*Book Reviews**

Quantum Mechanics. Volumes I and II. By C. COHEN-TANNOUDJI, B. DIU, and F. LALOË (Paris). Translated from the French by S. R. HEMLEY, N. OSTROWSKY and D. OSTROWSKY. Wiley/Interscience, New York. 1977. xv + 1524 pp. Vol. I: $32.50 ($17.50 paperback). Vol. II: $27.50 ($15.75 paperback).

An encyclopedic textbook on elementary quantum mechanics based on the authors' teaching of final year undergraduates in the Paris university system. All the standard topics are covered with great pedagogical detail in some 14 chapters. Each chapter is outfitted with a number of "Complements" covering computational details plus special topics of varying degrees of difficulty. Overall the writing is sound and reasonably lucid, yet there are places where one might have preferred a less ponderous, more incisive style. It is also somewhat disappointing that a treatise of such magnitude—over 1500 pages—omits a number of topics of central significance in current physics and chemistry: relativistic electron theory (although its consequences are quoted, without proof, in several places), group theory, and the Hartree–Fock method. The work is remarkably free of errors and misprints. An excellent 17-page bibliography cites books and articles in relevant areas of physics, chemistry, and mathematics.

Induced Representations in Crystals and Molecules: Point, Space and Nonrigid Molecule Groups. By S. L. ALTMANN (Oxford University). Academic Press, London. 1977. xi + 369 pp. $35.25.

A monograph intended for graduate students and research workers in solid-state physics and theoretical chemistry on applications of induced representations of finite groups. (An induced representation of a group is one constructed from a representation of one of the subgroups.) A unified and rigorous treatment is given for a selection of topics including double cosets, semidirect products, projective representations, central extensions, Mackey's theorem, little groups, and orbits. The symmetry groups of nonrigid molecules are apparently covered for the first time in textbook form.

Introduction to Group Theory with Applications. By GERALD BURNS (IBM). Academic Press, New York. 1977. xv + 429 pp. $18.50.

A volume in the Academic Press Materials Science Series. This book was developed from a course in group theory given by the author at IBM Research Center. The stress is on the 32 crystallographic point groups with applications to solid-state physics. In addition, crystal field theory, molecular orbital theory, and hybrid orbitals are discussed. The approach is to motivate and apply the requisite mathematical theorems, the reader being referred elsewhere (e.g., Wigner) for rigorous proofs. The book is well written and does successfully fulfill its stated purpose.

BOOKS RECEIVED

Developments in Polymer Degradation—1. Edited by N. GRASSIE (Glasgow). Applied Science Publishers, London. 1977. x + 284 pp. $32.00.

Cationic Graft Copolymerization. Applied Polymer Symposium No. 30. Edited by J. P. KENNEDY (University of Akron). Wiley/Interscience, New York. 1977. iv + 193 pp. $10.00 (softcover).

Fourth International Symposium on Cationic Polymerization. Polymer Symposium No. 56. Edited by J. P. KENNEDY (University of Akron). Wiley/Interscience, New York, 1977. vii + 507 pp. $24.00 (softcover).

Recent Advances in the Field of Crystallization and Fusion of Polymers. Polymer Symposium No. 59. Edited by J. P. MERCIER and R. LEGRAS (University of Louvain, Belgium). Wiley/Interscience, New York. 1977. 143 pp. $9.00 (softcover).

Liquid Crystals and Plastic Crystals. Volume 1. Preparation, Constitution and Applications, Edited by G. W. GRAY (University of Hull) and P. A. WINSOR (Shell Research Ltd.). Wiley/Halsted Press, New York. 1974. vii + 383 pp. $32.50.

Covers fundamental aspects of thermotropic and lyotropic liquid crystals together with plastic crystals.

Platinum-Iridium Reforming Catalysts. By J. C. RASSER (Proctor & Gamble, Belgium). Delft University Press, Delft, The Netherlands. 1977. xii + 216 pp. Dfl 24.00 (paperbound).

Temperature-programmed desorption of hydrogen; selectivity and activity in heptane conversion.

Heat and Mass Transfer Sourcebook: Fifth All-Union Conference, Minsk, 1976. Edited by M. A. STYRIKOVICH (Moscow), A. A. ŽUKAUSKAS (Vilnius), J. P. HARTNETT (Chicago), and T. F. IRVINE, JR. (Stony Brook). Wiley/Halsted Press, New York. 1977. viii + 480 pp. $37.50.

Ion-Selective Electrodes. Edited by E. PUNGOR and I. BUZAS. Akadémiai Kiadó, Budapest. 1977. 263 pp. $16.00.

Papers from the 2nd Conference on Ion-Selective Electrodes held at Mátrafüred, Hungary, 18–21 Oct 1976.

Dielectric Phenomena and the Double Layer in Disperse Systems and Polyelectrolytes. By. S. S. DUKHIN and V. N. SHILOV. Wiley/Halsted Press, New York, 1974. vii + 192 pp. $21.75.

A textbook by two major contributors to the field, translated from Russian by D. Lederman.

Orientation Effects in Solid Polymers. Polymer Symposium No. 58. Edited by G. BODOR (Budapest). Wiley/Interscience, New York. 1977. 423 pp. $19.00 (paperback).

Advances in Preparation and Characterization of Multiphase Polymer Systems. Polymer Symposium No. 60. Edited by R. J. AMBROSE (Firestone) and S. L. AGGARWAL (General Tire). Wiley/Interscience, New York. 1977. 209 pp. $12.00 (paperback).

