pected and in themselves revealing. The present volume, which is part of a series edited by A. M. Alfer, John L. Margrave, and A. S. Nowick, provides an up-to-the-year summary of some of the issues of concern to those involved in the study of diffusion. It has both the advantages and the disadvantages of a multiauthored volume. What one gains in breadth by having a number of viewpoints represented is partly offset by a lack of unity. In the present case the advantages far outweigh the disadvantages, since the book is primarily intended to give the reader a broad perspective of major issues of current interest.

The first two chapters, by Wilbur M. Franklin and Charles H. Bennett, respectively, are devoted to theoretical analysis of factors such as mass dependence and quantum and anharmonicity effects that enter into the detailed structure of the equations that govern diffusion, and give exact calculations for simplified models. The remaining chapters focus on special types of diffusion that currently are of major interest. There is a chapter on isotope effects in diffusion by N. L. Peterson, one on fast diffusion in metals by W. K. Warburton and D. Turnbull, one on the diffusion of hydrogen in metals by J. Völkl and G. Alefeld, one on electromigration in metals by H. B. Huntington, and a discussion of atomic currents generated by vacancy winds by T. R. Anthony. The volume is by no means restricted to metals but also contains an account of diffusion in the alkali halides by W. J. Fredericks and a discussion of very rapid ionic transport in solids by Robert A. Huggins.

The book carries with it the atmosphere of lively interest one encounters at moving frontiers. It is an important addition to the literature of solid state science.

FREDERICK SEITZ
Rockefeller University,
New York City

Ion-Molecule Interactions

Interaction between Ions and Molecules. Proceedings of a NATO Advanced Study Institute, Biarritz, France, June 1974. PIERRE AUSLOOS, Ed. Plenum, New York, 1975. x, 690 pp., illus. $54. NATO Advanced Study Institutes Series B, Physics, vol. 6.

This book is a report of recent progress achieved in the many, specialized kinds of research concerned with ion-molecule interactions. Taken as a whole, it is a success story par excellence. From scant beginnings only 20 years ago, when experiments on ion-molecule reactions were carried out mainly in electron-impact ion sources of conventional mass spectrometers, there have been such great advances that this collection of 28 papers and four panel discussions can barely scratch the surface. Crossed-beam and beam-attenuation methods for the experimental study of elastic, inelastic, and reactive collision dynamics make up about one-sixth of the volume, yet are somewhat underrepresented, although there are fine papers on elastic scattering (Ding), direct ion-molecule reactions (Mahan), and angular distribution studies (Birkinshaw *et al.*). A mixed group of theoretical papers covers questions of potential energy surfaces, statistical phase-space theory, classical trajectories, and simple polarization and ion-dipole theories but is somewhat less successful than the experimental papers in providing a clear summary of present accomplishments and future expectations.

The most substantive advances, at least in terms of number of reaction systems, extension to negative ions, energy and temperature ranges covered, and application to complicated reactant species, have come in the "bulk" methods, those of the flowing afterglow (Ferguson, Fehsenfeld, Bohme), of ion cyclotron resonance (Beauchamp), and of drift tubes and swarms (Hasted). This progress has made possible the strikingly successful application of newly measured rate parameters to atmospheric (Ferguson) and astrophysical (Dalgarno) problems. Ten to 15 years ago, research on ion-molecule interactions was a frontier in chemical physics. That frontier has now shifted to more esoteric matters, such as the effects of internal excitation on the reactant or the product channels of these interactions. The photoionization technique is shown to be particularly useful in providing accurate information on the effect of vibrational or electronic excitation in the ionic reactant on the cross section of reactive processes (Chupka), and reactions of electronically excited positive ions are studied by beam attenuation methods (Koski). The examination of electronically excited reaction products in beam or flowing afterglow experiments, now still in its infancy, may be expected to grow rapidly (Marx).

The book is understandably uneven in style and coverage, but it is so full of interesting and varied new work, presented with authority and enthusiasm, that one gladly forgives minor failings. The editor thought the summer school a memorable one, and its published record bears him out.

