

Book Reviews*

Equilibrium in Solution and Surface and Colloid Chemistry. By G. SCATCHARD (Massachusetts Institute of Technology). Harvard University Press, Cambridge, Mass. 1976. xxxv + 306 pp. \$30.00.

This volume contains two previously unpublished texts, an autobiographical memoir by the late author, and a bibliography of his publications. An introduction by one of Professor Scatchard's former associates, I. H. Scheinberg, relates many of the author's personal attributes.

The first book of eight chapters includes a brief review of some basic thermodynamic concepts and a concise treatment of ideal and real gases before launching into the dominant sections on equilibrium in gaseous and liquid mixtures. The text is written much like a review article, with numerous references to the earlier literature, many to the author's own publications. The two chapters on electrolyte solutions are especially complete in this respect. Scatchard's concise manner of writing makes for difficult reading, but there are four appendices to aid the reader. One appendix lists the symbols used throughout the text, and another reviews important thermodynamic equations in the theory of solutions. The other two appendices give analytic expressions for experimental results and classification of molecules.

The book on surface and colloid chemistry contains six chapters in 68 pages. Chapters 1-4, about half the text, treat surface phenomena. The remainder is devoted to colloidal solutions. While contributions of many investigators are discussed, this book, unlike the first, suffers from a lack of references to the original literature. Its usefulness would be greatly enhanced if it were used in conjunction with another text on the subject.

Both books cover the subject up to about 25 years ago. Consequently, statistical mechanical treatments are not included. The level of these books requires a good background in physical chemistry. Their feature is the intuitive insight of an author intimately associated with the subject matter.

This volume is recommended reading for advanced students of physical chemistry who wish to obtain a thorough and concise view of earlier developments in solution and surface chemistry.

Cecil M. Criss, *University of Miami*

Purine Metabolism in Man. II (Advances in Experimental Medicine and Biology). Volume 76A: Regulation of Pathways and Enzyme Defects. Volume 76B: Physiology, Pharmacology, and Clinical Aspects. By M. M. MULLER and E. KAISER (University of Vienna) and J. E. SEEGMILLER (University of California, San Diego). Plenum Press, New York. 1977. Vol. 76A: xxii + 641 pp. \$49.50. Vol. 76B: xxii + 373 pp. \$36.00.

"Purine Metabolism in Man" in two volumes presents the proceedings of the Second International Symposium on Purine Metabolism in Man held in Baden, Austria, June 20 to 26, 1976. In general these two volumes represent many advances in the field from 1973 through to the end of 1976. Many of the chapters are written by recognized authorities. There is considerable variation in the quality of each individual chapter since this is a multiple author effort. In general, however, the text, figures, and tables are well reproduced and scientifically accurate. The contents of Volume 76A include descriptions of purine synthesis de novo and its regulation by nucleotides and phosphoribosylpyrophosphate, nucleotide metabolism, salvage pathways, and purine catabolism. There is also a detailed account of mutations affecting purine metabolism in man, including the phosphoribosylpyrophosphate synthetase mutation, adenine phosphoribosyltransferase deficiency, hypoxanthine-guanine phosphoribosyltransferase deficiency, xanthine oxidase deficiency, and the new and exciting purine enzyme defects and immune disorders. There is a well-written chapter by J. E. Seegmiller reviewing immunological aspects of purine metabolism followed by accounts of metabolic abnormalities observed in patients with adenosine deaminase deficiency and purine nucleoside phosphorylase deficiency. The volume also includes a series of articles on the relationships between carbohydrate, lipid, and purine metabolism and some methodologies in purine metabolism. Volume 76B focuses on the renal handling of urate, the biochemistry of purine transport, the biochemical pharmacology of drugs used to inhibit purine metabolism, mechanisms of gouty infla-

tion, and clinical aspects of purine metabolism including those factors associated with elevated serum urate concentrations in man and the effect of nutritional state on purine metabolism. Therapy for disorders of purine metabolism and a panel discussion on hyperuricemia as a risk factor are included.

Although many of the reports in these volumes have appeared in periodicals either before or since the publication of the books, the great advantage of having this mass of information in two volumes is evident. Volume 76A may be of more interest to biochemists focusing on the regulation of purine metabolism and geneticists interested in the biochemical genetics of inborn errors in purine metabolism. Volume 2 may be of more interest to physiologists and pharmacologists interested in renal handling of urate in animals and man and the biochemical pharmacology of drugs used to treat patients with gout or to inhibit purine metabolism. The latter volume will be also of interest to clinicians whose focus may be the role of uric acid as a risk factor, on the effect of nutrition on purine metabolism in man, and on the management of gout.

In general, these books will serve an excellent reference source for the biochemistry and molecular pathology of purine metabolism in man. They are essential for the library of researchers working in this area.