Nukleare Analysenverfahren (Reprinted from *Journal of Radio-Analytical Chemistry.* Volume 28). Edited by T. BRAUN and E. BUJDOSÓ. Akadémiai Kiadó, Budapest. 1976. 269 pp. $28.00.

Improved Oil Recovery by Surfactant and Polymer Flooding. Edited by D. O. SHAH (University of Florida) and R. S. SCHECHTER (University of Texas). Academic Press, New York. 1977. x + 578 pp. $23.50.

SI Chemical Data. By G. H. AYLWARD (UNESCO) and T. J. V. FINDLAY (University of New South Wales). Wiley, New York. 1975. xiii + 136 pp. $8.50 (paperback).

Pipe Line Rules of Thumb Handbook. Gulf Publishing Co., Houston, Texas. 1978. vii + 197 pp. $12.95.

Electron-Ion Exchangers: A New Group of Redoxites. By A. V. KOZHEVNIKOV. Wiley/Halsted Press, New York. 1975. xi + 129 pp. $18.75.

Fiber Science. Applied Polymer Symposium No. 31. Edited by M. LEWIN (Jerusalem). Wiley/Interscience, New York. 1977. ix + 415 pp. $19.00 (paperback).

Durability of Adhesive Bonded Structures. Applied Polymer Symposium No. 32. Edited by M. J. BODNAR (U.S. Army). Wiley/Interscience, New York. 1977. vi + 443 pp. $19.00 (paperback).

Single Cell Protein from Renewable and Nonrenewable Resources. Biotechnology and Bioengineering Symposium No. 7. Edited by A. E. HUMPHREY (University of Pennsylvania) and E. L. GADEN, JR. (University of Vermont). Wiley/Interscience, New York. 1977. v + 129 pp. $? (paperback).

* Unsigned book reviews are by the Book Review Editor.

Proceedings of the Symposium on Molecular and Cellular Aspects of Sickle Cell Disease. Edited by J. I. HERCULES, G. L. COTTAM, M. R. WATERMAN, and A. N. SCHECHTER. U. S. Government Printing Office, Bethesda, Md. 1976. viii + 398 pp. $8.20.

Separation Methods for Nucleic Acids and Oligonucleotides. Laboratory Techniques in Biochemistry and Molecular Biology. Volume 4. Part II. By H. GOULD (London) and H. R. MATTHEWS (Portsmouth). North-Holland Publishing Co., Amsterdam. 1975. pp 209–491. $15.25 (paperback).

Polysaccharide Shapes. By D. A. REES (Unilever Research Laboratory). Wiley/Halsted Press, New York. 1977. 80 pp. $3.95 (paperback).

New Drugs: Discovery and Development. Drugs and the Pharmaceutical Sciences Series. Volume 5. Edited by A. A. RUBIN (Endo Laboratories). Marcel Dekker, New York. 1978. x + 313 pp. $35.00.

IUPAC Macromolecular Microsymposia-16. Edited by B. SEDLÁČEK (Prague). Pergamon Press, Oxford. 1978. pp 905–962. $9.00.

A Critical Review of Equilibrium Data for Proton and Metal Complexes of 1,10-Phenanthroline, 2,2′-Bipyridyl and Related Compounds. IUPAC Chemical Data Series. No. 17. By W. A. E. MCBRYDE (University of Waterloo, Canada). Pergamon Press, Oxford. 1978. vi + 78 pp. $11.00 (paperbound).

Handbook of Thermochemical Data for Compounds and Aqueous Species. By H. E. BARNER and R. V. SCHEUERMAN. Wiley/Interscience, New York. 1978. vi + 156 pp. $19.95.

A compilation of heats of formation, free energies of formation, enthalpies, and entropies as functions of temperature for aqueous ions and neutral complexes.

Chemical Equilibria in Carbon-Hydrogen-Oxygen Systems. By R. E. BARON, J. H. PORTER, and O. H. HAMMOND, JR. (MIT). MIT Press, Cambridge, Mass. 1976. xii + 110 pp. $? (paperback).

Introduction to Stereochemistry. 6th Printing. By KURT MISLOW (Princeton University). W. A. Benjamin, Reading, Mass. 1978. xii + 193 pp. $11.50 (softcover).

Proceedings of the Second International Symposium on Protein Metabolism and Nutrition (Flevohof, The Netherlands, May 2–6, 1977). ISBS Inc., Forest Grove, Oreg. 1978. xiii + 178 pp. $17.00 (paperback).

IUPAC Symposium: Boron Chemistry-3. Edited by H. NÖTH (Munich). Pergamon Press, Oxford. 1977. pp 691–811. $17.50.

Selected lectures commemorating the 100th birthday of Alfred Stock.

IUPAC Symposium: Coordination Chemistry-17. Edited by E. WEISS (Hamburg). Pergamon Press, Oxford. 1977. pp 813–876. $12.00.

Operational Amplifiers in Chemical Instrumentation. By R. KALVODA (Prague). Wiley/Halsted Press, New York. 1975. 178 pp. $23.50.

Topics in Sulfur Chemistry. Volume 3. Edited by A. SENNING and P. S. MAGEE. Georg Thieme Publishers, Stuttgart. 1977. 128 pp. DM 58.00 (paperback).

Sulfur-containing polymers; energy conversion devices; thiirenium and thiirenium ions.

Mössbauer Effect Data Index. Volume 8: Covering the 1975 Literature. Edited by J. G. STEVENS and V. E. STEVENS (University of North Carolina, Ashville). Plenum, New York. 1976. x + 444 pp. $49.50.

