characteristic of muscarine alkaloids. The products stimulated the smooth muscle of the intestinal tract, thereby increasing tone and motility. These actions were inhibited by atropine.[11]

Acknowledgment. Financial support from the Matsunaga Science Foundation is acknowledged. The authors also tender their gratitude to Mr. O. Asano for his physiological tests.

(11) Full details of these results will be presented in a forthcoming paper.

R. Noyori,* Y. Hayakawa, S. Makino
N. Hayakawa, H. Takaya
Department of Chemistry, Nagoya University
Chikusa, Nagoya 464, Japan
Received January 26, 1973

*Book Reviews**

Annual Reports on the Progress of Chemistry. Volume 68. 1971. Section A: General, Physical, and Inorganic Chemistry. Section B: Organic Chemistry. The Chemical Society, London. 1972. Section A: xvi + 546 pp. £6.00. Section B: xvi + 627 pp. £7.00.

This steadfast companion to the chemist hard-pressed by the burgeoning literature shows an inexorable growth in size, notwithstanding the efforts of the Senior Reporters at containment. The recent development of the Specialist Periodical Reports Series has not been sufficient to arrest the expansion completely.

The subjects of the chapters are too varied and too predictable to warrant listing them all here, but, as examples, "Molecular Acoustics" and "Application of Molecular Sieve Zeolites to Catalysis" in Section A, and "Electron Spectroscopy for Chemical Analysis" in Section B, might not ordinarily be expected. A 20-page section on "Electro-organic Chemistry" attests to the current vigor in this previously rather quiet area; as the reporters state, "It would seem that the organic chemist and the electrochemist are at last coming to terms with each other." It is good to see the continuing alertness of the publishers to the changing face of chemistry.

BIDICS—1971: Bond Index to the Determinations of Inorganic Crystal Structures. By I. D. Brown, C. P. Weiss, and K. K. Wu (McMaster University). Institute for Materials Research, Hamilton, Ontario, Canada. 1972. 126 pp. $7.50.

This is a soft-bound volume, produced by offset from typescript, which covers the subject as reported in the international literature in 1971. Similar indexes for 1969 and 1970 are also available ($3.00 each). The Index is a bibliography, arranged by bond type, in alphabetical order of the elements concerned; thus, for example, all structure determinations involving Ag–M bonds are listed first, and the last group of entries are those for compounds with Zn–M bonds. The entries cover one line only and give the literature reference, the length of the particular bond cited, the method used, and identification of the compound by name or formula. This is difficult information to track down, and this compilation appears to be potentially very useful.

Ion Implantation. Edited by F. H. Eisen (NAR Science Center) and L. T. Chadderton (University of Copenhagen). Gordon and Breach, New York, N. Y. 1971. xii + 467 pp. $22.50.

The Proceedings of the First International Conference on Ion Implantation and Semiconductors (1970) are presented in this volume. The papers were originally published in the journal *Radiation Effects* and are here collected between hard covers. Each paper is in complete, formal condition, including abstract, authors' addresses, diagrams, etc. The subject matter is heavily oriented toward silicon and the effects of bombardment by ions, atoms, etc., on its solid-state properties. There is no subject index.

Molecular Mechanisms of Antibiotic Action on Protein Biosynthesis and Membranes. Edited by E. Muñoz, F. Garcia-Ferrandiz, and D. Vázquez. American Elsevier, New York, N. Y. 1973. xvi + 804 pp. $27.50.

This volume contains the proceedings of an international symposium held in Spain in 1971, consisting of 42 papers plus the opening and closing addresses. The papers are evidently photoreproduced from the typescripts submitted by the authors, for the type faces are varied, but the quality of presentation is very good. The papers report original research, but it is not clear to what extent the material may have been or may be going to be published in journal articles as well. A useful feature is an appendix of 25 pages listing antibiotics with their structural formula. There is a general subject index as well as an antibiotic index.

Nonaqueous Electrolytes Handbook. Volume I. Edited by G. J. Janz and R. P. T. Tomkins (Rensselaer Polytechnic Institute). Academic Press, New York, N. Y. 1972. xiii + 1108 pp. $55.00.

This book consists of an immense quantity of carefully arranged and tabulated data that will be of use to a broad range of chemists. There are seven main sections: Physical Properties of Solvents (single and mixed); Solvent Purification; Electrical Conductance (of solutions); Diffusion; Density (of solutions); Viscosity (of solutions); and Transference Numbers. There is also a large appendix of additional data and a Compound Index. The entries are all keyed to references to the original literature, which is covered through 1971. The editors state that they have not attempted to repeat all the information in Walden's pioneer work "Elektrochemie Nichtwässeriger Lösungen" (1924), but have emphasized more recent contributions. Even though the editors were assisted by seven other contributors, the effort required must have been really consuming; the result seems to be worth it!

