

Intermediate-Energy Physics

Nuclear and Particle Physics at Intermediate Energies. Papers from an institute, Victoria, Canada, June 1975. J. B. WARREN, Ed. Plenum, New York, 1976. viii, 608 pp., illus. \$49.50. NATO Advanced Study Institutes Series B, vol. 15.

The study of nuclei and particles at intermediate energies had its origin more than 25 years ago with the operation of meson-producing accelerators. Considering the wide variety of subjects, the complicated interrelations among them, and the enormous literature of the field, it is fortunate that there have been excellent proceedings of topical conferences and schools such as the volume under review to assist those who wish to keep in close touch with developments. With several generations of accelerators, dubbed "pion factories," in operation, an examination of the areas where developments are expected to be concentrated and of the confrontation between theory and experiment is timely.

One of the key questions addressed by the book is: Given the increased precision now possible, what can be learned about the nucleus with the pion as a probe, from π production, scattering, and energy levels of pionic bound states? Where does the experimentalist need to concentrate, what can be expected from the present theoretical models, and what needs to be done to improve both theory and experiment?

The book includes a number of short papers that cover experiments in progress (on muon capture and radiative pion capture and low-energy π nuclear scattering, for example), new experimental facilities (Omicron and the Swiss Institute for Nuclear Research universal spectrometer installation), and programs on the machines at Los Alamos Meson Physics Faculty, the Space Radiation Effects Laboratory, and the Swiss Institute for Nuclear Research. There are also several comprehensive reviews. Outstanding is the opening paper by Primakoff, which gives a meticulous account of the quantitative status of the decay and interactions of the muon. This review sets the tone of the book. Koch ably reviews research on muonic and hadronic atoms. The review by Scheck on pion-nuclear interactions presents a thorough parameterization of the fundamental interaction and scattering and adsorption phenomena. It elaborates the specific nuclear complications and presents the various models and their successes and shortcomings. There is an excellent paper by Beurtey on the magnetic spectrometry program at Saclay that is

sufficiently detailed to provide the reader with an understanding of this pioneering work. The paper by Schenck on the application of positive muons in solid state physics also provides a sufficiently detailed account to appeal to those interested in understanding this new development.

KENNETH M. CROWE

*Department of Physics,
University of California,
Berkeley*

Laser Spectroscopy

Dynamic Light Scattering. With Applications to Chemistry, Biology, and Physics. BRUCE J. BERNE and ROBERT PECORA. Wiley-Interscience, New York, 1976. viii, 376 pp., illus. \$24.95.

Aside from proceedings volumes, *Dynamic Light Scattering* is the fourth book on modern light-scattering spectroscopy to appear in recent years. Fabinskii's *Molecular Scattering of Light* (Plenum, 1965) mainly summarized contributions of prelaser times. Two volumes in the Quantum Electronics series (Academic Press) deal with experimental methods, practical applications, and elementary principles of the high-resolution spectroscopic techniques, known as Fabry-Perot interferometry and light-beating, intensity-fluctuation, optical-mixing, or photon-correlation spectroscopy. The first volume concentrates on basic light-scattering theory, methods, and practical applications related to macromolecules in solution, laser Doppler velocimetry, and critical opalescence (Benjamin Chu, *Laser Light Scattering*, 1974); the second is concerned almost exclusively with statistical properties of scattered light (B. Crosignani, P. Diporto, and M. Bertolotti, *Statistical Properties of Scattered Light*, 1975). The book under review provides a comprehensive introduction to the theoretical foundations of light-scattering spectroscopy and is thus complementary to the earlier volumes.

Berne and Pecora are experts in the field of statistical mechanics. They have made valuable and important contributions to the elucidation of the principles of light-scattering spectroscopy, and their book covers the topics that interest them and in which they have had considerable experience. Consequently, many important topics, such as nonlinear light scattering and dynamic scattering from liquid crystals and turbulent fluids, are not treated at all, and others, such as critical opalescence, especially critical dy-

namics, are barely touched. Furthermore, details of the experimental methods are missing. The book does deal, however, with many theoretical aspects of Rayleigh scattering. With the aid of time-dependent statistical mechanics, the authors endeavor to explain how information about the structure and dynamics of the system of interest can be obtained from light-scattering characteristics, but they provide only a summary of schemes for performing those measurements.