Quantitative Structure-Activity Relationships. Experientia Supplementum 23. Edited by M. TICHÝ (Prague). Birkhäuser, Basel. 1976. 265 pp. SFr 58.00.

Solid Electrolytes. Topics in Applied Physics. Volume 21. Edited by S. GELLER (University of Colorado). Springer-Verlag, Berlin. 1977. x + 229 pp.$33.20.

Photoelectron Statistics: With Applications to Spectroscopy and Optical Communications. Springer Series in Optical Sciences. Volume 6. Edited by B. SALAH (University of Wisconsin). Springer-Verlag, Berlin. 1978. xiii + 441 pp. $31.30.

Methods of mathematical statistics applied to optical phenomena and photoelectron events.

Inelastic Electron Tunneling Spectroscopy. Springer Series in Solid-State Sciences. Volume 4. Edited by T. WOLGRAM (University of Missouri). Springer-Verlag, Berlin. 1978. xiii + 242 pp. $29.00.

Proceedings of the International Conference on Electron Tunneling, Columbia Missouri, May 25–27, 1977. IETS is developing a useful tool for the study of surface and interface phenomena.

Advances in Polymer Science. Volume 24. Molecular Properties. Springer-Verlag, Berlin. 1977. 244 pp. $37.00.

Ultrashort Light Pulses: Picosecond Techniques and Applications. Topics in Applied Physics. Volume 18. Edited by S. L. SHAPIRO (Los Alamos Scientific Laboratory). Springer-Verlag, Berlin. 1977. x + 389 pp. $42.70.

Of chemical interest are articles by D. von der Linde (picosecond interactions in liquids and solids) and K. B. Eisenthal (picosecond relaxation processes in chemistry).

Photoemission in Solids I: General Principles. Topics in Applied Physics. Volume 26. Springer-Verlag, Berlin. 1978. x + 290 pp. $39.50.

Photoelectron spectroscopy (ESCA, XPS, UPS) applied to investigations of electronic structure in solids.

Handbook of Moisture Determination and Control. Volumes 2 and 3. By A. PANDE (Delhi, India). Marcel Dekker Inc., New York. 1975. Vol. 2: xi + 584 pp. $33.50. Vol. 3: xi + pp. 585–873. $33.50.

Monographies sur les Métaux de Haute Pureté. Volume 2. Groupes IIA, IVA, VA, VIA. Edited by (the late) G. CHAUDRON. Masson, Paris. 1977. xvi + 644 pp. $?

Salt Water Purification. 2nd Edition. By K. S. SPIEGLER (University of California, Berkeley). Plenum, New York. 1977. ix + 189 pp. $19.50.

Fine Particles in Gaseous Media. By H. E. HESKETH (Southern Illinois University). Ann Arbor Science Publishers Inc., Ann Arbor, Mich. 1977. x + 214 pp. $24.00.

Proceedings of the Second International Symposium on Nitrite in Meat Products (Zeist, The Netherlands, September 7–10, 1976). Edited by B. J. TINBERGEN and B. KROL. ISBC, Inc., Forest Grove, Oreg. 1977. 326 pp. $32.50.

Classics in Coordination Chemistry. Part III. Twentieth-Century Papers (1904–1035). Edited by G. B. KAUFFMAN (California State University). Dover, New York. 1978. xiv + 236 pp. $6.00 (paperback).

Metal Chelation: Principles and Applications. Oxford Chemistry Series, No. 25. By C. F. BELL (Brunel University). Oxford University Press, New York. 1977. viii + 147 pp. $11.00.

Physics and Chemistry of Materials with Layered Structures. Volume 4. Optical and Electrical Properties. Edited by P. A. LEE (Brighton Polytechnic, England). D. Reidel, Boston, Mass. 1976. viii + 464 pp. $49.00.

Physics and Chemistry of Materials with Layered Structures. Volume 5. Structural Chemistry of Layer-Type Phases. By F. HULLIGER (Zurich). D. Reidel, Boston, Mass. 1977. viii + 367 pp. $39.50.

Electrotechnology. Volume 1. Wastewater Treatment and Separation Methods. Edited by R. P. OUELLETTE, J. A. KING, and P. N. CHEREMISINOFF. Ann Arbor Science Publishers Inc., Ann Arbor, Mich. 1978. xii + 609 pp. $39.95.

Electrotechnology. Volume 2. Applications in Manufacturing. Edited by R. P. OUELETTE, F. ELLERBUSCH, and P. N. CHEREMISINOFF. Ann Arbor Science Publishers Inc., Ann Arbor, Mich. 1978. xii + 495 pp. $39.95.

Biochemistry, Mechanisms of Metabolism. By E. B. CUNNINGHAM (Medical University of South Carolina). McGraw-Hill, New York. 1978. x + 767 pp. $?

Biophysical Chemistry: Principles, Techniques and Applications. By A. G. MARSHALL (University of British Columbia). Wiley, New York. 1978. xv + 812 pp. $19.95.

Developments in Adhesives-1. Edited by W. C. WAKE. Applied Science Publishers Ltd., London. 1977. vii + 318 pp. $40.00.

Adhesion. Volumes 1 and 2. Edited by K. W. ALLEN. Applied Science Publishers Ltd., London. 1977 and 1978. Vol. 1: ix + 315 pp. $35.00. Vol. 2: viii + 224 pp. $30.00.

These volumes contain papers presented at the 13th, 14th, and 15th Annual Conferences on Adhesion and Adhesives held at City University, London. Mainly geared to technological applications.

