and biology of lanthanide ions as replacement probe ions for calcium.

Of particular interest to medicinal chemists are the last two chapters. K. S. Rajan, R. W. Colburn, and J. M. Davis assemble in Chapter 5 evidence pertaining to possible roles for calcium, magnesium, ATP, and phospholipids in the uptake, storage, and release of catecholamines and related compounds. The hypotheses put forth are thought-provoking and should be given consideration by all researchers in the catecholamine–neuropharmacology area. In the last chapter F. N. Briggs and R. J. Solaro review "The Role of Divalent Metals in the Contraction of Muscle Fibers", covering the macromolecular organization of muscle fibers and the changes which accompany contraction, electrochemical coupling, and the roles of sodium, calcium, and magnesium in depolarization–contraction cycling.

Few medicinal chemists will want to purchase this volume, because it is expensive and the reviews are rather specialized and stand-alone, rather than interrelated. However, it is part of a continuing series well worth being aware of for their potential as reference material.

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Advances in Modern Nutrition. Volume I. Carbohydrate Metabolism: Regulation and Physiological Role. Edited by Carolyn D. Berdanier. Hemisphere Publishing Corp., Washington, D.C. 20005. 1976. 16 × 23.5 cm. xv + 318 pp. $24.50.

It is stated in Chapter 1 that "There exists an ever increasing human craving for sweetness". This incisive, timely, carefully documented work addresses itself to the importance of carbohydrates, sweet and otherwise, in inducing physiological responses in animals. The approach is broad and includes the following reviews: (1) Some Perspectives on Carbohydrate Consumption, L. Gardner; (2) Taste and Bioavailability of Sugars as Related to Structure, R. S. Shallenberger; (3) Digestion and Absorption of Dietary Carbohydrates, S. Reiser; (4) Insulin/Glucagon Ratio—A Determinant of Glucose Homeostasis, E. B. Spannhake; (5) Metabolic Consequences of Carbohydrate Free Diets, R. W. Boggs; (6) Carbohydrate Nutrition and Hyperalimentation, C. D. Berdanier and M. V. Kaminski; (7) Effect of Starvation and Food Restriction on Carbohydrate Metabolism, B. Szepesi; (8) Sex Differences in the Metabolic Response to Dietary Carbohydrate, I. MacDonald; (9) Genetic–Diet Interaction in Carbohydrate Nutrition, A. M. Cohen and S. Eisenberg; (10) Genetic Errors in Carbohydrate Metabolism, C. D. Berdanier.

Each review is stimulating, authoritative, and detailed, and most contain references into 1975. The relationship of carbohydrate nutrition to dental caries, atherosclerosis, and diabetes are examples of topics covered along with the metabolic bases for the observed effects. An author and subject index are included. Volume II of this series titled "Diabetes, Obesity and Vascular Disease" is scheduled for publication in the spring of 1977 and if it maintains the high standards of Volume I it will deserve wide circulation. "Carbohydrate Metabolism" is highly recommended for those concerned with current developments and probable future directions in this field.

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Chemical Carcinogens. ACS Monograph 173. Edited by Charles E. Searle. American Chemical Society, Washington, D.C. 1976. 15.5 × 23.5 cm. xxvi + 788 pp. $67.50.

For some time a need existed for a single book which describes our present knowledge of the chemistry, biology, and hazards of the known range of carcinogens. This book admirably serves the needs of chemists, medical, and other scientists involved in cancer research.

The most recent theories in cancer chemistry and biology are described by 23 authorities from the United States, United Kingdom, France, and West Germany who have contributed 16 chapters on bioassays and tests; tumor-promoting and cocarcinogenic agents; endocrine aspects; carcinogenesis by alkylating agents; polynuclear aromatic carcinogens, soots, tars, and oils in occupational cancer; environmental respiratory carcinogenesis; aromatic amines; epidemiology; laboratory hazards; *N*-nitroso compounds; carcinogens in plants and microorganisms; the braken carcinogen; carcinogens in food; asbestos carcinogenesis; and the metabolism of chemical carcinogens to reactive nucleophiles and their mechanism of action.

Chemical carcinogenesis poses so many intriguing problems that its study would attract research workers even if it did not have such a direct relevance to present-day life and human well-being. Chemists in particular will have good reason to study

this subject, in identifying carcinogens and finding out how they act. They would want to know which chemical agents are hazardous to life and health so that they can avoid them or at least reduce their hazards to the minimum possible. The goal of research should be to identify carcinogenic hazards in advance, rather than belatedly after their effects on man have become apparent.

This volume, in spite of the price, is recommended for all practicing chemists, irrespective of their field of interest, who will come in daily contact with many of the potential and real carcinogens described therein. It should be readily available in all libraries. The book is uniformly well written, liberally illustrated with structural formulas, and contains a subject index.

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The Fate of Drugs in the Organism. Volume 3. By J. Hirtz. Marcel Dekker, New York, N.Y. 1976. 587 pp. 16 × 23.5 cm. $69.50.

