

also arise in the much simpler context of quantum field theory in curved space-time. Resolving these issues in the semiclassical approximation may aid the development of a full quantum theory of gravity. Second, many of the effects that can be calculated in the semiclassical approximation are important in their own right. In particular, the predicted creation of particles near black holes and in the early universe and their "back-reaction" effects on the gravitational field have

direct physical significance.

In this book, N. D. Birrell and P. C. W. Davies emphasize work related to the second goal. Indeed, a number of unresolved issues related to the first goal are not discussed, for example, how to choose between unitarily inequivalent candidates for the Hilbert space of physical states of a quantum field in a general curved space-time. With regard to the second goal, however, the book fully achieves its stated aim of collecting and unifying the research on

semiclassical theory of the past decade. A large number of papers on quantum field theory in curved space-time have been devoted to a specific calculational technique or model, with little attempt made to relate the results to other research in the area. Hence, in many cases it would be difficult to obtain a coherent picture of research in quantum field theory in curved space-time by consulting the original references. Birrell and Davies address this need. They provide a coherent and comprehensive treatment of the research of the past decade on boundary and acceleration effects in flat space-time, the theory of particle detection, particle creation in cosmology and, by black holes, the renormalization of the stress-energy tensor of the quantum field, and the theory of self-interacting quantum fields in curved space-time. Their book also contains an excellent bibliography of the original research papers. Graduate students and researchers should find it a valuable reference.

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University of Chicago

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book notes

Electrons and Valence: Development of the Theory. 1900-1925

A. N. Stranges. 291 pp. Texas A&M U.P.,
College Station, Tex., 1982 \$28.50

This book is not history of science, but a retrospective scientific review article, summarizing, in more or less chronological order, published theories of chemical bonding. It is wholly descriptive, represents no point of view, and eschews historical analysis. The author ignores the large body of work by historians of physics and the smaller but pertinent work in the history of chemistry. He makes virtually no use of rich and accessible archival materials—not even biographical data. I had thought this sort of old science had disappeared a generation ago.

This is a great shame, because the subject raises important and fascinating questions about the intellectual and social relations between physics and chemistry. The problem of molecular structure lies across the border of these disciplines and is thus a strategic site to investigate how innovation occurs and spreads. How do theoretical physicists learn of appropriate chemical problems? How do they react to chemists' (often amateurish) efforts at physical theorizing? How do ideas diffuse from physics to the community of chemists who possess the problems to which such theory may be fruitfully applied?

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ideas. Alas—that book remains to be written.

ROBERT E. KOHLER
University of Pennsylvania

Abusing Science: The Case Against Creationism
P. Kitcher
213 pp. MIT P., Cambridge, Mass., 1982.
\$15.00

With a court decision last year that voided the state-required teaching of creationism in Arkansas public schools, the efforts of creationists to force their views into public-school science curricula were not stopped, only detoured. Creationists continue to prevail over local school boards and textbook publishers. *Abusing Science* is intended to be "a manual for intellectual self-defense" for scientists and nonscientists alike. Author Philip Kitcher, a philosopher of science at the University of Vermont, not only treats evolution and biology, but also refutes the attacks creationists make against astronomy, geology and nuclear physics in their attempts to fit science to a literal reading of *Genesis*. Because they also misrepresent the scientific enterprise, he shows how evolution fulfills the criteria for the development of a science. He also discusses what tolerance requires of us, what rhetorical techniques creationists abuse, and how they confuse science and religion. —DG

new books

Optics and Acoustics

Light Transmission Optics. Second Edition. D. Marcuse. 534 pp. Van Nostrand Reinhold, New York, 1982. \$32.50. *reference*

Color and Color Vision: Selected Reprints. P. L. Pease, ed. 129 pp. American Association of Physics Teachers, New York, 1982. \$4.00

Fundamentals of Ocean Acoustics. L. Brekhovskikh, Yu. Lysanov. 250 pp. Springer, New York, 1982. \$46.00. *text*

Electroacoustics: The Analysis of Transduction, and Its Historical Background. Reprint. F. V. Hunt. 260 pp. AIP, New York, 1982. \$15.00

Acoustical Designing in Architecture. Reprint. V. O. Knudsen, C. M. Harris. 408 pp. AIP, New York, 1982. \$15.00. *handbook*

Evolution of Order and Chaos in Physics, Chemistry, and Biology. Proceedings of the International Symposium on Synergetics at Schloss Elmau, Bavaria, April 1982. H. Haken, ed. 286 pp. Springer, New York, 1982. \$32.00

Auditory Perception: A New Synthesis. R. M. Warren. 237 pp. Pergamon, New York, 1982. \$25.00. *second-level text*

Color Science: Concepts and Methods, Quantitative Data and Formulae. Second Edition. G. Wyszecki, W. S. Stiles. 950 pp. Wiley, New York, 1982. \$75.00. *reference*

Quantum Electronics and Lasers

Lasers: Selected Reprints. D. C. O'Shea, D. C. Peckham, eds. 139 pp. American Association of Physics Teachers, New York, 1982. \$4.00

Laser-Plasma Interactions. Proceedings of the Twentieth Scottish Universities Sum-

mer School in Physics, St. Andrews, August 1979. R. A. Cairns, J. J. Sanderson, eds. 837 pp. University of Edinburgh Department of Physics, Edinburgh. \$18.00

Laser Spectroscopy: Basic Concepts and Instrumentation. Second Corrected Printing. W. Demtröder. 696 pp. Springer, New York, 1982. \$69.00. *graduate text*

Applied Atomic Collision Physics. Vol. 3. Gas Lasers. E. W. McDaniel, W. L. Nighan, eds. 469 pp. Academic, New York, 1982. \$67.00. *compendium*

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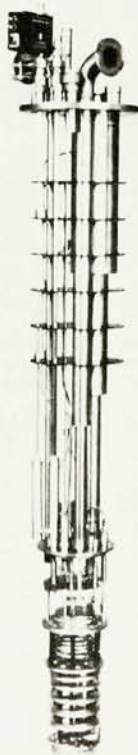
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