

as a useful source of data and of expositions. There is an excellent first chapter on ruthenium(II) and osmium(II) polypyridine complexes, in the usual terse style of N. Sutin and C. Creutz, followed by more specialized chapters by other groups. Similar complexes of chromium(III) are discussed by M. S. Henry and M. Z. Hoffman. There follow several papers on various metal carbonyl and arene complexes, concluding with a stimulating discussion of photogenerated catalysts by Wrighton. Two papers explicitly discuss systems relevant to solar energy; H. B. Gray and co-workers discuss isocyanide complexes and their redox cycles, and C. Kütal examines energy storage through photoinduced endergic isomerization.

A unifying theme in a collection such as this one should be that photochemistry, as well as photophysical processes such as emission, proceeds from thermally equilibrated excited states. One is repeatedly impressed with the growing knowledge of standard redox potentials of such states, for example. Some distinct name is needed to emphasize that such states constitute a thermodynamic ensemble; they are good chemical species possessing structure and thermodynamic properties such as entropy and free energy. My colleagues and I and other workers have used "thexi state" for "thermally equilibrated excited state." A thexi state is essentially an isomer of the ground state. Some of the discussions in the book are satisfyingly explicit on this point. In others, unfortunately, the word "state" is used sloppily and with no indication of the distinction between a thexi state and Franck-Condon or other nonequilibrium collection of spectroscopic species. For example, band maxima positions are nice to know for purposes of identification, but they usually do not even approximately correspond to thexi state energies. Discussions involving energetics in this book do not always make clear which type of energy (band maximum or thexi state) is being used (and why). Some of the discussions are unconvincing, and there are at least two figures that are closer to modern art than to modern science.

It is a pleasure to see in this book further evidence of the growing maturity of the "second" chemistry, that of thexi states. The papers illustrate both the diversity of the field and the sophistication of experimental and conceptual approaches now in use.

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Books Received

Adolescence to Adulthood. Change and Stability in the Lives of Young Men. Jerald G. Bachman, Patrick M. O'Malley, and Jerome Johnston. Institute of Social Research, University of Michigan, Ann Arbor, 1978. xxiv, 326 pp., illus. \$16. Youth in Transition, vol. 6.

Advances in Inorganic Chemistry and Radiochemistry. Vol. 21. H. J. Emeléus and A. G. Sharpe, Eds. Academic Press, New York, 1978. xii, 302 pp., illus. \$29.50.

Advances in Pharmacology and Chemotherapy. Vol. 15. Silvio Garattini, A. Goldin, F. Hawking, I. J. Kopin, and R. J. Schnitzer, Eds. Academic Press, New York, 1978. x, 326 pp., illus. \$31.50.

Affective Disorders. Drug Actions in Animals and Man. Leslie Iversen, Susan D. Iversen, and Solomon H. Snyder, Eds. Plenum, New York, 1978. xvi, 380 pp., illus. \$29.50. Handbook of Psychopharmacology, vol. 14.

Analysis of Drugs and Metabolites by Gas Chromatography-Mass Spectrometry. Vol. 5. Analgesics, Local Anesthetics, and Antibiotics. Benjamin J. Gudzinowicz and Michael J. Gudzinowicz with the assistance of Horace F. Martin and James L. Driscoll. Dekker, New York, 1978. xii, 542 pp., illus. \$55.

Animal Health Products. Papers from a symposium, New York, May 1977. Donald C. Monkhouse, Ed. American Pharmaceutical Association and Academy of Pharmaceutical Sciences, Washington, D.C., 1978. viii, 142 pp., illus. Paper, \$14.

Australian National Paper for the United Nations Conference on Science and Technology for Development, 1979. Australian Government Publishing Service, Canberra, 1978. xii, 184 pp. Paper.

Barley. D. E. Briggs. Chapman and Hall, London, and Halsted (Wiley), New York, 1978. xviii, 612 pp., illus. \$60.

Basic Liquid Chromatography. Edward J. Johnson and Robert Stevenson. Varian, Palo Alto, Calif., 1978. xii, 354 pp., illus. Paper, \$9.75.

Biosystematics in Agriculture. Papers from a symposium, Beltsville, Md., May 1977. Allanheld, Osmun, Montclair, N.J., and Halsted (Wiley), New York, 1978. xii, 340 pp., illus. \$24. Beltsville Symposia in Agricultural Research, 2.

