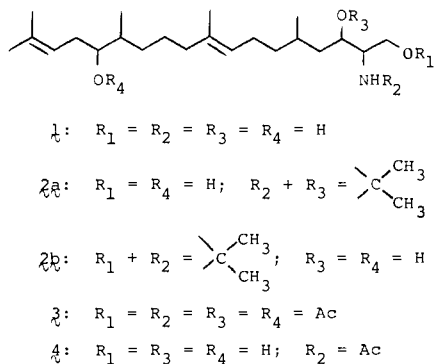


(Scheme 1) of acetonides **2a** and **2b** ( $-78\text{ }^{\circ}\text{C}$ ,  $\text{CH}_2\text{Cl}_2/\text{C}_5\text{H}_5\text{N}$ ) followed by gas chromatography/mass spectrometry of the trimethylated products, which identified the aldehydes **9** and **10** by their molecular weights, 258 and 343, respectively.<sup>11</sup>



Aplidiasphingosine (**1**, 2-amino-5,9,13,17-tetramethyl-8,16-octadecadiene-1,3,14-triol) can be regarded as a derivative of sphingosine itself, i.e., as 14-hydroxy-5,9,13,17-tetramethyl-8,16-sphingadienine, disregarding stereochemistry at C-2 and C-3. One may reasonably assume that the biosynthesis of apolidiasphingosine proceeds from the corresponding diterpenic acid (perhaps as its CoA derivative) plus serine with loss of the serine carboxyl group.<sup>12</sup> However, whether apolidi-

asphingosine serves some of the same biological functions in this urochordate that sphingosine does in higher animals (and plants) can only be speculated. Similarly, it is not yet known whether the various bioactivities of apolidiasphingosine may depend on its interference with normal sphingosine functions.

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## References and Notes

- (1) Presented in part at the Second International Symposium on Marine Natural Products (IUPAC-Societa Chimica Italiana), Sorrento, Italy, Sept 12-15, 1978.
- (2) Identified by Dr. D. P. Abbott, Hopkins Marine Station, Pacific Grove, Calif., from a sample preserved in ethanol.
- (3) *New York Times*, July 19, 1976, p. 1.
- (4) Biological activity data were provided by (a) Dr. L. P. Hager, Mr. J. Nemanich, and Ms. G. Williamson, University of Illinois; (b) Dr. L. H. Li and Ms. S. L. Kuentzel, The Upjohn Co.; (c) Dr. R. G. Hughes, Roswell Park Memorial Institute; (d) Dr. J. J. Vavra and Mr. G. E. Zurenko, The Upjohn Co.
- (5) The samples were stored in ethanol after collection, and a proportional aliquot of the storage ethanol was included in the extraction.
- (6) The 5:1 mixture of **2a** and **2b** was recognized from its  $^{13}\text{C}$  NMR spectrum, which shows duplicate absorptions for the ketal carbon, C-1, C-2, and C-3.
- (7) In accord with the molecular formulas shown were (a) high resolution or (b) low resolution mass spectral data.
- (8) C. C. Sweeley and E. A. Moscatelli, *J. Lipid Res.*, **1**, 40 (1959).
- (9) (a) E. Stenhagen, *Z. Anal. Chem.*, **181**, 462 (1961); (b) R. P. Hansen, *Nature (London)*, **210**, 841 (1966), and references therein.
- (10) Further support for this assignment was provided by the failure of **4** to undergo a similar periodate cleavage.
- (11) Aldehydes **10a** and **10b** were not resolved chromatographically.
- (12) A. L. Lehninger, "Biochemistry", 2nd ed., Worth Publishers, New York, 1975, p. 676.

Guy T. Carter, Kenneth L. Rinehart, Jr.\*

Roger Adams Laboratory, University of Illinois  
Urbana, Illinois 61801

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## Book Reviews\*

**Advances in Organometallic Chemistry, Volume 15.** Edited by F. G. A. Stone and R. West. Academic Press, New York, 1977. vii + 332 pp. \$33.00.