Annual Reports on Fermentation Processes. Volume 1. Edited by D. PERLMAN (University of Wisconsin) and G. T. TSAO (Purdue University). Academic Press, New York. 1977. xi + 386 pp. $19.50 (softcover).

Nitrogen Ceramics. No. 23. NATO Advanced Study Institutes Series: Applied Science. Edited by F. L. RILEY (University of Leeds). Noordhoff, Leyden. 1977. xii + 694 pp. $50.00.

Proceedings of a NATO Advanced Study Institute, Canterbury, England, 16–27 Aug 1976, devoted to refractory inorganic materials containing nitrogen.

The Basis of Organic Chemistry. 2nd Edition. By R. J. FESSENDEN and J. S. FESSENDEN (University of Montana). Allyn and Bacon, Boston, Mass. 1978. 420 pp. $?

Applied Mathematics for Physical Chemistry. By J. R. BARRANTE (Southern Connecticut State College). Prentice-Hall, Englewood Cliffs, N.J. 1974. xiii + 173 pp. $7.95.

Chemistry and Life. An Introduction to General, Organic and Biological Chemistry. By J. W. HILL (University of Wisconsin, River Falls) and D. M. FEIGL (St. Mary's College, Indiana). Burgess Publishing Co., Minneapolis, Minn. 1978. viii + 672 pp. $17.95 (hardbound); $14.95 (paperback). Student Study Guide, $4.95.

Sussex-N.P.L. Computer Analysed Thermochemical Data: Organic and Organometallic Compounds. By J. B. PEDLEY and J. RYLANCE (University of Sussex). University of Sussex, Brighton, U.K. 1977. No pagination. £10 plus postage.

Surface Effects in Crystal Plasticity. No. 17. NATO Advances Institutes Series: Applied Science. Edited by R. M. LATANISION and J. T. FOURIE. Noordhoff, Leyden. 1977. xix + 943 pp. $45.25.

Proceedings of a NATO Advanced Study Institute held in Hohegeiss, West Germany, 5–14 Sept 1975. Concerned with friction, wear, adhesion, catalysis, oxidation, and corrosion on free surfaces, with technological implications.

Principles of Organic Chemistry. 4th Edition. By T. A. GEISSMAN (UCLA). W. H. Freeman, San Francisco, Calif. 1977. x + 1035 pp. $19.95.

Organic Chemistry. Revised Printing. By T. W. G. SOLOMONS (University of South Florida). Wiley, New York. 1978. xxiii + 1057 pp. $21.95.

Unitized Experiments in Organic Chemistry. 4th Edition. By R. Q. BREWSTER (University of Kansas), C. A. VANDERWERF (University of Florida), and W. E. MCEWEN (University of Massachusetts). Van Nostrand, New York. 1977. xxii + 577 pp. $10.95 (paperback).

Introduction to Organic and Biological Chemistry. 2nd Edition. By S. J. BAUM (State University of New York, Plattsburgh). Macmillan, New York. 1978. xiii + 514 pp. $14.95.

Organometallic Reactions and Syntheses. Volume 6. Edited by E. I. BECKER (University of Massachusetts) and M. TSUTSUI (Texas A&M University). Plenum Press, New York. 1977. xi + 314 pp. $39.50.

This book is the continuation of the series "Organometallic Reactions" previously published by John Wiley. The series is intended to guide the preparative chemist by describing, for chosen areas of organometallic chemistry, the methods by which compounds have been prepared, and by giving specific recommendations of experimental procedures. The present volume fulfills this role, but there is an unevenness in the time span of the literature coverage which detracts from its usefulness.

An article by C. U. Pittman is concerned with the polymerization of transition metal organometallic compounds with vinyl substituents, of which vinylferrocene is the most important example. The polymerizations are mainly initiated by free radicals although cationic and Ziegler–Natta systems are also mentioned. Few comprehensive physical measurements have been carried out on the polymers, but 15 pages are devoted to specific synthesis and this section is especially valuable.

The centerpiece of the book is a comprehensive review (158 pp) of the Reactions of Metallocarboranes, by R. N. Grimes. While mainly preparative in content, the author includes a useful section on structure and bonding and some comments on nomenclature in the area. There are several helpful tables so that the reader can quickly find data of a specific carborane derivative of either a transition element or main group metal.

The final chapter in this volume by M. F. Farona is concerned with catalysis by arene–group VIB tricarbonyls and includes such topics as Friedel–Crafts reactions and the hydrogenation of olefins. This review is not completely successful because its literature coverage is so incomplete after 1974, although a few later references are given. The section on olefin metathesis is particularly misleading as there has been much progress in this area since the article was written. It seems unlikely that the author is to blame for the delay as he has contributed directly to the progress in this area. It is to be hoped that future volumes will provide a contemporary view of their subject at the time of publication.

A. W. Parkins, *Cornell University*

Advances in Catalysis. Volume 26. Edited by D. D. ELEY (University of Nottingham), H. PINES (Northwestern University), and P. B. WEISZ (Mobil Research). Academic Press, New York. 1977. xix + 419 pp. $39.50.

The latest volume of this well-established series contains five scientific review articles, the IUPAC recommendations on the terminology of heterogeneous catalysis, and the obituary notices of E. K. Rideal and M. Polanyi.

