

foreword to Kenneth Jones's book, and to comprehend their nature, constitutes the subject for this slender volume. The author begins with a brief description of nebulous objects mentioned in Ptolemy's *Almagest*, Al-Sûfi's *Book of the Fixed Stars* and Ulugh Begh's astronomical tables. Jones then leaves the Arabs and sets forth the accomplishments of 24 Europeans, from Tycho Brahe (1546–1601) through Pierre Méchain (1744–1804). A list of true nebulae and star clusters discovered up to the year 1781 (when Charles Messier's catalogue was published) appears near the end of the book, which is apparently written more for the historically inclined astronomer than for the general reader.

The Logico-Algebraic Approach to Quantum Mechanics, Vol. 1: Historical Evolution. C. A. Hooker, ed. 607 pp. D. Reidel, Dordrecht, Holland, 1975. \$68.00 clothbound, \$24.00 paperbound

An increasingly prominent technique used in the illumination of physical theory, particularly quantum theory, involves the extraction of abstract algebraic structures inherent in theoretical formulations and the rendering of significant questions into precisely answerable form concerning properties of the corresponding algebraic or logical structures. Clinton Hooker has collected a number of pioneering papers that served to develop this approach. Topics include the logic of quantum theory, three-valued logic and the logic of propositions not simultaneously decidable, hidden-variables problems and probability in physics. Physical scientists, mathematicians and philosophers appear as contributors: Garrett Birkhoff, John Von Neumann, Martin Strauss, Hans Reichenbach, Hilary Putnam, Paul Feyerabend, Andrew Gleason, E. P. Specker, David Foulis, Neal Zierler, V. S. Varadarajan, Jerzy Łoś, Franz Kamber, Michael Schlessinger, Simon Kochen, Patrick Suppes, James C. T. Pool, P. D. Finch, J. M. Jauch, C. Piron, Samuel Holland Jr., N. S. Kronfli, R. J. Greechie, Stanley P. Gudder and Bas Van Fraassen.

Mechanics: Classical and Quantum (Int. Series in Natural Philosophy, Vol. 82). T. T. Taylor. 399 pp. Pergamon, New York, 1976. \$22.50 clothbound, \$15.00 paperbound

"Designed for the junior year," writes Thomas Taylor in the preface, "this book is intended to give students a solid grounding in the principles of quantum mechanics after leading them to these principles via the medium of analytical mechanics." The first four chapters deal with classical mechanics (the Lagrangian and Hamiltonian formulations, Hamilton–Jacobi theory and waves), and the other nine chapters take up quantum theory. After he reviews the historical background of quantum ideas, the author

effects his transition to wave mechanics by making the wave eikonal proportional to the classical action function. Having illustrated the time-independent Schrödinger equation with some standard applications and discussed operators and observables, Taylor again brings together the classical and quantum approaches in a chapter on the significance of expectation values and in another on the concept of measurement in quantum mechanics. Hydrogenic atoms and matrix mechanics appear at the end. Though some more advanced topics are covered in the appendices, spin barely receives mention in the text, scattering none at all.

new books

Elementary Particles and Fields

Weak and Electromagnetic Interactions at High Energies (First half of Proc. of a NATO Summer Institute, Cargèse, France, June–July 1975). M. Levy, J.-L. Basdevant, D. Speiser, R. Gastmans, eds. 467 pp. Plenum, New York, 1976. \$39.50

Proceedings of the Sixth Hawaii Topical Conference in Particle Physics (1975). P. N. Dobson Jr., S. Pakvasa, V. Z. Peterson, S.-F. Tuan, eds. 561 pp. Hawaii U.P., Honolulu, 1976. \$12.00

Atoms and Molecules

Spectroscopy of the Excited State (Proc. of a NATO Advanced Study Institute, Erice, Italy, June 1975). B. Di Bartolo, ed. 416 pp. Plenum, New York, 1976. \$32.50

Molecular Physics of Equilibrium Gases: A Handbook for Engineers. C. F. Hansen. 325 pp. Scientific and Technical Information Office, NASA, Washington, D.C., 1976. \$9.50

Quantum States of Atoms, Molecules, and Solids. M. A. Morrison, T. L. Estle, N. F. Lane. 575 pp. Prentice-Hall, Englewood Cliffs, N.J., 1976. \$25.50

Eine Einführung in die Theorie der Atom-spektren. P. Zimmermann. 91 pp. Bibliographisches Institut, Mannheim, West Germany, 1976. DM 24.00

Spectroscopic Data, Vol. 2: Homonuclear Diatomic Molecules. S. N. Suchard, J. E. Melzer, eds. 585 pp. Plenum, New York, 1976. \$57.50

Electron and Photon Interactions with Atoms: Festschrift for Professor Ugo Fano (Proc. of an Int. Symposium, University of Stirling, July 1974). H. Kleinpoppen, M. R. C. McDowell, eds. 682 pp. Plenum, New York, 1976. \$45.00

Chemical Physics

Reduced Density Matrices in Quantum Chemistry. E. R. Davidson. 135 pp. Academic, New York, 1976. \$17.00

The Physical Basis for Heterogeneous Catalysis (Battelle Institute Materials Science Colloquia, Gstaad, Switzerland, September

1974). E. Drauglis, R. I. Jaffee, eds. 596 pp. Plenum, New York, 1975. \$45.00

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Very High Resolution Spectroscopy (Proc. of the Rank Prize Funds' Symposium, London, September 1974). R. A. Smith, ed. 276 pp. Academic, London, 1976. \$24.25

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Nonlinear Acoustics. R. T. Beyer. 405 pp. Naval Sea Systems Command (US Govt. Printing Office), Washington, D.C., 1975. (Copies available free: Write John Neely, N.S.S.C. 06H1, Washington, D. C. 20360.)

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Fundamentals of Optics, 4th edition. F. A. Jenkins, H. E. White. 746 pp. McGraw-Hill, New York, 1976. \$19.00

Fundamentals of Optical Fiber Communications. M. K. Barnoski, ed. 227 pp. Academic, New York, 1976. \$18.50

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Laser Photochemistry, Tunable Lasers, and Other Topics (Physics of Quantum Electronics, Vol. 4). S. F. Jacobs, M. Sargent III, M. O. Scully, C. T. Walker, eds. 470 pp. Addison-Wesley, Reading, Mass., 1976. \$23.50

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Irreversible Properties of Type II Superconductors (Springer Tracts in Modern Physics, Vol. 76). H. Ullmaier. 165 pp. Springer-Verlag, Berlin, 1975. \$23.80

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