Bird Sounds and Their Meaning. Rosemary Jellis. British Broadcasting Corporation, London, 1977 (U.S. distributor, Humanities Press, Atlantic Highlands, N.J.). 256 pp., illus. \$11.

The Boundary Element Method for Engineers. C. A. Brebbia. Halsted (Wiley), New York, 1978. viii, 190 pp., illus. \$27.50.

Color in Plants and Flowers. John and Susan Proctor. Everest House, New York, 1978. 116 pp., illus. \$9.95.

The Common Sense of Science. J. Bronowski. Harvard University Press, Cambridge, Mass., ed. 2, 1978. vi, 154 pp. Paper, \$3.95.

Crop Physiology. U. S. Gupta, Ed. Oxford and IBH Publishing Co., New Delhi, 1978. xvi, 432 pp., illus. Rs. 70.

The Cult of the Wild. Boyce Rensberger. Drawings by Betty Fraser. Anchor/Doubleday, Garden City, N.Y., 1978. xii, 268 pp. Paper, \$2.95. Reprint of the 1977 edition.

Electrostatic and Electromagnetic Effects of Ultrahigh-Voltage Transmission Lines. Electric Power Research Institute, Palo Alto, Cal-

if., 1978. Various pages, illus. Paper, \$12.25. EPRI EL-802.

Elements of Electronic Communications. Joseph J. Carr. Reston (Prentice-Hall), Reston, Va., 1978. x, 486 pp., illus. \$19.95.

Evolution of Play Behavior. Dietland Müller-Schwarze, Ed. Dowden, Hutchinson and Ross, Stroudsburg, Pa., 1978 (distributor, Academic Press, New York). xvi, 398 pp., illus. \$32. Benchmark Papers in Animal Behavior, vol. 10.

Excavations at Quachilco. A Report on the 1977 Season of the Palo Blanco Project in the Tehuacan Valley. Robert D. Drennan. Spanish Text translated by Carlos Alberto Uribe. University of Michigan Museum of Anthropology, Ann Arbor, 1978. vi, 82 pp., illus. Paper, \$4. Technical Reports, No. 7. Research Reports in Archaeology, Contribution 3.

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Fundamentals of Measurement and Representation of Natural Systems. Robert Rosen. Elsevier/North-Holland, New York, 1978. xviii, 222 pp., illus. \$22.95.

Fundamentals of the Computing Sciences. Kurt Maly and Allen R. Hanson. Prentice-Hall, Englewood Cliffs, N.J., 1978. xxiv, 488 pp., illus. \$16.95.

Galileo Studies. Alexandre Koyré. Translated from the French edition (1939) by John Mepham. Humanities Press, Atlantic Highlands, N.J., 1978. xii, 278 pp., illus. \$25. European Philosophy and the Human Sciences.

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The Harvey Lectures. Delivered under the Auspices of the Harvey Society of New York, 1975-1976. Series 71. Academic Press, New York, 1978. xvi, 328 pp., illus. \$19.50.

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IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man. Vol. 16. Some Aromatic Amines and Related Nitro Compounds—Hair Dyes, Colouring Agents and Miscellaneous Industrial Chemicals. International Agency for Research on Cancer, Lyon, 1978 (U.S. distributor, WHO Publications Centre USA, Albany). 400 pp. Paper, \$20.

Internal Rotation and Inversion. An Introduction to Large Amplitude Motions in Molecules. David G. Lister, John N. Macdonald, and Noel L. Owen. Academic Press, New York, 1978. xii, 246 pp. \$23.75.

Lakes of New York State. Vol. 2, Ecology of the Lakes of Western New York. Jay A. Bloomfield, Ed. Academic Press, New York, 1978. xiv, 474 pp., illus. \$21.50.

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Laryngeal Biomechanics. B. Raymond Find and Robert J. Demarest. Harvard University Press, Cambridge, Mass., 1978. x, 134 pp., illus. \$30. A Commonwealth Fund Book.

Learning Strategies. Harold F. O'Neil, Jr., Ed. Academic Press, New York, 1978. xiv, 230 pp., illus. \$15. The Educational Technology Series.