The first review article, by G. A. Somorjai, is a very clear description of the techniques and recent results of studies on the active sites in heterogeneous catalysis. W. M. H. Sachtler and R. A. Van Santen provide an interesting account of catalysis by metal alloys. By far the longest chapter in the book (125 pp) by J. A. Dumesic and H. Topsøe is devoted to a survey of the applications of Mössbauer spectroscopy to heterogeneous catalysis. The fourth review, by A. K. Galwey, is concerned with the somewhat problematical compensation effect in heterogeneous catalysis, i.e., the interdependence of reaction rates on catalysts. The only account of homogeneous catalysis in this volume is by R. F. Heck who describes the transition metal catalyzed reactions of organic halides. The emphasis here is on organic synthesis with mechanistic explanation. The final chapter is the IUPAC recommendations for heterogeneous catalysis and is reprinted from Pure and Applied Chemistry.

The standard of the reviews is high and the publication time seems to have been quite short for a book of this type. The Editor writes in the preface that the proper objects of all catalytic research are more powerful and selective syntheses, and his declaration forestalls the criticism of imbalance towards physical studies. However, a more abbreviated treatment of the general principles of Mössbauer spectroscopy might have been more appropriate for a book devoted to catalysis.

A. W. Parkins, *Cornell University*

Kirk-Othmer Encyclopedia of Chemical Technology. 3rd Edition. Volume 1. Wiley/Interscience. New York. 1978. xxix + 967 pp. $95.00

This edition is an updated version and an extension of the second edition published in 1963. Thirty-two subjects from Abherents to Alkanolamines are treated in depth by eighty listed contributors, all but five being new authors. Some 40% of the topics in the second edition have been dropped and older topics rewritten. The "Health and Safety Factors" are a notable and consistent addition to the treatment of substances and processes.

The stated theme of Chemical Technology is carried out very well on such subjects as Absorption, Acetylene, Air Pollution Control Methods, Alcohols, Higher Aliphatic, and Alkali and Chlorine Products. Process descriptions, flow sheets, and design procedures are included. For other subjects, only background chemical information is included. An excellent 60-page treatment of Alkaloids gives sources, uses, a listing of 150 compounds with references for chemical structures, and a total of 560 references—a well-integrated treatment as compared to the short subtopics in the second edition.

This initial volume of the third edition is an excellent start in bringing forth new knowledge in composite form for professionals and students. The updating is verified by the large fraction of references beyond 1963, and the use of SI units. The addition of topics of current interest, attention to air pollution and its control, health and safety aspects of handling chemicals are fine examples. A subindex for Volume I would have been helpful, for many topics or substances are covered but they do not appear in the subject listings.

This third edition should be an addition to the second edition series, not a replacement.

Donald L. Katz, *University of Michigan*

Lipid Metabolism in Mammals. Volume 2. Edited by FRED SNYDER (Oak Ridge). Plenum Press, New York. 1977. xvi + 390 pp. $42.50.

In the preface, the editor states that this book has been written in order to provide readers with a comparative organ approach to lipid metabolism, so that similarities and differences between organs would be brought out. The first volume contains a general review of lipid metabolism, as well as lipid biochemistry of liver, blood elements, and adipose tissue. Volume 2 deals with lipids in lung, kidney, gonads, mammary glands, eye, skeletal muscle, skin, calcified tissue, and cells. The editor has undertaken a formidable task, for trying to organize a book on lipid metabolism is like writing a treatise on protein metabolism; the subject is too voluminous for a thorough coverage, and the selection of a narrow time frame or subject area would defeat the purpose of the book. The wide subject coverage has led to a variety of outlines among the contributing authors, some emphasizing pathological states, feedback control of lipid pathways, and cyclic nucleotides, while others focus on prostaglandins, complex lipid chemistry, and cholesterol metabolism. The most readable chapters were those dealing with the eye (Broekhuyse and Daemen) and gonads (Coniglio), both of which drew attention to changes in lipid metabolism with aging. The chapter on cancer cells (Lee and Snyder), although quite brief, is well organized; and the article by Bailey on cultured cells is excellent from the standpoint of the regulation of lipid metabolism. Pasternak, writing about membrane lipids, presents a strong case that lipid composition remains constant during growth and development for the same reason that amino acid, nucleotide, and sugar content is nonvarying, all serving as building blocks for multimolecular structures.

The editor could have rendered the book more readable by presenting a summary chapter that drew together some of the facts concerning the various metabolic pathways mentioned in the individual chapters. However, perhaps that task is best left to the reader, who most likely will be a researcher or serious student in lipid metabolism.

Herman Meisner, *Case Western Reserve University*

Proceedings of the International Conference on Colloid and Surface Science. Volume 1. Edited by E. WOLFRAM (Eotvos University, Budapest, Hungary). **Volume 2.** Edited by E. WOLFRAM and T. SZEKRENYESY. Akacdemiai Kiado, Budapest. Vol. 1: 1975. xii + 776 pp. $? Vol. 2: 1976. vii + 219 pp. $10.00.

This two-volume set chronicles in part the proceedings of the International Conference on Colloid and Surface Science held under the aegis of the International Union of Pure and Applied Chemistry in Budapest, Hungary, September 15–20, 1975. The program for the Conference comprised plenary, main, and invited lectures augmented by contributed papers. The program was very comprehensive in scope and international in character with some 130 papers from 22 countries.

The proceedings of this conference have been documented in the following manner. The primary, main, and invited lectures are contained partly in a separate issue of *Pure and Applied Chemistry* and partly in the *Progress of Colloid and Polymer Science*. The contributed papers are compiled in Volume 1 under review, while Volume 2 contains the discussion part (for all papers) and a few free communications.

