

physics. Prospective graduate students in experimental nuclear astrophysics will find this material essential.

The discussions of the burning stages of stellar evolution are interspersed with discussions of the state-of-the-art measurements of the relevant quantities. Students will find these discussions useful as a means for understanding the uncertainties in the field. Theoreticians will also find the book helpful, both for its explanations of experimental techniques and its overviews of a number of outstanding problems.

In summary, *Cauldrons in the Cosmos* is a useful and long-awaited introduction to nuclear astrophysics from the viewpoint of those who have labored to provide the insight that could only be obtained from laboratory-based low-energy nuclear physics. I strongly recommend it to anyone who wishes to understand the way in which this field has progressed toward a systematic scientific explanation of much of the observed universe.

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## Some Other Books of Interest

**Tributes to Paul Dirac.** J. G. TAYLOR, Ed. Hilger, Bristol, U.K., 1987 (U.S. distributor, Taylor and Francis, Philadelphia). x, 123 pp., illus. \$22. Based on a meeting, Cambridge, U.K., April 1985.

**Reminiscences About a Great Physicist.** Paul Adrien Maurice Dirac. BEHRAM N. KURSUNOGLU and EUGENE P. WIGNER, Eds. Cambridge University Press, New York, 1987. xviii, 297 pp., illus. \$49.50. Based on a meeting, Jan. 1983.

P. A. M. Dirac, in the words of Abdus Salam "undoubtedly one of the greatest physicists of this or any century," died in Florida in October 1984 at the age of 82, and the following April a meeting honoring his memory was held at Cambridge University, where he had spent most of his career.

*Tributes to Paul Dirac* consists largely of talks given at that meeting. After an introduction by P. T. Mathews the book opens with a "biographical sketch" of Dirac by R. H. Dalitz, to which is appended a list of his major papers and his books, most notably *The Principles of Quantum Mechanics*, first published in 1930 and still (in a fourth edition) in use. There follows a section of brief personal reminiscences by former students and colleagues of Dirac's: R. J. M. Phillips, J. C. Polkinghorne, Rudolf Peierls, Bertha Jeffreys (Swirles), Eugene Wigner (Dirac's brother-in-law), J. E. Lannutti, S.

Shanmugadhasan, and C. J. Eliezer. The remainder of the volume is devoted to appreciations of Dirac's contributions in various areas of physics: Jagdish Mehra and Polkinghorne on the early development and the interpretation of quantum mechanics, Salam on finite field theories, James Light-hill on Fourier analysis and generalized functions, Peter Goddard on magnetic monopoles, and Taylor on constrained dynamics.

*Reminiscences About a Great Physicist*, now also presented as a memorial, was originally intended as a festschrift for Dirac's 80th birthday. It consists, in addition to various prefatory matter (including a drawing of Dirac by Richard Feynmann), of 23 papers by 25 authors, including a number also represented in *Tributes* and others who knew Dirac during his later years in the United States. The first group of papers, headed Human Side, includes reminiscences by Dirac's widow, Margit, and by Lannutti, Peierls, Wigner, and five others. Under the heading More Scientific Ideas Dalitz discusses Dirac's more practically oriented work, particularly during World War II, and A. Pais provides a discussion drawn partly from his book *Inward Bound*. More technical contributions are provided by four other authors or pairs of authors, and the section also contains a paper by Dirac ("The inadequacies of quantum field theory") presented at the meeting from which the volume stems. Among the final group of papers, Influenced and Inspired by Association, are the paper by Salam also included in *Tributes* and papers by Nevill Mott and Willis E. Lamb, Jr. There is redundancy among the contributions—there are, for instance, at least two versions of Dirac's meeting with E. M. Forster, a number of contributors proffer Dirac's own explanation of his much-noted taciturnity, and there are several outlines of his family background and education—but, as the title of the book indicates, the contributors also offer many anecdotes and impressions from their own direct experience of Dirac.—K.L.