Progress in Surface and Membrane Science. Volume 5. Edited by J. F. Danielli (State University of New York), M. D. Rosenberg (University of Minnesota), and D. A. Cadenhead (State University of New York). Academic Press, New York, N. Y. 1972. xii + 353 pp. $21.45.

This book maintains the high quality of the four previous volumes. At first sight it would appear that the various chapters are too different to be of interest to any one reader. However, people interested in surface and membrane science will find it very stimulating to read the various chapters even if the specific subjects are not of immediate interest to them. For example, two of the chapters are concerned with biological membranes and are stimulating to read even if the subject is remote from one's field. The book begins with a very useful chapter on "The Mössbauer Effect in Surface Science" by M. C. Hobson, Jr. This will certainly stimulate readers to look into this technique for studying surfaces. The next two chapters have a great deal of practical as well as theoretical interest and are concerned with "Surface Functional Groups on Carbon and Silica" by V. L. Snoeyink and Walter J. Weber, Jr., and "Wetting Phenomena Pertaining to Adhesion" by Harold Schonhorn. The following chapter is biological in interest and is concerned with "The Physical State of Phospholipids and Cholesterol in Monolayers, Bilayers, and Membranes" by M. C. Phillips. A very useful and timely chapter follows on "Heterocoagulation" by S. Usui, which the reviewer found of particular value and interest. The final chapter by D. J. Triggle on "The Effects of Calcium on Excitable Membranes and Neurotransmitter Action" is again connected with biological membranes and although highly specialized is well written and should be interesting and useful to all researchers in the membrane field.

The overall impression received is that the book is a valuable

* Unsigned book reviews are by the Book Review Editor.

collection of review chapters written by experts. It should, therefore, be of great interest to all who work in membrane and surface science.

V. T. Stannett, *North Carolina State University*

Organic Chemistry: A Short Course. Fourth Edition. By HAROLD HART and ROBERT D. SCHUETZ (Michigan State University). Houghton Mifflin Co., Boston, Mass. 1972. ix + 500 pp. $9.95. **Study Guide and Solutions Manual.** $4.95.

This text is designed for students in a one-semester or one-quarter course in organic chemistry for nonchemistry majors, *e.g.*, those preparing for careers in nursing, agriculture, pharmacy, etc. Its popularity is attested to by the fact that this represents the fourth edition of the book, nearly twenty years after appearance of the original, truly an impressive record for longevity. This edition represents a far-reaching revision of the third edition (1966). The text has been reworked throughout, but more significant changes include the following: clarity of structures and reactions has been considerably improved by introduction of a two-color format; a chapter on spectroscopy (ir, uv, nmr, mass spectral) has been added; the sections on stereochemistry, carbohydrates, amino acids and proteins, and natural products have all been expanded; and the problem sets at the ends of chapters have been completely revised. The book is consequently much longer (147 pages) than the third edition, but the discussion of individual topics remains manageable. The book has one inconsistent and potentially confusing (to the student) feature: discussion of physical properties of a given class of compounds sometimes precedes and sometimes follows description of their chemistry. It would appear more reasonable to have physical properties always precede chemistry. Despite this objection, the book should serve well the purpose for which it was intended. There is available a good study guide, which contains solutions to problems and the reasoning involved in each solution.

Albert J. Fry, *Wesleyan University*

Mass Spectrometry. Edited by A. MACCOLL (University of London). MTP International Review of Science, Physical Chemistry, Series One, Volume 5. Consultant Editor: A. D. Buckingham (University of Cambridge). Butterworth and Co., London. University Park Press, Baltimore, Md. 1972. 300 pp. $24.50.

This book is one in a series of 13 volumes designed to review the fields of physical chemistry, chemical crystallography, and analytical chemistry from 1967 to 1971. A second series to review the 1971–1973 literature is to be published in 1974.