The coverage in Volume 1 is quite diverse and deals with adsorption phenomena at various interfaces, disperse systems, micellization, rheology, gels, wetting, and a number of other topics. The papers are of uneven quality as is to be expected from such conferences. The quality and quantity of discussion documented in Volume 2 show that the discussion must have been very lively and useful. There are seven free communications at the end of the discussion portion. Personally, I feel that these free communications are nothing but contributed papers and should belong to Volume 1.

There are some puzzling questions about the format in which these proceedings have been presented. I fail to understand why the plenary, main, and invited lectures are documented separately from this two-volume set? Also what was the rationale for separating the discussion in a volume by itself? Ideally the discussion should follow either individual papers or should be appended at the end of each section.

In spite of the peculiar way of presenting these proceedings, the volumes under review are very useful and contain a wealth of timely research information from every corner of the world. These volumes are highly recommended both for the seasoned researcher in this field and for libraries.

K. L. Mittal, *IBM Corporation*

Hard and Soft Acids and Bases Principle in Organic Chemistry. By TSE-LOK HO (Case Western Reserve University). Academic Press, New York. 1977. xii + 209 pp. $19.50.

This book is a *tour de force* in which a very large number of observations in organic chemistry are explained on the basis of the HSAB principle. The observations are mainly on the nature of the reactions that actually occur when two reactants are capable of reacting in a number of ways. Some of the examples are very well known; others are more esoteric.

As expected, the examples usually conform well to the HSAB expectations, though a few that do not are mentioned. It is not clear how thorough a search for counter-examples was made. A few postulates are made as to how substituents will alter the hardness or softness of a given center. For example, H^-, R^-, Ar^-, and OR^- stand in order of increasing hardness, as do CH_3, C_2H_5, i-C_3H_7 and t-C_4H_9. Resolutely adhering to these orderings, an amazing amount of information can be correlated. The concept of symbiosis and Saville's rules for catalysis are also frequently illustrated.

Nevertheless, I must confess to a certain amount of unease. I have always felt that both the intrinsic strength of an acid or a base, as well as its hardness or softness, was necessary to explain chemical behavior. Dr. Ho has managed to explain almost everything without invoking acid or base strength.

Also, it is well recognized that the influence of different alkyl groups on reactivity is a complex mixture of rather small changes in electron density (hardness), steric effects, solvation effects, polarizability, and so on. Singling out one such influence may be empirically successful, but falls short as a means of explaining and understanding.

In any event, readers of this book can learn a great deal of organic chemistry, presented in a somewhat unified and systematic way. Topics covered are displacement reactions, alkene chemistry, aromatic and heterocyclic chemistry, carbonyl compounds, organophosphorus reactions, organosulfur reactions, organoboron chemistry, and miscellaneous applications.

Ralph G. Pearson, *University of California, Santa Barbara*

Colloid and Interface Science. Volume 1. Plenary and Invited Lectures. Edited by MILTON KERKER, R. L. ROWELL, and A. C. ZETTLEMOYER. Academic Press, New York. 1977. xliii + 636 pp. $25.00.

This is the first of five volumes of proceedings of the International Conference on Colloids and Surfaces, 50th Colloid and Surface Science Symposium, held in June 1976. Major topics, each covered by a plenary lecture and several invited lectures (including one not presented at the Conference), were interfacial forces, catalysis, aerosols, solid surfaces, water at interfaces, rheology of disperse systems, colloidal stability, surface thermodynamics, membranes, and liquid crystals. A. M. Schwartz's overview provides a brief, unified discussion of each of the papers.

The tone of the papers varies substantially. Tabor (Surface Forces and Interactions) and Israelachvili and Ninham (Intermolecular Forces) present historical reviews of theory and experiment, with some of their own work appearing in context. The "References" of the latter paper are truly footnotes, discussing the significance of each reference, a style which might usefully be emulated by other reviewers. On the other hand, the discussions of catalysis and surface adsorbtion focus primarily on detailed current experimental work on specific systems, including H_2 on chromia (Burwell and Stec), N_2 and Xe on Pt and Ir (Niewenhuys and Sachtler), and molybdena and alumina (Jacono and Hall, Teichner et al.).

Kerker (light scattering from aerosols) gives a qualitative discus-

sion, supplemented by machine calculation, of several new static light scattering effects. Bricard et al. and Reiss et al. consider the formation of aerosols in the atmosphere and the laboratory, while Liu and Pui present experimental data on aerosol charging.

The new particle and beam techniques which are doing so much for the study of (crystalline) surfaces are discussed at length, beginning with a plenary lecture by G. A. Somorjai. Water at interfaces formed a separate topic, the plenary lecture by Klier and Zettlemoyer treating hydroxylated crystal surfaces. It is often asserted that liquid water near an interface has properties different from that of the bulk; in separate papers, Lyklema and Drost-Hansen review work on this question.

Theoretical treatments of reversible and irreversible thermodynamics of surfaces are given by Bellemans and by Defay et al. A corresponding theoretical discussion of quantum mechanics of crystalline surfaces (to complement the experimental work described by Somorjai and others) is not present. One must stop somewhere!

The classical topic of colloid rheology is treated in four papers, two considering particle motion in the presence of a shear field and two treating Brownian motion in a stationary fluid. The equally classical question of colloid stability is introduced by Ottewill and separately by Overbeek, who show how a century of work has systematized discussion of this problem.

Membranes, particularly biological membranes, and liquid crystals are also discussed, beginning with Smith et al.'s presentation on NMR and ESR studies on membranes and closing with Small's touchingly titled "Liquid Crystals in Living and Dying Systems". These last two topics have grown enormously on their own, so that the good papers presented here barely skim the surface of these areas of reserach.

