

clarifying the subject matter. Also, the authors are very diligent in defining terms: "point group" is carefully distinguished from "crystal class," "rotoinversion" from "rotoreflexion," and so on. At first use important terms are set in bold type and defined. Unfortunately the writing is not always easy to follow; for instance, one is left wondering why more than one lattice point is included in some lattices. Nevertheless, the book is remarkably consistent in style and level despite having been written by seven authors.

I think that the most valuable aspect of the book is its emphasis on procedures, especially those involving the use of computers. Say, for instance, that you know of the Rietveld method and you suspect it might be useful to you in your work on a particular problem. In chapter 2 you will find detailed instructions on how to carry out Rietveld analyses.

Chapter 4 does a very nice job of discussing the older techniques such as the Debye Scherrer method along with the new ones such as the imaging plate, which provides two-dimensional patterns in digital form. Solution and refinement of crystal structures are covered very thoroughly in chapter 5 with details on several different approaches. Chapters 6 through 8 offer a comprehensive, logically developed discussion of crystal chemistry from bonding to proteins, accompanied by hundreds of well-drawn diagrams. The final chapter synthesizes much of this information with a discussion of the physical properties of crystals and the controls underlying them.

If you have any occasion to use crystallography in your work, you will find this book of value.

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## Theoretical Physics

**Quantum Field Theory.** LOWELL S. BROWN. Cambridge University Press, New York, 1992. xiv, 542 pp., illus. \$100 or £60.

Quantum field theory now comprises such a large number of topics that it is nearly impossible to present it adequately to the beginning student in a single volume. *Quantum Field Theory* by Lowell Brown comes close to accomplishing this feat. Marked by its astute choice of topics as well as by the clarity with which they are expounded, it is akin to a toolbox for students of modern quantum field theory.

The book begins with a quick review of

quantum mechanics, followed by a detailed presentation of the Dirac-Feynman path integral, functional determinants, and coherent states. The next three chapters, the best in the book, are an excellent concise introduction to the basic techniques in nonrelativistic field theory and as such will benefit the student oriented toward condensed matter theory, who will find very pretty treatments of field theory at finite temperature, spontaneous symmetry breaking, and the role of the chemical potential. These discussions are presented in the context of the analysis of superfluid helium. A more conventional treatment of relativistic field theory follows, first using scalar theory and then quantum electrodynamics. Dimensional regularization is used throughout. I particularly enjoyed the sections on composite operators and on the operator product expansion. In chapter 6 the reader will find an excellent discussion of the Lehman representation of the propagator as well as a very thorough and rare treatment of unstable particles, including a detailed description of the deviations from the exponential decay law. The last chapter contains a detailed analysis of the quantum electrodynamic and infrared problem using dimensional regularization by way of a specific example and an equally thorough discussion of the Lamb shift, in which the same techniques are used. The imaginative problems at the end of each chapter serve to introduce concepts not treated in the main text. These exercises, designed to arouse the curiosity of the diligent student, constitute a valuable sub-book in their own right.

This is a very interesting and original textbook. Although, regrettably, it leaves many topics uncovered, for example non-Abelian gauge theories, it treats other subjects seldom mentioned in other texts. The style of presentation is crisp, and the book is sprinkled with the author's understated humor. The technical discussions are lucid, compact, and easy to follow, although they sometimes assume greater knowledge than might be expected from a student at this stage. However, any student who masters the techniques expounded here will emerge with a thorough knowledge of quantum field theory. I strongly recommend this book to whoever aspires to become either a particle or a condensed matter physicist.

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## Books Received

**Advances in Cardiovascular Engineering.** Ned H. C. Hwang, Vincent T. Turitto, and Michael R. T. Yen, Eds. Plenum, New York, 1992. viii, 443 pp., illus. \$115. NATO Advanced Science Institutes Series A, vol. 235. From an institute, Málaga, Spain, Dec. 1991.