The presentation in chapters 1 through 8 of the basic theories pertaining to the dynamics of macromolecules and colloids in fluids is in general extremely well done. The authors provide detailed derivations and discussions of scattering from model systems of spherical molecules, optical anisotropic molecules, and very large macromolecules. The format is excellent because the authors have presented the less pertinent but nevertheless important derivations in an appendix and provided short notes as hints for those who wish to achieve a deeper understanding of the more subtle points in their theoretical development. On numerous occasions, helpful intermediate steps are presented.

Chapters 9 through 14 treat systems composed of interacting molecules and collective modes. The authors correctly say that chapter 11, which deals with projection operators and relaxation equations, "is mathematically involved and should be skipped, at least on the first reading, by those not conversant with the mathematics of quantum mechanics." In fact, the book as a whole will be tough reading for those who do not have advanced training in the physical sciences, such as a semester of statistical mechanics at the graduate level. Let biologists and medical scientists be forewarned of the mathematical sophistication that permeates the book.

It is unfortunate that such a first-rate piece of work should contain a number of typographical errors, which are especially annoying in figures and equations. The references are neither numerous nor entirely up to date. In dealing with motile microorganisms, the authors fail to point out that the scaling represented by their figure 5.7.1.b is coincidental because the structure factor of large particles cannot be ignored.

This is an impressive, carefully written book that should be useful as a source of information on many theoretical aspects of light-scattering spectroscopy. It provides a broad perspective on the field and contains much that is of value for those who want a rigorous understanding

of the principles of laser light scattering. I can recommend it most strongly to graduate students and research workers who intend to enter this interesting and promising field.

B. CHU

Chemistry Department,
State University of New York,
Stony Brook

Books Received

Advances in the Drug Therapy of Mental Illness. Proceedings of a symposium, Geneva, Nov. 1973. World Health Organization, Geneva, 1976 (U.S. distributor, Q Corporation, Albany, N.Y.). 170 pp. Paper, \$12.

Agronomic Research for Food. Papers from a meeting, Knoxville, Tenn., Aug. 1975. Fred L. Patterson, Matthias Stelly, David M. Kral, and Linda C. Eisele, Eds. American Society of Agronomy, Madison, Wis., 1976. vi, 98 pp. Paper. ASA Special Publication No. 26.

America as Art. Joshua C. Taylor with a contribution by John G. Cawelti. Published for the National Collection of Fine Arts by the Smithsonian Institution Press, Washington, D.C., 1976. xii, 320 pp., illus. \$25.

Analyse Structurale des Amplitudes de Collision. Structural Analysis of Collision Amplitudes. Papers from an institute, Grenoble, France, June 1975. Roger Balian and Daniel Iagolnitzer, Eds. North-Holland, Amsterdam, 1976 (U.S. distributor, Elsevier, New York). xx, 638 pp., illus. \$57.50.

Analysis of Essential Oils by Gas Chromatography and Mass Spectrometry. Yoshiro Masada. Halsted (Wiley), New York, 1976. xvi, 334 pp., illus. \$37.50.

Anatomical Neuroendocrinology. Papers from a conference, Chapel Hill, N.C., May 1974. Walter E. Stumpf and Lester D. Grant, Eds. Karger, Basel, 1976. viii, 472 pp., illus. \$37.

Androgyny. Toward a New Theory of Sexuality. June Singer. Anchor/Doubleday, Garden City, N.Y., 1976. viii, 376 pp. \$8.95.

Annotated Bibliography of Expository Writing in the Mathematical Sciences. Matthew P. Gaffney and Lynn Arthur Steen with the assistance of Paul J. Campbell. Mathematical Association of America, Washington, D.C., 1976. xii, 282 pp. Paper, \$7.

Annual Review of Phytopathology. Vol. 14. Kenneth F. Baker, George A. Zentmyer, and Ellis B. Cowling, Eds. Annual Reviews, Palo Alto, Calif., 1976. xii, 512 pp. \$17.

Applied Physiology of Respiratory Care. John Hedley-Whyte, George E. Burgess III, Thomas W. Feeley, and Malcolm G. Miller. Little, Brown, Boston, 1976. xiv, 552 pp., illus. \$22.50.