The volume covers on-going work in a broad field at a level suitable for active workers. It was not intended as an introduction for graduate students, but some of the articles (together with their references) would be a suitable starting point for independent reading.

George D. J. Phillies, *University of Michigan*

Chemical and Biochemical Applications of Lasers. Volume 2. Edited by C. BRADLEY MOORE. Academic Press, New York. 1977. ix + 288 pp. $15.00.

This series reviews the state of the art in laser studies of a variety of chemical problems. Volume 2 covers laser spectroscopy in supersonic jets (D. M. Levy et al.), vibrational relaxation in matrices (F. Legay), dynamic processes of polyatomic molecules in liquids on a picosecond time scale (A. Laubereau and W. Kaiser), laser velocimetry (B. R. Ware), new laser sources (J. J. Ewing), and a theoretical treatment of kinetics and thermodynamics of molecular nonequilibrium situations (R. D. Levine and A. Ben-Shaul). The references in each chapter extend into 1976. Each section is a self-contained work presented by one currently active in the field, the author's own work usually (though not always) being used to organize discussion of major ideas and techniques. The uniform use of a slightly discursive expository style of writing makes the material more accessible to nonexperts than is the case in many review volumes. However, at least in the field with which this reviewer is familiar (laser velocimetry), the treatment is quite complete. An advanced graduate student (or researcher in another field) who is interested in any of these topics should find solid, readable coverage in this volume.

George D. J. Phillies, *University of Michigan*

Statistical Treatment of Experimental Data. By J. R. GREEN and D. MARGERISON (University of Liverpool). Elsevier, Amsterdam. 1977. xiv + 382 pp. $34.95.

This book is the combined effort of a statistician and a chemist. It consists of sixteen chapters and two appendices. The major topics include probability distributions, estimation and hypothesis testing, specific tests on means, variances, and correlations and for goodness of fit. Fully a third of the book is devoted to weighted straight-line and polynomial regression and to the testing of hypotheses relevant to these models.

Although the text is reasonably well organized, the mathematical notation is disturbingly difficult to follow at times. It is also difficult to find important equations which appear earlier in the text. However, the book is not too heavy mathematically and it attempts to confront practical problems. There are several examples of typical calculations, often of interest to chemists, distributed throughout the text. Notably, the book stresses the important fact that any statistical analysis of data is based upon some assumed probability model.

A serious undesirable feature of the book is the absence of nonparametric (or distribution free) methodology. (Such methods are designed to avoid the assumption of normality for the populations sampled and, hence, have broader applicability.) There is also too little emphasis on the proper design of experiment, especially of sampling schemes. The list of references is modest, and no tables of frequently used statistics are provided.

Stuart M. Rothstein
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Total Synthesis of Natural Products. Volume III. Edited by JOHN APSIMON, Wiley/Interscience, New York, 1977. 566 pp. $35.00.

This volume on the synthesis of alkaloids relies upon the efforts of three researchers in the field: The Total Synthesis of Isoquinoline Alkaloids (272 pp, 524 refs) by T. Kametani; The Synthesis of Indole Alkaloids (166 pp, 359 refs) by J. P. Kutney; and Alkaloid Synthesis (115 pp, 307 refs) by R. V. Stevens. Also included is a sketchy compound index and a rather subjective reaction index. Chapter 1 covers synthesis up to December 1975. Chapters 2 and 3 cover work up to early 1976.

Chapter 1 reviews general methods of isoquinoline synthesis, stereochemical considerations, synthesis by phenolic oxidation, photochemical techniques, and miscellaneous syntheses such as the Ullman reaction. In a chapter of this size, it is not surprising that experimental detail is scarce. It is not, however, a very critical review.

Chapter 2 covers a basic and general discussion of the strategies behind the synthesis and elaboration of the indole ring as well as some syntheses of representative members of indole alkaloid families: carbolines, ergots, corynoritheyohimbe, oxindoles, etc.

Chapter 3 includes a short commentary on planning of syntheses and critical discussions on strategies in selected examples. This chapter alone is worth the price of the book.

Stevens reviews the synthesis of mesembrine, amaryllidaceae, lycopodium, and pyrrolidizidine alkaloids. The chapter concludes with a discussion of general methods of synthesis of the pyrrolidine and piperidine ring containing alkaloids, which is Steven's area of research expertise.

Despite occasional flaws, this volume is a useful reference on alkaloid synthesis.

Alan Schwartz, *Hoffmann-LaRoche, Inc.*

Valency and Molecular Structure. 4th Edition. By E. CARTMELL (University of Southampton) and G. W. A. FOWLES (University of Reading). Butterworths, London. 1977. 341 pp. Softcover, $10.95.

This latest edition, purportedly completely rewritten, might have been done so in a vacuum. New material consists mainly in some sections of complex compounds of odd coordination number and an additional chapter on the electronic spectra of transition metal complexes. To make room for this, some of the early chapters have been cut short, although the first two chapters and much of the third on the background of the quantum theory have little more than historical interest and could have been eliminated altogether. One will find here no mention of valence-shell electron pair repulsion theory or, for that matter, any recent advance in the study of molecular structure, as the core of the text consists mainly in drawing out the ramifications of molecular orbital theory and crystal field theory, much as these theories must have been understood fifteen or more years ago.

