of functional pollen morphology, this book may be disappointing. However, it samples some of the most dynamic current trends in palynology, and it contains enough ideas and reviews of previous work to serve as a valuable stimulus for more focused studies.

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Ramifications in Physics

The Quantum Universe. TONY HEY and PATRICK WALTERS. Cambridge University Press, New York, 1987. viii, 180 pp., illus. $47.50; paper, $16.95.

Two major revolutions in the basic ideas of physics have taken place in this century: the theory of relativity and quantum theory. Both have far-reaching philosophical, theoretical, experimental, and practical implications. Of the two, however, quantum theory is the more pervasive in terms of the variety of phenomena it allows us to understand. It is also the more discomforting to our intuition because it uses apparently contradictory concepts, such as wave and particle, to treat the same objects and because it renounces the sort of determinism we naively expect in a physical science. Hey and Walters have set themselves the task of explaining the physics (but not the philosophy) of quantum theory, together with its application to a broad range of phenomena, to people who are not physicists and who have a limited knowledge of mathematics. Although the Dirac equation (with symbols undefined) does appear, the equations that the authors use are mainly at the level of $I_{12} = (h_1 + h_2)^2$ for the intensity I_{12} of two waves of amplitudes h_1 and h_2.

The authors emphasize two main aspects of quantum theory: the wave nature of particles and the Pauli exclusion principle. They explain interference through a detailed discussion of the double-slit experiment for electron waves, including the situation in which the interference pattern is destroyed by the observation of which slit the electron traversed. They use the wave picture to explain interference effects for electrons and other particles, the Heisenberg uncertainty principle, quantum barrier penetration or tunneling, the quantization of the energy of a bound particle, and quantum coherence, among other phenomena. I particularly liked the illustration of tunneling with photographs of water waves being stopped by a barrier but being transmitted with reduced intensity when the barrier thickness is decreased. The authors use the Pauli principle, that only one electron, proton, neutron, or other "fermion" can occupy a given quantum state, to provide an understanding of the periodic table of the elements, chemical bonds, the electrical conductivity of metals, semiconductors, and insulators, and the evolution of stars. They also discuss the tendency of "bosons," such as the "photon" (or quantum of light) and pairs of electrons (such as the "Cooper" pairs, which play a crucial role in the theory of superconductivity) to be in the same quantum state (a sort of opposite to the Pauli principle). They apply Bose statistics to lasers, superfluid helium, and superconductivity.

Hey and Walters show how the wave picture, the Pauli principle, and Bose statistics provide qualitative explanations of a wide range of phenomena of pure physics, from quarks in the small to various types of stars (normal stars like the sun and exotic stars like white dwarfs, neutron stars, and black holes) in the large. They also demonstrate the applicability of quantum ideas to phenomena ranging from the solidity of everyday objects like chairs to the "high technology" of lasers, Josephson junctions, and field-emission microscopes. The variety of the topics discussed reflects the throughgoing way in which quantum ideas have illuminated our understanding of nature.

The book is copiously illustrated with photographs and diagrams, many in color, of objects in the physical world, of physicists, of equipment, and of experiments. It is written in a clear and engaging style. Hey and Walters have given us a digestible quantum feast. Their book is a pleasure to both the mind and eye.

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Some Other Books of Interest

Lasers. Invention to Application. JESSE H. AUSUBEL and H. DALE LANGFORD, Eds. National Academy Press, Washington, DC, 1987. viii, 134 pp., illus., + plates. Paper, $14.95. From a symposium, 1985.

Among the gatherings held in 1985 to celebrate the 25th anniversary of the invention of the laser was a symposium sponsored by the National Academy of Engineering. The present volume, stemming from that symposium, is an attempt to "bring the excitement and intensity of the laser story to a broader audience." The opening chapter, by Anthony E. Siegman of Stanford University, gives a broad overview of the subject, including the history, characteristics, types, and present and possible future applications of lasers. Anthony J. DeMaria of United Technologies Research Center and Rensselaer Polytechnic Institute then discusses the industrial use of laser technology, including economic data as well as accounts of several particular applications. In the next chapter, the longest in the book, C. Kumar N. Patel of Bell Laboratories reviews the uses of lasers in communications and information processing.

Medical uses of lasers are summarized by Rodney Perkins, a surgeon with both research and business interests in the field. In two final chapters Arthur Schawlow of Stanford (sharer of a Nobel Prize for his work in developing laser spectroscopy) describes some uses of lasers in scientific research and John R. Whinnery of the Univerity of California at Berkeley discusses the contributions of science and engineering in laser development. All the contributors express optimism about the future of laser technology, though DeMaria points to a shortage of appropriately trained engineers as a potentially serious problem. The volume includes a glossary and several color plates. —K.L.

Current Topics in AIDS. Vol. 1. M. S. GOTTLIEB, D. J. JEFFRIES, D. MILDVAN, A. J. PINCHING, T. C. QUINN, and R. A. WEISS, Eds. Wiley-Interscience, New York, 1987. xii, 313 pp., illus. $49.95.

This volume, the first in what is intended to be a regular series, is an attempt to fill "a need for authoritative review articles by active investigators who could take a wide perspective on their specific area" of AIDS research. According to the editors they have tried to select topics that have not been extensively covered elsewhere and that are of particular current interest or warrant review because of a large accumulation of data. The volume contains 14 papers by 29 contributors from the United States and Britain. It opens and closes with papers on the broader aspects of the subject, including policy perspectives, epidemiology, the range of clinical manifestations, the natural history of infection with the AIDS virus, the disease as manifested in Africa, and its psychosocial impact. The intervening chapters deal with subjects of laboratory or clinical study: the causative virus and its kin, immunopathogenesis, serological tests, gastrointestinal manifestations, infections in infants and children, T cell phenotyping in diagnosis and management, effects on the central nervous system, and clinical manifestations as yet unstudied scientifically. A subject index is included.—K.L.