This volume is the third in a series containing a "Bibliographic Survey" of the drug metabolism literature compiled by the French Society for Pharmaceutical Science and Technology under the Chairmanship of J. Hirtz. The objective of this volume is a systemic compilation of references for rapid access to the literature.

The book is arranged into three sections. Part One contains 3000 references containing title, author(s), and journal references. These references are listed by number in no particular order. The second part contains a tabulation of drugs listed alphabetically by their common names (WHO) or by their chemical names according to the IUPAC regulations. For each drug there is a number for the reference(s) (Part One), the year of publication, and a series of 17 key words and an indication that the reference contains data corresponding to this particular key word. Part Three contains a tabulation of each drug by its empirical formula.

The most recent references in this volume are to 1973 which may be due to the difficulty in rapid publication of this book. Furthermore, this book neither is meant to be nor is it an exhaustive publication of the literature. Thus, this volume does have several omissions of useful references. In summary, this volume is useful for a very rapid acquaintance with some of the more pertinent literature of the fate of many of the commonly used drugs in the living organism.

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Biochemistry Involving Carbon–Fluorine Bonds. ACS Symposium Series 28. Edited by Robert Filler. American Chemical Society, Washington, D.C. 1976. 16 × 23.5 cm. ix + 214 pp. $15.75.

This volume contains the proceedings of a symposium by the Divisions of Fluorine and Biological Chemistry presented at the 170th National Meeting of the American Chemical Society, Chicago, Ill., August 26, 1975. Each of the ten papers published in this book is referenced (usually into 1975) and includes a terminal "question and answer" section. Abridged chapter titles (authors) are 1, Fluorocarboxylic Acids (Kun); 2, Ring-Fluorinated Imidazoles (Kirk, Cohen); 3,2-Fluoro-L-histidine (Klein, Kirk); 4,5-Fluoro- and 5-Trifluoromethyl-2′-deoxyuridylic Acid (Santi, Pogolotti, James, Wataya, Ivanetich, Lam); 5, Aliphatic Fluorine on Amine Drugs (Fuller, Molloy); 6, Deoxyfluoromonosaccharides (Taylor, Romaschin, Smith); 7, Characterization of Fluoro Compounds in Human Plasma (Guy, Taves, Brey, Jr.); 8, Iv Infusion of Cis–Trans Perfluorodecalin Emulsions (Clark, Wesseler, Kaplan, Emory, Moore, Denson); 9, Radiopaque Brominated Fluorocarbons (Long, Liu, Dobben, Szanto, Arambulo); 10, Fluorinated Volatile Anesthetics (Denson, Uyeno, Simon, Jr., Peters).

Although this book is now 1.5 years old, it is filled with a wealth of data and references to additional information on the biochemistry and pharmacology of fluorine-containing organic compounds. Various chapters include discussions of organic and physical chemistry, spectroscopy, and enzymology as well as biochemistry and pharmacology in vivo and in vitro. Since fluorine insertion into biologically active molecules markedly alters electronic properties of the parent compound and in certain substances causes marked changes in pK_a, it is to be expected that major changes in biological properties should result from such substitution. This monograph is of value to the reader who is not an expert in this area since much of this specialized field is summarized in a concise package. Chapters may serve as a source of undergraduate and graduate lecture material and provide a background for those interested in entering into one or more aspects of this field or using selected fluorine-containing molecules as biological probes. It is unlikely that individual ownership of this work would be advantageous unless one is involved in this kind of research. A subject index is included which contributes to the usefulness of the book.

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Protein Synthesis, a Series of Advances. Volume 2. Edited by Edwin H. McConkey. Marcel Dekker, New York, N.Y. 1976. xii + 386 pp. $34.50.

The first volume of this series was published in 1971 and focused exclusively and quite completely on the mechanistic aspects of bacterial protein synthesis. This second volume purports to focus on protein synthesis in eukaryotic systems. While the individual chapters are readable and cover their subjects well, the topics themselves deal with only limited aspects of the overall subject. For example, it is unfortunate in a review of this type that there is no discussion at all of the process of protein synthesis in eukaryotic cytoplasm or of the nature of the cytoplasmic factors or ribosomes. A second shortcoming of the book is that it appears relatively dated in that most of its references are dated prior to 1975. For this reason I believe that, while the book is useful as a source material on selected topics, it would probably not be useful as a general reference on the subject of protein synthesis in eukaryotic systems. This is regretable because such a book would be of value.

The book is divided into six chapters. The first three deal with the specialized topics of the relationship between heterogeneous nRNA and mRNA, histone biosynthesis, and inhibitors of eukaryotic protein synthesis. The next two chapters (more than one-third of the book) deal in a very coherent manner with the intriguing topic of protein synthesis as it occurs in subcellular organelles, chloroplasts, and mitochondria. The final chapter stands somewhat by itself and describes the regulatory features of ribosomal RNA synthesis in bacteria.

In sum, therefore, the second volume of this series provides useful if somewhat dated reviews on selected topics relating broadly to protein synthesis in eukaryotic systems. It is unlikely, however, that the average reader would find it a useful addition to their reference library.

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