**Instruments and Experiences.** Papers on Measurement and Instrument Design. R. V. JONES. Wiley, New York, 1988. xii, 485 pp., illus. \$79.95. Wiley Series in Measurement Science and Technology.

R. V. Jones, perhaps most broadly known for his work in scientific intelligence in World War II, has since the 1930s been concerned with the design and performance of scientific instruments. Here he brings together a selection of his papers in the field, dating from 1951 to 1979. Because of teaching and other duties, Jones writes in

the introduction, "I had to concentrate on problems that escaped the attention of large teams, and which could be taken up and laid aside, rather like knitting. . . . With basic interests in optics and in sensitivity of detection and in precision of measurement, I was naturally led to appreciate the importance of mechanical design, and the frequency with which optical and electronic design of the highest quality could be let down because too little attention had been paid to mechanical detail." The 31 papers chosen to represent this work are grouped into 10 "chapters." The opening chapter is a retrospective account of the author's early work on the detection of infrared radiation (work that could not be published because of its relevance to air defense). After the war Jones was elected to Clerk Maxwell's former chair at the University of Aberdeen, Scotland, where he took up work on optical levers, the subject of chapter 2. Subsequent chapters represent work on spring movements, microbarographs, capacitance micrometers, and measurement of optical radiation pressure and "aether drag." Each group of papers is preceded by an informal "commentary" giving some of the scientific rationale and "less lofty considerations" underlying the work covered. Part 2 of the volume is less technical in character, containing an essay on "some factors in the design of instruments that experience has taught [the author] to value," an "idiosyncratic review" of trends in instrumentation, and the texts of five lectures on broader themes—education, the advancement of learning—as related to instrumentation.—K.L.

**Kelvin's Baltimore Lectures and Modern Theoretical Physics.** ROBERT KARGON and PETER ACHINSTEIN, Eds. MIT Press, Cambridge, MA, 1987. xii, 547 pp., illus. \$40. Studies from the Johns Hopkins Center for the History and Philosophy of Science.

In 1884 Sir William Thomson, later Lord Kelvin, delivered a series of lectures on wave theory and molecular dynamics at Johns Hopkins University. "Despite the fact that in these lectures Kelvin argued against the electromagnetic theory of light and proposed a model for the ether that few Americans were willing to take up," writes Robert Kargon in the introduction to this volume, "his enthusiasm for the discipline, his personal magnetism, and his performance gave a tremendous boost to the morale of the fledgling physics profession in the United States, and provided a focus for interest in mathematical physics, a subject not at the time noticeably strong in the western hemisphere." A revised version of the lectures was published in 1904 under the title *The*

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*Baltimore Lectures on Molecular Dynamics and the Wave Theory of Light.* The present commemorative volume brings together the texts of the lectures as recorded stenographically at the time of delivery and a collection of essays on related themes by present-day scholars. The 20 lectures, with an appendix and "index" (bibliographies and analytic table of contents), occupy about half the book. The 10 essays that occupy the remainder are grouped under the headings Historical Perspectives on the Age of Kelvin and Philosophical Reflections on Theoretical Physics Since Kelvin. The historical essays (by P. M. Harman, B. J. Hunt, M. N. Wise and C. Smith, and L. Badash) center on Maxwell and the Maxwellians and include a consideration of Rutherford. The philosophical group (by H. Stein, A. Shimony, P. Teller, J. Earman, A. Fine, and T. Nickles) deals with issues of conceptual descent, the parts-whole problem, debates over space-time, action at a distance, the quantum-measurement problem, and the divergence of philosophy and physics.—K.L.