The chapters in this volume are: Recent Developments in Theoretical Organometallic Chemistry (D. M. P. Mingos); Metal Atom Synthesis of Organometallic Compounds (P. L. Timms and T. W. Turney); Metal Complexes of  $\pi$ -Ligands Containing Organosilicon Groups (I. Haiduc and V. Popa); Activation of Alkanes by Transition Metal Compounds (David E. Webster); Supported Transition Metal Complexes as Catalysts (F. R. Hartley and P. N. Vezey); Structures of Main Group Organometallic Compounds Containing Electron-deficient Bridge Bonds; and Organometallic Radical Anions (P. R. Jones).

It is not stated how up to date the literature coverage in these reviews is, but some references from 1976 are included, and one chapter includes a note added in proof, concerning some important work published in 1976. As is characteristic of the series, there are included extensive tables and bibliographies, a subject index, and a cumulative list of titles from previous volumes.

\* Unsigned book reviews are by the Book Review Editor.

**The Uncertainty Principle and Foundations of Quantum Mechanics.** Edited by W. C. Price, FRS, and S. S. Chissick (King's College, London). John Wiley & Sons, Inc., New York, N.Y. 1977. xvii + 572 pp.

A tribute to the late Professor Werner Heisenberg (1901-1976) to commemorate the 50th anniversary of the formulation of quantum mechanics. In his dedication of the volume, Professor Sir Hermann Bondi states, "This volume brings together many illuminating phases of one of the most exciting and successful hunts in history, the formulation of the quantum theory. Not only was this hunt outstanding in the range and wealth of experimental data it covered . . . but also in its philosophical implications." The collection of 25 articles by 30 authors is organized into four parts: 1. Quantum Uncertainty Description; 2. Measurement Theory; 3. Formal Quantum Theory; 4. Applied Quantum Mechanics. The opening article is by Heisenberg himself, "Remarks on the Origin of the Relations of Uncertainty." A good portion of the contents presupposes the professional expertise of a theoretical physicist. Of chemical interest are articles by C. C. J. Roothaan and J. H. Detrich, "Relativistic Electromagnetic Interaction Without Quantum Electrodynamics", and by M. A. Ratner, J. R. Sabin, and S. B. Trickey, "Applications of Model Hamiltonians to the Electron Dynamics of Organic Charge Transfer Salts". Price

and Chissick were also editors of a tribute to Professor Louis de Broglie: "Wave Mechanics, the First Fifty Years" (Wiley, New York, 1973).

**Symmetry and Separation of Variables (Encyclopedia of Mathematics and its Applications. Volume 4).** By WILLARD MILLER, JR. (University of Minnesota). Addison-Wesley, Reading, Mass. 1977. xxx + 285 pp. \$21.50.

The first systematic treatment of the relationship between symmetry properties in Lie algebras and separation of variables in the differential equations of mathematical physics. Some modern group-theoretical twists in the method of separation of variables can provide a foundation for much of the theory of special functions. An interesting Foreword by Richard Askey points out that certain orthogonality relations among  $3j$  and  $6j$  symbols, apparently discovered since 1930, correspond to the long-known results in the theory of Lie algebras; hence there is an appeal to the producers and consumers of mathematics to talk to one another.

**Collected Accounts of Transition Metal Chemistry. Volumes I and II.** Edited by F. BASOLO (Northwestern University), J. F. BUNNETT (University of California, Santa Cruz), and J. HALPERN (University of Chicago). American Chemical Society, Washington, D.C. Vol. I: 1973. v + 250 pp. \$11.50 hardbound; \$7.50 paperback. Vol. II: 1977. v + 265 pp. \$12.50 hardbound; \$8.50 paperback.

Reprints of selected papers on transition metal chemistry which appeared in Volumes 1-8 of *Accounts of Chemical Research*. Subclassified under headings including Synthesis, Structure and Bonding; Inorganic Reaction Mechanisms; Organometallic Reactions and Catalytic Applications; Transition Metal Chemistry of Biological Interest. Both volumes include subject indexes.

**Fluorine Coupling Constants.** By J. W. EMSLEY (University of Southampton), L. PHILLIPS (Imperial College, London), and V. WRAY (Braunschweig). Pergamon Press, New York, N.Y. 1977. v + 671 pp. \$75.00.

Reprinted from *Progress in NMR Spectroscopy*, Volume 10, Parts 3/4. Introductory sections on the theory of spin-spin coupling and medium effects. The bulk of the volume (about 600 pp) consists of a tabulation of spin-spin coupling constants involving fluorine, organized into tables of fluorine-hydrogen, fluorine-fluorine, and fluorine-other element coupling. Covers published data up to 1972.