Irving H. Fox, *University of Michigan*

Laser Spectroscopy III. Edited by J. L. HALL and J. L. CARLSTEN (JILA, University of Colorado). Springer-Verlag, Berlin-Heidelberg-New York. 1977. xii + 468 pp. \$29.50.

This book, Volume 7 in the Springer Series in Optical Sciences, provides the Proceedings of the Third International Conference on Laser Spectroscopy (TICOLS), which was held 4-8 July 1977 at Jackson Lake Lodge, Wyoming. The publishers have done a fine job in producing the book within four months of the meeting. The Conference was well attended by excellent scientists, and it was truly international, fully 40% of the participants being foreign. The continued rapid advancement of laser spectroscopy during the current decade is rather amazing, as is well documented by the proceedings of these biennial conferences [I: Vail (1973); II: Megève (1975)]. Although the contents of many of the papers presented at TICOLS will eventually be published in the journal literature, this book is valuable reading for researchers in laser spectroscopy because of its timeliness. Indeed, many of the more tutorial lectures, which review recent progress in special applications of laser spectroscopy, are unlikely to be published elsewhere. Multiphoton processes are particularly well represented within the broad range of contributed papers, and modern methodology in all areas is well covered. In general, a high proportion of the technical papers are written for an audience composed of laser scientists from different subfields, and most will be readily understood by chemists and other scientists who are interested in learning about modern laser spectroscopy. Thus, *Laser Spectroscopy III* is a welcome addition to the growing library in this field.

George E. Leroi, *Michigan State University*

Chemical Applications of Graph Theory. Edited by A. T. BALABAN (Polytechnic, Bucharest, Roumania). Academic Press, London. 1976. xii + 390 pp. \$35.00/£14.50.

Graph-theoretical approaches to the formulation and solution of chemical problems are largely of two types: those in which a graph corresponds to a molecule, with points representing atoms and lines representing bonds, and those in which a graph corresponds to a mixture of molecules, with points representing molecular species and lines representing interconversion pathways. Much of graph theory in fact developed from consideration of the enumeration of isomers. This volume, which is the first comprehensive monograph on the chemical applications of graph theory, contains eleven excellent articles. These are: "Early History of the Interplay Between Graph Theory and Chemistry", by A. T. Balaban and F. Harary; "An Exposition of Graph Theory", by F. Harary; "Polya's Contributions to Chemical Theory", by F. Harary, E. M. Palmer, R. W. Robinson, and R. C. Reed; "The Enumeration of Acyclic Graphs", by R. C. Reed; "Enumeration of Cyclic Graphs", by A. T. Balaban; "Metric Spaces

and Graphs Representing the Logical Structure of Chemistry", by J. Dugundji, P. Gillespie, D. Marquarding, I. Ugi, and F. Ramirez; "The Topological Matrix in Quantum Chemistry", by D. H. Rouvray; "Some Aspects of Graph Theory for Intermolecular Interactions in Chemical Physics", by J. Brocas; "Applications of Graph Theory to Organometallic Chemistry", by M. Gielsen; "The Graph-Like State of Matter and Polymer Science", by M. Gordon and W. B. Temple; and "Ordered Chromatic Graph and Limited Environment Concepts", by J.-E. Dubois. The editor is to be congratulated for achieving an unusually high level of complementarity among these articles and for including chapters on introductory material. This is a significant and stimulating volume which should be of considerable interest to a wide variety of chemists wishing to become better acquainted with the graph-theoretical approach to chemical problems.

Lawrence L. Lohr, Jr., *University of Michigan*

Dye Lasers (Topics in Applied Physics, Volume I, Second Revised Edition). By F. P. SCHAFER (Göttingen). Springer-Verlag, Berlin. 1977. x + 320 pp. \$19.80.

This revised paperback edition of an earlier (1973) collection on dye lasers is still a valuable guide for research in the field. The major focus is on the theory and workings of dye lasers, and it contains a wealth of practical information including details of operation and performance. The book is written on a level that a well-prepared graduate student can understand.

The first chapter contains the principles of dye laser operation giving an excellent chemical approach. The theory of operation is related to actual construction and design, and many useful illustrations are presented.

A chapter on continuous dye lasers is somewhat brief and slightly more advanced. It presents some of the subtleties special to CW operation. This is followed by a useful chapter on mode-locking. This is a very practical section which explores some of the limitations and difficulties of mode-locking.

A chapter on the structure and properties of laser dyes is extremely useful not only for laser design but also for general chemical understanding. By studying the properties of active media undergoing lasing one can obtain much information of a general chemical nature. There is also a comprehensive list of dyes which have been successfully utilized in laser systems.

A chapter giving brief descriptions of a number of applications is valuable mainly as a survey. A final chapter has been added to discuss progress in the interim. Some 400 new articles are briefly mentioned. This section is more valuable for bibliographic purposes than for any real information content.

The need for a second edition essentially unchanged from the first indicates that dye lasers are not a temporary fad but will continue to contribute to chemical knowledge.