Despite such limitations, a text like this still has many uses. The material is presented in an orderly and convenient fashion, and undergraduate inorganic chemistry courses in particular might benefit from it. The modern theory of molecular structure, abstruse and recondite as it is, is a poor substitute for the simple methods presented here, wherein a few simple considerations can supply much useful information about a molecule of interest. It might be argued that a fully accurate knowledge of molecules is seldom needed, and is usually too time consuming and expensive to obtain; insofar as this is true, this book provides a useful alternative.

J. W. Warner, *University of Michigan*

Electron Spectroscopy. Volume 1. Theory, Techniques and Applications. Edited by C. R. BRUNDLE (IBM Research) and A. D. BAKER (City University of New York). Academic Press, London–New York–San Francisco. 1977. xv + 459 pp. $46.00.

Electron spectroscopy can now be said to have come of age, having undergone a rapid development since the early 1960s. Today there

is a wide range of techniques in use which depend on the kinetic energy analysis of ejected or scattered electrons. Applications range all the way from fundamental research, furthering man's basic understanding of molecular structure, through to routinely applied analytical techniques. As such the literature is scattered widely throughout the publications of pure and applied science. The series of volumes edited by Brundle and Baker is thus timely and provides a much needed reference source for present and future workers in the field. An excellent international and multidisciplinary team of authors has been recruited to write chapters on a wide range of topics dealing both with fundamental as well as applied aspects of electron spectroscopy.

With the publication of Volume 1, the series has got off to an excellent start. The chapter by Baker and Brundle, and also that by Price, gives an excellent introduction and background to the various aspects of electron spectroscopy. The many well-chosen illustrations and examples will prove most useful to teachers as well as research workers seeking a rapid grasp of the important basic phenomena relevant to studies using electron spectroscopy. There are also well-written chapters on the application of both X-ray and ultraviolet photoelectron spectroscopy to inorganic molecules as well as a separate chapter devoted to high-temperature UV PES studies.

Photoelectron spectroscopy has made a large contribution to the understanding of the structure of organic molecules as well as in the use and evaluation of molecular orbital theory. The comprehensive treatment of this subject by Heilbronner and Maier gives an excellent discussion of the subject from both experimental and theoretical standpoints.

It also is pleasing to see a strong injection of up-to-date theory throughout this volume. The sophistication of experimental techniques in electron spectroscopy is now such that the inadequacy of simple one-electron descriptions is apparent in many cases. The chapter on many-electron theory of photoemission by Martin and Shirley provides a very useful discussion and treatment of this subject.

The final chapter of this volume deals with two-parameter coincidence experiments. The authors correctly point out the importance and specificity of coincidence experiments, giving a number of clear illustrations from current work. However, it is notable that there is apparently no mention either in this chapter or elsewhere in Volume 1 of one of the truly exciting new frontiers in electron spectroscopy, namely binary (e, 2e) electron impact coincidence spectroscopy (see for example. Weigold et al., *Phys. Rev. Lett.*, **30,** 475 (1973), and *Phys. Rep.*, **27c,** 275–371 (1976)). These experiments, using electron spectroscopy, are providing very detailed information on orbital symmetry, molecular orbital wave functions, chemical bonding, binding energies, and many-electron effects. The editors should ensure that this work is discussed in a future volume in this series.

In summary then, this is a very good volume which will be of use both in pure and applied science as well as in advanced teaching. Subsequent volumes will be eagerly awaited.

C. E. Brion, *University of British Columbia*

Essays on Analytical Chemistry. In Memory of Professor Anders Ringbom. Edited by E. WÄNNINEN (Åbo Akademi). Pergamon Press, New York. 1977. xiv + 607 pp. $50.00.

This book is a collection of some 52 papers and essays by friends and colleagues of the later Professor Ringbom. As such, it quite naturally and appropriately tends to be oriented towards his research interests, although other areas are also touched on. The editors have roughly distributed the papers into categories headed Chemical Equilibria, Titrations, Photometric Analysis, Electrochemistry, Separations, Trace Analysis, Kinetic Analysis and a final selection of six papers lumped together as Other Analytical Topics. The last group contains some interesting and unusual subjects.

The book excels in its treatment of acid–base and complex-ion chemistry. Among many very good papers, two worthy of comment are the lead-off paper by I. M. Kolthoff, which deals with acid and base behavior in nonaqueous solvents and covers the historical development of this field, and a review by J. Bjerrum on soft–hard interactions. The "Titrations" section is very good, having not only the expected contributions on end-point detection and precision, but also articles on photometric, complexometric, and radiofrequency titrations, and one on newer trends in redox titrimetry. "Electrochemistry" is brief and will disappoint those interested in reading about exotic new voltammetric techniques. Others will find valuable two timely articles by Pungor and Pretsch on ion-selective electrodes. A review by Laitinen on electrometric titrations is particularly interesting owing to the historical tack taken by the author. "Separations" and "Kinetics", while also somewhat limited in scope, contain important material on the subjects that are discussed.

The book is short on instrumental methodology, but a number of applications of instruments to the solution of chemical problems (emphasis on chemical) are described. Some of these are fluorescence, stripping voltammetry, atomic absorption, flame emission, photoelectron spectroscopy, and the GLC of inorganic substances.

In a book conceived as this was, an even coverage of all the important topics of a subject cannot be expected, and many major areas of Analytical Chemistry are not represented here. A more serious shortcoming is the trite quality of a number of the contributions, which do not match up to the majority. In spite of these imperfections, this is a book which should be read by students of analytical chemistry. Teachers of the subjective will find the historical perspective of a number of the articles to be especially rewarding.

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