FREDERICK KAUFMAN
Department of Chemistry,
University of Pittsburgh,
Pittsburgh, Pennsylvania

Books Received

Adenine Arabinoside. An Antiviral Agent. Papers from a symposium, San Francisco, Sept. 1974. Deborah Pavan-Langston, Robert A. Buchanan, and Charles A. Alford, Jr., Eds. Raven Press, New York, 1975. xx, 426 pp., illus. $21.50.

Adsorption at Interfaces. Papers from a symposium, Los Angeles, Apr. 1974. K. L. Mittal, Ed. American Chemical Society, Washington, D.C., 1975. xiv, 290 pp., illus. $12.95. ACS Symposium Series, 8.

Advances in Applied Mechanics. Vol. 15. Chia-Shun Yih, Ed. Academic Press, New York, 1975. x, 266 pp., illus. $16.50.

Advances in Human Genetics. Vol. 5. Harry Harris and Kurt Hirschhorn, Eds. Plenum, New York, 1975. xiv, 386 pp., illus. $32.50.

Advancing Frontiers in Cytogenetics. In Evolution and Improvement of Plants. Professor P. N. Mehra Commemorative Volume. Proceedings of a seminar, Kashmir, India, Oct. 1972. P. Kachroo, Ed. Hindustan Publishing Corp., Delhi, 1974 (U.S. distributor, International Scholarly Book Services, Portland, Ore.). xvi, 378 pp., illus. $14.

Aging. Scientific Perspectives and Social Issues. Diana S. Woodruff and James E. Birren, Eds. Van Nostrand, New York, 1975. viii, 422 pp., illus. $9.95.

Algebras in Analysis. Proceedings of a NATO Advanced Study Institute, Birmingham, England, Sept. 1973. J. H. Williamson, Ed. Academic Press, New York, 1975. xiv, 312 pp. $28.50.

The Alkaloids. Chemistry and Physiology. Vol. 15. R. H. F. Manske, Ed. Academic Press, New York, 1975. xvi, 316 pp., illus. $39.50.

Amazon Jungle. Green Hell to Red Desert? An Ecological Discussion of the Environmental Impact of the Highway Construction Program in the Amazon Basin. R. J. A. Goodland and H. S. Irwin. Elsevier, New York, 1975. x, 156 pp., illus. $13.75. Developments in Landscape Management and Urban Planning, 1. Reprinted from *Landscape Planning*, vol. 1, No. 2/3.

Anesthesiology and the University. Nicholas M. Greene. Lippincott, Philadelphia, 1975. x, 164 pp. $10.

An Atlas of Histology. Johannes A. G. Rhodin. Oxford University Press, New York, 1975. xii, 452 pp. $15. Reprint of the atlas section of *Histology: An Atlas and Text* (1974).

Annual Review of Materials Science. Vol. 5. Robert A. Huggins, Richard H. Bube, and Richard W. Roberts, Eds. Annual Reviews, Palo Alto, Calif., 1975. xii, 418 pp., illus. $15.

Antoine-Laurent Lavoisier. Chemist and Revolutionary. Henry Guerlac. Scribner, New York, 1975. 174 pp., illus. Cloth, $7.95; paper, $2.95. DSB Editions. Based on article in *Dictionary of Scientific Biography* (1973).

Applied Analytical Mathematics for Physical Scientists. James T. Cushing. Wiley, New York, 1975. xx, 652 pp. $19.95.

Archaeological Sediments. A Survey of Analytical Methods. Myra L. Shackley. Halsted (Wiley), New York, 1975. xii, 160 pp., illus. $21.50.

Assessment of Research on Natural Hazards. Gilbert F. White and J. Eugene Haas. MIT Press, Cambridge, Mass., 1975. xxii, 488 pp., illus. Paper, $17.50.

Astronomy and Astrophysics Abstracts. Vol. 12, Literature 1974, Part 2. S. Böhme and seven others, Eds. Published for Astronomisches Rechen-Institut by Springer-Verlag, New York, 1975. x, 702 pp. $37.

(Continued on page 919)