John R. Lombardi, *City College, CUNY*

Flame Emission and Atomic Absorption Spectrometry, Volume 3, Elements and Matrices. Edited by JOHN A. DEAN (University of Tennessee) and THEODORE C. RAINS (National Bureau of Standards). Marcel Dekker, Inc., New York. 1975. xii + 674 pp. \$57.00.

This is the third and final volume in the most complete treatise on flame methods of analysis. Theory was covered in Volume 1, published in 1969; apparatus and techniques were covered in Volume 2, issued in 1971. Volume 3 has two principal sections. The first 14 chapters summarize flame emission and atomic absorption spectra of all of the elements except hydrogen, promethium, and the elements with atomic numbers 84 or higher. The rare gases can be determined from their absorption spectra, and they are included even though it is obviously not necessary to atomize them in a flame. The final 11 chapters cover flame methods for the analysis of agricultural materials, biological fluids, foods, petroleum products, glass, Portland cement and its raw materials, ferrous and nonferrous metals and alloys, geochemical samples, water, and air pollutants. Sample preparation methods are included, as well as techniques for the final determination in the flame. Each chapter is provided with an adequate number of references to the original literature.

The authors are all recognized authorities. Many of them have made helpful interpretations and comments on the information they

have included. The others, who have not made explicit comments, have been careful about the selection of material. It is this selectivity by experts that makes this book useful. Material covered in the first two volumes is not repeated in this one, but it is referenced where appropriate. For this reason, most who purchase this volume will need the two earlier ones as well.

The weakness of this book is that much time has passed since the chapters were written. The editors remark in the Preface that they have added references to publications as recent as mid-1974. Most of the references are from 1971 or earlier. Flame spectroscopy is a fairly mature method of analysis, so the lapse of time is less serious than if the methodology had undergone great advances in the 1970's. What is missing from this book is primarily information on analyses of samples vaporized and atomized in a furnace or those vaporized from a filament or a boat. While more laboratories are equipped with these newer atomizers now than when these chapters were written, the great majority of analyses can be and are done by the older method of nebulizing droplets into a flame. This book will thus not become obsolete for quite some time.

Marvin Margoshes, *Technicon Instruments Corporation*

Trace Analysis of Atmospheric Samples. By KIKUO OIKAWA (Hokuto College of Technology). Halsted Press, New York. 1977. vii + 158 pp. \$22.50.

The title of this book is somewhat misleading in that the text deals only with the sampling and analysis of atmospheric particulate material. No mention is made of gaseous samples. The material presented is contained in three chapters dealing with sampling, sample pretreatment and preparation for analysis, and analytical methodology. Emphasis is placed on the detailed description of well-known instrumentation and methodology, and the book contains a great deal of practical information which would be useful to those engaged in routine atmospheric monitoring operations.

With a few exceptions, mainly in the area of sample preparation, the material presented does not represent the state of the art. Furthermore, procedures are presented in the form of recipes so that the reader gains essentially no understanding of the principles involved and the limitations which apply. Indeed, this uncritical acceptance of reported work has resulted in the presentation of some clearly erroneous material. Finally, it is particularly disappointing to find that the analytical instrumentation described is almost universally obsolete—at least with respect to contemporary practice in the United States.

Overall, this is not a scholarly book nor one which will make a significant contribution to the field of atmospheric particulate sampling and analysis. It does, however, gather together a great deal of useful practical information in a single volume and is recommended to the discriminating reader purely as a source of data relating to the practice of atmospheric particulate sampling and analysis.

David F. S. Natusch, *Colorado State University*

Analytical Profiles of Drug Substances, Volume 6. Edited by KLAUS FLOREY (Squibb Institute for Medical Research). Academic Press, New York. 1977. ix + 600 pp. \$27.50.

This volume is the sixth in a series providing detailed analytical data on pharmacologically important drugs. Areas covered include chemical and physical properties, chromatographic behavior, spectra (ultraviolet, infrared, Raman, optical rotatory dispersion, fluorescence, NMR, mass), X-ray diffraction, and synthesis. For some drugs information is also given on major contaminants and metabolites, extraction and analysis in body fluids, pharmacokinetics and bioassay, although in general the treatment of these subjects is less comprehensive. The sections are well referenced permitting the reader to easily locate original papers for additional data. The drugs covered in Volume 6 include Amphotericin B, betamethasone dipropionate, clonazepam, cyclizine, dipiperodon, ergotamine tartrate, fenoprofen calcium, isoniazid, kanamycin sulfate, ketamine, minocycline, nystatin, proparacaine hydrochloride, propylthiouracil, sodium nitroprusside, sulphamerazine, and triamcinolone hexacetonide.

This is a valuable reference source for analytical chemists, pharmacologists, and other scientists. There is no other series or book which contains so much specific chemical and physical information on such a wide range of pharmaceutically important drugs.

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