**Water, Wastes and Health in Hot Climates.** Edited by RICHARD FEACHEM, MICHAEL MCGARRY, and DUMCAN MARA. John Wiley & Sons, Inc., London. 1977. xvi + 399 pp. \$26.50.

Civil, public health, and environmental engineers will find that this book will provide an excellent introduction to the problems of providing potable water and waste disposal in developing nations. Some of the topics discussed are water-related diseases, health risks of irrigation schemes and manmade lakes in tropical environments, surface water quality, water supplies for low-income communities, patterns of domestic water use, water treatment, solid wastes, biogas and fish culture, and public health considerations in wastewaters and excreta re-use for agriculture. Excellent photographs and illustrations are included, as well as references.

M. C. W. Smith, *University of Michigan*

**Turbulence in Mixing Operations. Theory and Application to Mixing and Reaction.** Edited by ROBERT S. BRODKEY (The Ohio State University, Columbus). Academic Press, New York, N.Y. 1975. 339 pp. \$19.50.

Chemical engineers and manufacturing chemists should find this collection of articles useful. Among the topics covered are theoretical aspects of turbulent mixing reactants, mixing in turbulent fields, non-premixed reactions, turbulent mixing in chemically reactive flows, simulating turbulent-field mixers and reactors, and industrial turbulent mixing. Each section includes references.

M. C. W. Smith, *University of Michigan*

**Microbiology-1977.** Edited by DAVID SCHLESSINGER. American Society for Microbiology, Washington, D.C. 1977. ix + 593 pp. \$22.00.

The major portion of this annual publication is devoted to subjects

of interest mainly to microbiologists and physicians. A few articles may be of interest to chemists and biochemists. Among these are discussions of peptidoglycan synthesis, reversible formation of undecaprenyl glucosaminyl lipids, penicillin and penicillinase, bacterial endotoxins, and lipoteichoic acids. References are included.

M. C. W. Smith, *University of Michigan*

**Annual Review of Biophysics and Bioengineering.** L. J. MULLINS, Editor (University of Maryland). Annual Reviews Inc., Palo Alto, Calif. 1977. vii + 565 pp. \$?

This review volume contains an amazing variety of topics from phototropism in coprophilous zygomycetes to stiff differential equations. Chapters of interest to chemists are areas, volumes, packing and protein structure, mechanisms of zymogen activation, protein-lipid interactions, assembly of multisubunit respiratory proteins, interpretation of resonance Raman spectra of biological molecules, reactivity and cryoenzymology and enzymes in crystalline state, carbon-13 nuclear magnetic resonance studies of proteins, and high-resolution nuclear magnetic resonance studies of double helical polynucleotides. References are included.

M. C. W. Smith, *University of Michigan*

**Microbial Aspects of Pollution Control.** By R. K. DART and R. J. STRETTON (University of Technology, Loughborough, G.B.). Elsevier Scientific Publishing Co., Amsterdam. 1977. 222 pp. \$34.75.

This slim volume is a veritable gold mine of information for the microbiologist and civil, environmental, or public health engineer and provides an excellent introduction to the role of microorganisms in the environment. Topics included are microbial production of pollutants, air pollution and microorganisms, health hazards arising from water-borne pathogens, water testing, sewage treatment, disinfection, recycling of water, eutrophication, thermal pollution, and sulfur cycle and waste recovery, oil pollution, and biodegradation. Each chapter includes references.

M. C. W. Smith, *University of Michigan*

**Biochemical Engineering Fundamentals.** By JAMES E. BAILEY and DAVID F. OLLIS (University of Houston and Princeton University). McGraw-Hill Book Co., New York, N.Y. 1977. xiv + 753 pp. \$25.00.

This book was designed as a textbook for biochemical engineering. Chapter headings include, a little microbiology, chemicals of life, kinetics of enzyme-catalyzed reactions, isolation and utilization of enzymes, metabolic pathways and energetics of the cell, cellular genetics and control systems, kinetics of substrate utilization, product yield, and biomass production in cell cultures, transport phenomena in microbial systems, design and analysis of biological reactors, biological reactors, substrates and products I: single-species applications; analysis of multiple interacting microbial populations, and biological reactors, substrates, and products II: Mixed microbial populations in applications and natural systems. Problems and references are included at the end of each chapter. Although some of the figures seem to be mislabelled, the text as a whole should be adequate for an introductory course.