An Assessment of Alternative Economic Stockpiling Policies. United States Congress Office of Technology Assessment, Washington, D.C., 1976 (available from the Superintendent of Documents, Washington, D.C.). xiv, 328 pp., illus. Paper, \$3.10.

Astronomy Transformed. The Emergence of Radio Astronomy in Britain. David O. Edge and Michael J. Mulkay. Wiley-Interscience, New York, 1976. xviii, 482 pp. \$25.

Athlon. Essays in Palaeontology in Honour of Lorin Shano Russell. C. S. Churcher, Ed.

Royal Ontario Museum, Toronto, Canada, 1976. vi, 286 pp., illus. \$15. Royal Ontario Museum Life Sciences Miscellaneous Publications.

Behavior-Therapy Assessment. Diagnosis, Design, and Evaluation. Eric J. Mash and Leif G. Terdal, Eds. Springer, New York, 1976. xviii, 382 pp. \$14.95. Springer Series in Behavior Modification, vol. 2.

Behavioral Pharmacology. Stanley D. Glick and Joseph Goldfarb, Eds. Mosby, St. Louis, 1976. xviii, 380 pp., illus. \$16.95.

A Bibliography of Quantitative Ecology. Vincent Schultz, L. L. Eberhardt, J. M. Thomas, and M. I. Cochran. Dowden, Hutchinson and Ross, Stroudsburg, Pa., 1976 (distributor, Halsted [Wiley], New York). x, 362 pp. \$18.50.

Biochemische Grundlagen der Teilung und Differenzierung von Normal- und Tumorzellen. G. Butschak. Fischer, Jena, East Germany, 1976. 348 pp., illus. Paper, 29.60 M.

Biochemistry and Cytology of Plant-Parasite Interaction. Papers from a symposium, Osaka, Japan, Sept. 1974. K. Tomiyama, J. M. Daly, I. Uritani, H. Oku, and S. Ouchi, Eds. Kodansha, Tokyo, and Elsevier, New York, 1976. xiv, 256 pp., illus. \$31.50.

Brain-Stimulation Reward. Papers from a conference, Beerse, Belgium, Apr. 1975. Albert Wauquier and Edmund T. Rolls, Eds. North-Holland, Amsterdam, and Elsevier, New York, 1976. xxviii, 622 pp., illus. \$56.95.

Braverman's Introduction to the Biochemistry of Foods. Second edition by Z. Berk. Elsevier, New York, 1976. xii, 316 pp., illus. \$18.95.

Building Economy. Design, Production and Organisation. A Synoptic View. P. A. Stone. Pergamon, New York, ed. 2, 1976. xiv, 294 pp. Cloth, \$14; paper, \$8. Pergamon International Library.

C*-Algebras and Their Applications to Statistical Mechanics and Quantum Field Theory. Proceedings of a school, Varenna on Lake Como, Italy, July 1973. D. Kastler, Ed. Società Italiana di Fisica, Bologna, and North-Holland, Amsterdam, 1976 (U.S. distributor, Elsevier, New York). xii, 264 pp. \$38.50.

Calcium in Biological Systems. Papers from a symposium, Englefield Green, Surrey, England, Sept. 1975. Published for the Society for Experimental Biology by Cambridge University Press, New York, 1976. viii, 486 pp., illus. + plates. \$42.50. Symposia of the Society for Experimental Biology, No. 30.

Cancer Chemotherapy. Papers from a symposium, Philadelphia, Apr. 1975. Alan C. Sartorelli, Ed. American Chemical Society, Washington, D.C., 1976. x, 126 pp., illus. \$14.75. ACS Symposium Series, 30.

Catálogo de la Fauna Venezolana. Vol. 8, Mollusca. Jaime Tello. Published by the author, Residencias Unión, Apt. B-105, 4 Ave. Los Palos Grandes, Caracas 106, Venezuela, 1975. xx, 600 pp. \$100.

Cellular Ageing. Concepts and Mechanisms. Part 2. Mechanisms 2, Translation, Transcription and Structural Properties. Richard G. Cutler, Ed. Karger, Basel, 1976. vi, 130 pp. Paper, \$30.50. Interdisciplinary Topics in Gerontology, vol. 10.