## Reprints of Books Previously Reviewed

**Group Structure of Gauge Theories.** L. O'Raifeartaigh. Cambridge University Press, New York, 1988. Paper, \$13.95. *Reviewed 234, 93.*

**On Human Nature.** Edward O. Wilson. Harvard University Press, Cambridge, MA, 1988. Paper, \$8.95. *Reviewed 204, 735 (1979).*

**Superstring Theory.** Michael B. Green, John H. Schwarz, and Edward Witten. Cambridge University Press, New York, 1988. 2 vols. Vol. 1, Introduction. Paper, \$19.95. Vol. 2, Loop Amplitudes, Anomalies, and Phenomenology. Paper, \$29.95. *Reviewed 238, 94 (1987).*

**Wave Interactions and Fluid Flows.** Alex D. D. Craik. Cambridge University Press, New York, 1988. Paper, \$19.95. *Reviewed 235, 1522 (1987).*

## Books Received

**Adaptive Strategies and Population Ecology of Northern Grouse.** Arthur T. Bergerud and Michael W. Gratson, Eds. University of Minnesota Press, Minneapolis, 1988. xxiv, 809 pp., illus. \$59.50; paper, two volumes, \$17.95 each. A Wildlife Management Institute Sponsored Book.

**Advances in Electrophoresis.** Vol. 1. A. Chrambach, M. J. Dunn, and B. J. Radola, Eds. VCH, New York, 1988. x, 441 pp., illus. \$110.

**Alterations in the Neuronal Cytoskeleton in Alzheimer Disease.** George Perry, Ed. Plenum, New York, 1987. x, 229 pp., illus. \$49.50. *Advances in Behavioral Biology*, vol. 34. From a symposium, Washington, DC, Dec. 1986.

**Alternatives to Animal Use in Research, Testing, and Education.** Office of Technology Assessment, Congress of the United States. Dekker, New York, 1988. x, 441 pp., illus. \$59.75.

**The American Jury on Trial.** Psychological Perspectives. Saul M. Kassir and Lawrence S. Wrightsman. Hemisphere, New York, 1988. xiv, 232 pp. \$39.50; paper, \$18.95.

**Biological Psychology.** Daniel P. Kimble. Holt, Rinehart and Winston, New York, 1988. xiv, 482 pp., illus. \$36.25.

**The Biology of Behavior and Mind.** Bruce Bridgeman. Wiley, New York, 1988. xii, 547 pp., illus. \$42.50.

**Flow Injection Analysis.** Jaromír Růžička and Elo Harald Hansen, 2nd ed. Wiley-Interscience, New York, 1988. xxii, 498 pp., illus. \$75. *Chemical Analysis*, vol. 62.

**The General and the Bomb.** A Biography of General Leslie R. Groves, Director of the Manhattan Project. William Lawren. Dodd, Mead, New York, 1988. xii, 324 pp. \$21.95.

**Genetic Basis of Autoimmune Disease.** J. M. Cruse and R. E. Lewis, Jr., Eds. Karger, Basel, 1988. viii, 202 pp., illus. \$113.50. *Concepts in Immunopathology*, vol. 5.

**HIV and Other Highly Pathogenic Viruses.** Roberts A. Smith, Ed. Academic Press, San Diego, CA, 1988. x, 135 pp., illus. \$24.50. From a conference, Newport Beach, CA, Jan. 1987.

**Human Motivation.** David C. McClelland. Cambridge University Press, New York, 1988. xii, 663 pp., illus. \$25.95. Reprint, 1985 edition.

**Illustrated Genera of Smut Fungi.** Kálmán Vánky. Fischer, Stuttgart, 1987 (U.S. distributor, VCH, New York). viii, 158 pp., illus. Paper, \$40. *Cryptogamic Studies*, vol. 1.

**Laser Optics of Condensed Matter.** Joseph L. Birman, Herman Z. Cummins, and A. A. Kaplyanski, Eds. Plenum, New York, 1988. xiv, 564 pp., illus. \$97.50. From a symposium, Leningrad, U.S.S.R., June 1987.