M.C.W. Smith *University of Michigan*

**Methodicum Chemicum. Volume 11. Part 2.** Edited by F. KORTE, Academic Press, Inc., New York. 1977. ix + 304 pp. \$49.50.

This book is the second of three parts of Volume 11 which deals with natural products only. The opening chapter on antibiotics is an excellent, concise but comprehensive review on all clinically used antibiotics. It includes historical development of chemotherapy, the discovery process of naturally occurring antibiotics from screening of soil samples to chemical development of structure determination, and synthesis with many examples taken from major classes of antibiotics, their biochemistry, and clinical use. The second chapter presents a brief introduction to the occurrence, chemistry, and biochemistry of vitamins and coenzymes. Subsequent chapters contain similar treatment on enzymes, hormones, and naturally occurring toxic substances. Under the "Miscellaneous" heading are covered odor and taste substances, luciferins, and the chemical aspects of memory—a relatively new frontier. The book is easy reading and an excellent source of condensed information for familiarization of areas covered with ample references for an in-depth reading.

O. P. Goel, *Warner-Lambert/Parke-Davis*

**Order in Polymer Solutions (Volume 2 of Midland Macromolecular Monographs).** Edited by K. ŠOLC (Midland Macromolecular Institute). Gordon and Breach, New York. 1976. viii + 320 pp. \$19.50.

The thirteen papers collected in this volume were presented at a Midland Macromolecular Symposium held in August of 1973. The topics covered included the helical state and the helix-coil transition in biopolymers, conformational properties of block copolymers and optically active stereoregular polymers, polymer-solvent interactions as characterized by gas-liquid chromatography, solvation effects, relaxation phenomena, random association, highly ordered association, the effect of association on optical activity, and association-dissociation equilibria. Discussion questions and answers are recorded for most of the articles, and there is a useful Subject Index. The articles have apparently also been published in several issues of *The International Journal of Polymeric Materials*.

This will be a very useful collection of articles for anyone working on solutions of polymers (whether biopolymeric or "synthetic"), in which either intramolecular or intermolecular ordering can take place.

J. E. Mark, *University of Cincinnati*

**Polymer Physics Treatise. Volume 2. Ion-Containing Polymers: Physical Properties and Structure.** By A. EISENBERG and M. KING (McGill University). Academic Press, New York. 1977. xvi + 287 pp. \$27.50.

This volume reviews current (through 1976) research on a wide variety of ion-containing polymers, at a level suitable for a researcher already conversant with the techniques of the field. The authors make a strong effort to refer readers to other monographs rather than duplicating content. Some topics (e.g., biological polymers) are simply excluded, while others (glass transitions, polyelectrolytes in solution) are treated briefly, from the specific viewpoint of this book. The main emphasis of this work is on viscoelastic properties of solid-state materials, but other techniques (small-angle X-ray scattering, dielectric measurements) are also included. For details of experimental techniques, as distinct from measurements on particular systems, the reader must return to the literature.

After a brief introduction, the authors turn to supermolecular structure and glass transitions. Actual physical measurements are separated from the multitudinous models invoked to describe them. Separate chapters then examine viscoelastic properties of homo- and copolymers. The chapters are organized on structural rather than historic lines. The treatment of homopolymers begins with inorganic compounds, turns to nonionic organic compounds containing dissolved salts, and finishes with a treatment of ionic organic compounds. Copolymers are separated into non-crystalline, crystalline and rubber-forming classes. Charge-transfer complexes are only discussed briefly. A final brief chapter (50 pages) notes work on molecular dimensions and intrinsic viscosities in solution and on rubber elasticity.

The authors have done a particularly good job of summarizing masses of literature results, noting unifying themes, and emphasizing contrasts between different classes of materials. The thorough symbol table greatly eases reading.

George D. J. Phillips, *University of Michigan, Ann Arbor*

**Amino-Acids, Peptides, and Proteins. Volume 8 (Specialist Periodical Reports).** Senior Reporter: R. C. SHEPPARD. The Chemical Society, Burlington House, London. American Chemical Society, Washington, D.C. 1976. xvii + 504 pp. \$63.00.