Chemistry and Physics of the Stratosphere. American Geophysical Union, Washington, D.C., 1976. Various pages, illus. Paper, \$6. Reprinted from *Reviews of Geophysics and Space Physics*, vols. 13 and 14.

Children's Rights and the Mental Health Professions. Gerald P. Koocher, Ed. Wiley-Interscience, New York, 1976. xii, 260 pp. \$17.95. Wiley Series on Personality Processes.

Cleaning Up America. An Insider's View of the Environmental Protection Agency. John Quarles. Houghton Mifflin, Boston, 1976. xvi, 256 pp. + plates. \$8.95.

Clinical Pharmacology of Serotonin. Proceedings of a symposium, Helsinki, July 1975. F. Sicuteri and E. Schönbaum, Eds. Karger, Basel, 1976. viii, 140 pp., illus. Paper, \$26. Monographs in Neural Sciences, vol. 3.

Clinical Tumor Immunology. Proceedings of a symposium, Brussels, May 1975. Joseph Wybran and Maurice J. Staquet, Eds. Published for the European Organization for Research on Treatment of Cancer by Pergamon, New York, 1976. xvi, 282 pp., illus. Cloth, \$25; paper, \$15. EORTC Monographs on Cancer. Supplement to the *European Journal of Cancer*.

Clues to America's Past. Jeffrey P. Brain and five others. National Geographic Society, Washington, D.C., 1976. 200 pp., illus. \$4.75.

Cognitive Styles in Infancy and Early Childhood. Nathan Kogan. Erlbaum, Hillsdale, N.J., 1976 (distributor, Halsted [Wiley], New York). xiv, 146 pp. \$12.95.

Color Television Troubleshooting. Edward Bannon. Reston (Prentice-Hall), Reston, Va., 1976. viii, 264 pp., illus. \$14.95.

Communication Revolution. D. A. Ehrenfeld. Published by the author, P.O. Box 1161, Mountain View, Calif. 94042, 1976. iv, 162 pp. \$5.30.

Compliance with Therapeutic Regimens. Papers from a symposium, Hamilton, Ontario, Canada, May 1974. David L. Sackett and R. Brian Haynes, Eds. Johns Hopkins University Press, Baltimore, 1976. xviii, 294 pp. \$15.

Concepts of Species. C. N. Slobodchikoff, Ed. Dowden, Hutchinson and Ross, Stroudsburg, Pa., 1976 (distributor, Halsted [Wiley], New York). xvi, 368 pp., illus. \$25. Benchmark Papers in Systematic and Evolutionary Biology, vol. 3.

The Conservation of the California Tule Elk. A Socioeconomic Study of a Survival Problem. W. E. Phillips. University of Alberta Press, Edmonton, Canada, 1976. viii, 120 pp., illus. Paper, \$4.

Contemporary Africa. Geography and Change. C. Gregory Knight and James L. Newman, Eds. Prentice-Hall, Englewood Cliffs, N.J., 1976. xiv, 546 pp., illus. \$14.95.

The Correspondence of Henry Oldenburg. Vol. 10, June 1673–April 1674, Letters 2241–2489. Edited and Translated by A. Rupert Hall and Marie Boas Hall. Mansell, London, 1975 (U.S. distributor, International Scholarly Book Services, Forest Grove, Ore.). xxviii, 596 pp. \$35.

Cosmological Letters on the Arrangement of the World-Edifice. J. H. Lambert. Translated from the German with an introduction and notes by Stanley L. Jaki. Science History Publications (Neale Watson), New York, 1976. viii, 246 pp. \$18.

Cost Control in Hospitals. John R. Griffith, Walton M. Hancock, and Fred C. Munson, Eds. Health Administration Press, Ann Arbor, Mich., 1976. xiv, 448 pp. \$15.

Creation and Detection of the Excited State. Vol. 4. William R. Ware, Ed. Dekker, New York, 1976. xii, 320 pp., illus. \$39.75.

Cross-Cultural Approaches to the Study of Alcohol. Papers from a conference, Chicago, Aug. 1973. Michael W. Everett, Jack O. Waddell, and Dwight B. Heath, Eds. Mouton, The Hague, 1976 (U.S. distributor, Aldine, Chicago). xviii, 432 pp. \$24.50. World Anthropology.

(Continued on page 1192)