Liquids and Their Properties. A Molecular and Macroscopic Treatise with Applications. H. N. V. Temperly and D. H. Trevena. Horwood, Chichester, England, and Halsted (Wiley), New York, 1978. 274 pp., illus. \$37.50. Mathematics and Its Applications.

The Mammoth—in Ice and Snow? Cold-Adaptation of Woolly Mammoth: Fact or Fiction? Hans Krause. Published by the author, Kameralamtsstrasse 22, Stuttgart, 1978. 108 pp., illus. Paper, \$8.80.

Manual of Standardized Methods for Veterinary Microbiology. George E. Cottral, Ed. Comstock (Cornell University Press), Ithaca, N.Y., 1978. 732 pp., illus. \$35.

Membrane Cell Regulation. Papers from a meeting, Roscoff, France, Nov. 1977. Pierre Guerrier and Marc Moreau, Eds. Société Française de Microscopie Electronique, Paris, 1978. iv, 176 pp., illus. Paper, 80 F. *Biologie Cellulaire*, vol. 32, 1.

Metal Ions in Biological Systems. Vol. 7, Iron in Model and Natural Compounds. Helmut Sigel, Ed. Dekker, New York, 1978. xx, 418 pp., illus. \$39.50.

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Modeling of Complex Systems. An Introduction. V. Vemuri. Academic Press, New York, 1978. xvi, 448 pp., illus. \$19.50. Operations Research and Industrial Engineering.

Mössbauer Effect Data Index. Covering the 1976 Literature. John G. Stevens and Virginia E. Stevens, Eds. IFI/Plenum, New York, 1978. x, 358 pp., illus. \$95.

The Multimedia Library. Materials Selection and Use. James Cabeceiras. Academic Press, New York, 1978. xvi, 276 pp. \$13. Library and Information Science.

Myelination and Demyelination. Proceedings of a symposium, Helsinki, Aug. 1977. Jorma Palo, Ed. Plenum, New York, 1978. xii, 652 pp., illus. \$49.50. Advances in Experimental Medicine and Biology, vol. 100.

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Progress without Poverty. Socially Respon-

sible Economic Growth. Peter S. Albin. Basic, New York, 1978. x, 230 pp. \$13.95.

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Structure in Nature Is a Strategy for Design. Peter Pearce. MIT Press, Cambridge, Mass., 1978. xviii, 246 pp., illus. \$45.

Studies in Mathematical Biology. S. A. Levin, Ed. Mathematical Association of America, Washington, D.C., 1978. Two volumes. Part 1, Cellular Behavior and the Development of Pattern. xiv, 316 pp., illus. + index. \$16. Part 2, Populations and Communities. xx + pp. 316-624, illus. + index. \$16. The set, \$27. MAA Studies in Mathematics, vols. 15 and 16.

Technology Assessment of the Gas Turbine-High-Temperature Gas-Cooled (Helium) Reactor. Prepared by NUS Corporation. Electric Power Research Institute, Palo Alto, Calif., 1978. xiv, 252 pp., illus. Paper, \$8.75. EPRI NP-805.

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Thinking Metric. Thomas F. Gilbert and Marilyn B. Gilbert. Wiley, New York, ed. 2, 1978. xvi, 142 pp., illus. Paper, \$3.95.

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Vestibular Mechanisms in Health and Disease. Papers from a meeting, London, Sept. 1977. J. D. Hood, Ed. Academic Press, New York, 1978. xx, 378 pp., illus. \$28.50.

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X-Ray Photoelectron Spectroscopy. Thomas A. Carlson, Ed. Dowden, Hutchinson and Ross, Stroudsburg, Pa., 1978 (distributor, Academic Press, New York). xvi, 344 pp., illus. \$31. Benchmark Papers in Physical Chemistry and Chemical Physics, vol. 2.

Your Medicine Chest. A Consumer's Guide to Prescription and Non-Prescription Drugs. Wayne O. Evans and Jonathan O. Cole. Little, Brown, Boston, 1978. x, 340 pp. Paper, \$5.95.

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Physical Oceanographer: Ph.D. and experience. Has worked and published in meteorology, air-sea interaction, descriptive physical oceanography, and biology. Extensive computer experience. Desires position involving interdisciplinary research and teaching. Box 76, SCIENCE. 3/2, 9