This eighth report on amino acids, peptides and proteins covering the literature of 1975 continues in essentially the same format as earlier volumes. As in earlier reports, the part on structure and biological activity is limited to one area. This section of this volume is limited to the literature on peptide hormones and related compounds for a two-year period, 1974-75. Twenty-two contributors have compiled the report which consists of six chapters: (1) the chemistry of amino acids; (2) structural investigations of peptides and proteins, comprising almost half of the volume; (3) peptide synthesis, with useful tabular appendices; (4) peptides with structural features not typical of proteins (such as cyclic peptides); (5) a survey of the peptide hormones and related compounds with extensive tabular data on activities covering a very active period of research activity; and (6) further ex-

tracts concerning nomenclature, and in addition an author index of referenced works.

The report is intended to review the literature, excepting in some instances biological and patent literature, of this specific period, and as such is a valuable aid for the specialist in the areas covered. The limitation of biological activity to a specific area may limit its usefulness for some, but the extensive chemistry reported in this manner is of considerable value.

William Shive, *University of Texas*

**Photochemistry. Volume 8.** Edited by D. BRYCE-SMITH (University of Reading). The Chemical Society, London. 1977. xix + 644 pp. £37.00.

The literature of photochemistry published between July 1975 and June 1976 is reviewed in the latest volume of the Specialist Periodical Reports on Photochemistry. This volume maintains the format of previous volumes in the series. The literature is grouped now in six main categories: Physical Aspects of Photochemistry, which this time emphasizes practical developments in instrumentation and techniques, and omits the section on spectroscopic and theoretical aspects; Photochemistry of Inorganic and Organometallic Compounds; Organic Aspects of Photochemistry; Polymer Photochemistry, in which the patent literature is reviewed also; Photochemical Aspects of Solar Energy Conversion; and finally, a welcome addition Chemical Aspects of Photobiology, which emphasizes the photochemical and photophysical processes underlying photosynthesis and vision. This volume maintains the high standards of previous volumes but the price continues to rise to the point where even institutional libraries may have to reconsider continued subscription to the series.

Seyhan N. Ege, *University of Michigan*

**Fourier Transform NMR Spectroscopy.** By DEREK SHAW (Varian Associates, Ltd.). Elsevier North-Holland Inc., New York. 1976. xvii + 357 pp. \$49.75.

A number of books are available on the mathematics of Fourier transforms, computer techniques for fast calculation and applications to infrared spectroscopy. This is one of the very few books available which develops the use of Fourier transforms in nuclear magnetic resonance spectroscopy. Most topics of interest for pulsed high resolution spectroscopy and the use of Fourier transforms are covered.

The book begins with a short history of Fourier transforms and several steps in the development of NMR spectroscopy. Chapters follow on the principles of NMR, mathematics of Fourier transforms, excitation and pulse techniques, instrumentation from the probe to interface, computer and software, and experimental techniques. The final three chapters discuss the phenomena to be measured. One chapter is on NMR spectra and its determining factors, another is on multiple resonance experiments, and a final one is on relaxation. Many topics are covered in the last two chapters, including double resonance, the Bloch-Siegert and Overhauser effects, spin decoupling, quadrupolar effects, relaxation in the rotating frame, and a note on *J* spectra.

The main strength of the book is its comprehensive scope. It is thus potentially useful both as a reference and as a textbook. It addresses all important concepts and generally includes enough depth for the basic idea to be understandable. All chapters are well documented with references, and many good illustrations and sample spectra are included. The underlying mathematical formalism of each technique or experiment is given, augmented by practical considerations and useful tips.

For readers initially unfamiliar with a concept or technique, consultation of other sources will probably be necessary for a thorough understanding. If the book were used as a text, these additions could be made by the lecturer, as could examples and problems. There are some inconsistencies, particularly in the second chapter, in vector notation. Some effort on the instructor's part would be required to tidy this up to the satisfaction of students not already familiar with this material.

In summary, this book is one of a very few which develops Fourier transform techniques for NMR. It is comprehensive, well illustrated and referenced, expensive, but a desirable addition to one's library and of possible use as a textbook.

Roy R. Knispel, *University of Wisconsin--Oshkosh*