Although given the rather broad title, "Mass Spectrometry," this volume is actually restricted to a review of investigations dealing with the chemical physics of gas-phase ions. No attempt is made to survey the analytical applications of mass spectrometry in organic and bioorganic chemistry. Divided into eight chapters of approximately equal length, the book covers the following topics: theory of mass spectra (A. L. Wahrhaftig), ionization and appearance potentials (J. D. Morrison), electron spectroscopy (C. E. Brion), field ionization (A. J. B. Robertson), chemical ionization mass spectrometry (F. H. Field), ion cyclotron resonance mass spectrometry (C. J. Drewery, G. C. Goode, and K. R. Jennings), time-of-flight mass spectrometry (R. S. Lehrle and J. E. Parker), and metastable ions (J. L. Holmes and F. M. Benoit). Each chapter is prefaced by a detailed list of contents since the index for this and the other members of series one will be published as a separate volume.

D. F. Hunt, *University of Virginia*

Vibrating Molecules. By P. GANS (University of Leeds). Chapman and Hall, Ltd., London. 1971. xii + 236 pp. $11.25.

This book, subtitled "An Introduction to the Interpretation of Infrared and Raman Spectra," is, in fact, a limited collection of topics in the general area of vibrational spectroscopy. After an introductory chapter, there is a chapter reviewing linear algebra and including the equations of the GF method of normal coordinate analysis (both chapters for students with no "previous knowledge" of the subject). Then there are three brief chapters on the symmetry of molecules, the representations of molecular vibrations, and the symmetrized version of the GF Method. Force constant calculations are then described more explicitly in the sixth chapter with a flow diagram for a computer program, discussion of methods for obtaining matrix eigenvalues and eigenvectors, tests for convergence, questions of assignment, discussion of force fields, etc. The group frequency concept is discussed and partly justified in the next chapter, while the final two chapters discuss atom-ligand group frequencies and the effect of coordination on ligand group frequencies, respectively, and are only two chapters where the number of quoted vibrational frequencies exceeds the number of equations. (Incidentally, there are only five spectra in the whole book!) Finally come the character tables, a brief bibliography, and an inadequate index.

Thus, the title and subtitle of this book are very much misleading, the qualifying statements made in the preface notwithstanding. All rotational spectroscopy is omitted, and there is no discussion (or even reference to discussion) of the coupling of vibrational and electronic or vibrational and rotational motion, and very little discussion of the coupling between normal modes. Fermi resonance is mentioned, but important considerations for anyone attempting force constant calculations are ignored, *e.g.*, inversion and internal rotation. The comparison with experiment in the last two chapters not only excludes organic and organometallic compounds, but inorganic compounds not based on a single central atom as well. This reviewer questions the validity of such a narrow course of study which ignores all these above considerations while reaching a fairly sophisticated level in discussion, for example, of redundant coordinates and matrix diagonalization methods.

Nevertheless, let us assume that such a course of study may be desirable for some students (presumably inorganic). Does this book present the topics it includes in an adequate manner? This reviewer feels that by and large it does, with parts of the chapters on representations of molecular vibrations (4) and details of force constant calculations (6) being particularly worthwhile reading. There are a number of irritating remarks such as the definitions of the Born–Oppenheimer approximation (p 4), a linear transformation (p 29), and the dipole moment operator (p 100), but these have no serious consequences in the area defined by the book itself.

In summary, this book adequately presents a selection of topics in the area of vibrational spectroscopy but is by no means a balanced and complete introduction to this subject.

William C. Stwalley, *University of Iowa*

The Scanning Electron Microscope. Part I. The Instrument. By C. W. OATLEY, F.R.S. (University of Cambridge). Cambridge University Press, Cambridge, England. 1972. viii + 194 pp. $16.50.

This is a very timely book dealing with the principles underlying the design and function of scanning electron microscopes. Professor Oatley and his associates at Cambridge University pioneered the development of these instruments, so he writes with the authority and perspective of one who is thoroughly familiar with his subject. Chapter 1 reviews the history of these instruments. Chapter 2 is a systematic development of the basic physical principles which impose limitations on attainable resolution. Chapter 3 then deals with the way in which these limitations influence the design of the individual components of the electron optical system. Chapter 4 discusses the interactions of electrons with solids to provide a basis for understanding the mechanisms of image contrast and resolution which are covered in Chapter 5. The approach is basically theoretical rather than operational, in that practical operating procedures are not discussed to any extent. The treatment is nonmathematical, however, and all essential physical concepts are developed in sufficient detail to be appreciated and understood without an extensive background in electron optics. The primary purpose of this book is to provide users of scanning electron microscopes with a basis for understanding the design and performance of their instruments. This objective is achieved exceptionally well, so that this book should be appreciated by beginning and veteran scanning electron microscopists alike.

W. C. Bigelow, *University of Michigan*