**Noncommutative Noetherian Rings.** J. C. McConnell and J. C. Robson, with L. W. Small. Wiley-Interscience, New York, 1988. xvi, 596 pp. \$138. *Wiley Series in Pure and Applied Mathematics*.

**Pulse Methods in 1D and 2D Liquid-Phase NMR.** Wallace S. Brey, Ed. Academic Press, San Diego, CA, 1988. x, 561 pp., illus. \$90.

**Quality Assurance of Chemical Measurements.** John Keenan Taylor. Lewis, Chelsea, MI, 1987. xxii, 328 pp., illus. \$59.95.

**Radon and the Environment.** William J. Makofske and Michael R. Edelstein, Eds. Noyes, Park Ridge, NJ, 1988. xx, 465 pp., illus. \$39. From a conference, Mahwah, NJ, May 1988.

**The Response of Nuclei Under Extreme Conditions.** R. A. Broglia and G. F. Bertsch, Eds. Plenum, New York, 1988. x, 412 pp., illus. \$79.50. *Erttore Majorana International Science Series (Physical Sciences)*, vol. 28. From a course, Erice, Italy, Oct. 1986.

**The Science of Structures and Materials.** J. E. Gordon. Scientific American Books, New York, 1988 (distributor, Freeman, New York). x, 217 pp., illus. \$32.95. A Scientific American Library Book.

**The Scientific Companion.** Exploring the Physical World with Facts, Figures, and Formulas. Cesare Emiliani. Wiley, New York, 1988. xiv, 287 pp., illus. Paper, \$14.95. *Wiley Science Editions*.

**Semiconductors and Semimetals.** Vol. 24, Applications of Multiquantum Wells, Selective Doping, and Superlattices. Raymond Dingle, Ed. Academic Press, San Diego, CA, 1987. xii, 511 pp., illus. \$75.

**Shock Tubes and Waves.** Hans Grönig, Ed. VCH, New York, 1988. xviii, 952 pp., illus. \$125. From a symposium, Aachen, F.R.G., July 1987.

**Spacelab.** An International Success Story. Douglas R. Lord. National Aeronautics and Space Administration, Washington, DC, 1987 (available as NASA SP-487 from the Superintendent of Documents, Washington, DC). xvi, 554 pp., illus. \$33.

**Tasks, Errors and Mental Models.** A Festschrift to Celebrate the 60th Birthday of Professor Jens Rasmussen. L. P. Goodstein, H. B. Andersen, and S. E. Olsen, Taylor and Francis, Philadelphia, 1988. xiv, 342 pp., illus. \$77.

**Towards Better Carbohydrate Vaccines.** R. Bell and G. Torrigiani, Eds. Published for the World Health Organization by Wiley, New York, 1988. x, 363 pp., illus. \$77. From a meeting, Geneva, Switzerland, Oct. 1986.

**Trace Elements in Human and Animal Nutrition.** Vol. 1. Walter Mertz, Ed. 5th ed. Academic Press, San Diego, CA, 1987. xii, 480 pp., illus. \$69.

**Triangulated Categories in the Representation Theory of Finite Dimensional Algebras.** Dieter Happel. Cambridge University Press, New York, 1988. x, 208 pp., illus. Paper, \$24.95. *London Mathematical Society Lecture Note Series*, vol. 119.

**Uranus and Neptune.** The Distant Giants. Eric Burgess. Columbia University Press, New York, 1988. xii, 188 pp., illus. \$29.95.

**Vertebrate Endocrinology.** Fundamentals and Biomedical Implications. Vol. 2, Regulation of Water Electrolytes. Peter K. T. Pang, Martin P. Schreiber, and Wilbur H. Sawyer, Eds. Academic Press, San Diego, CA, 1987. xiv, 321 pp., illus. \$75.

**Western Civilization in Biological Perspective.** Patterns in Biohistory. Stephen Boyden. Clarendon (Oxford University Press), New York, 1987. xii, 370 pp., illus. \$60.