**American Ground Zero.** The Secret Nuclear War. Carole Gallagher. MIT Press, Cambridge, MA, 1993. xxiv, 427 pp., illus. \$39.95.

**Balinese Worlds.** Fredrik Barth. University of Chicago Press, Chicago, 1993. x, 370 pp., illus. \$55; paper, \$19.95.

**Chemistry in the Laboratory.** A Study of Chemical and Physical Changes. J. A. Beran. Wiley, New York, 1993. xiv, 407 pp., illus. Paper, \$40.95.

**Dictionary of Biotechnology.** James Coombs. 2nd ed. Stockton, New York, 1992. iv, 364 pp., illus. \$90.

**Economics.** Joseph E. Stiglitz. Norton, New York, 1993. Various pages, illus. \$54.95.

**Fire in the Brain.** Ronald K. Siegel. Plume, New York, 1993. x, 275 pp. Paper, \$10. Reprint, 1992 ed.

**A Guide to Manual Materials Handling.** A. Mital, A. S. Nicholson, and M. M. Ayoub. Taylor and Francis, Philadelphia, 1993. viii, 114 pp., illus. Paper, \$25.

**Handbook of the Birds of Europe, the Middle East, and North Africa.** The Birds of the Western Palearctic. Vol. 6, Warblers. Stanley Cramp and Duncan J. Brooks, Eds. Oxford University Press, New York, 1992. vi, 728 pp., illus., + plates. \$130.

**Immunology of Pregnancy and Cancer.** Valentin I. Gavallo. Nova, Commack, NY, 1993. xiv, 310 pp., illus. \$79. Translated from the Russian by Lena Jacobson.

**The Lepidoptera.** Form, Function and Diversity. Malcolm J. Scoble. Oxford University Press, New York, 1992. xii, 404 pp., illus. \$78. Natural History Museum Publications.

**Methods in Carbohydrate Chemistry.** Vol. 9, Lipopolysaccharides, Separation and Analysis, Glycosylated Polymers. James N. BeMiller, Roy L. Whistler, and Derek H. Shaw, Eds. Wiley, New York, 1993.

**New Developments in Fatty Acid Oxidation.** Paul M. Coates and Kay Tanaka, Eds. Wiley-Liss, New York, 1992. xxiv, 595 pp., illus. \$130. Progress in Clinical and Biological Research. From a symposium, Philadelphia, Nov. 1991.

**Oncogene and Transgenic Correlates of Cancer Risk Assessments.** Constantine Zervos, Ed. Plenum, New York, 1992. xii, 351 pp., illus. \$110. NATO Advanced Science Institutes Series A, vol. 232. From a workshop, Attiki, Greece, Oct. 1991.

**The Patterned Peatlands of Minnesota.** H. E. Wright, Jr., Barbara A. Coffin, and Norman E. Aaseng, Eds. University of Minnesota Press, Minneapolis, 1992. xx, 327 pp., illus. \$44.95.

**Release of Genetically Engineered and Other Micro-organisms.** J. C. Fry and M. J. Day, Eds. Cambridge University Press, New York, 1992. xvi, 178 pp., illus. \$89.95. Plant and Microbial Biotechnology Research Series, 2.

**Science, Politics and Morality.** Scientific Uncertainty and Decision Making. René von Schomberg, Ed. Kluwer, Norwell, MA, 1993. xii, 235 pp. \$86. Theory and Decision Library Series A, vol. 17. From a workshop, June 1991.

**Treatise on Analytical Chemistry.** Part 1, Thermal Methods, vol. 13. James D. Winefordner *et al.*, Eds. 2nd ed. Wiley, New York, 1993. xx, 406 pp., illus. \$95.

**Understanding Genetics.** A Molecular Approach. Norman V. Rothwell. Wiley-Liss, New York, 1993. xvi, 656 pp., illus. \$48.

**The Variational Principles of Dynamics.** Boris A. Kupershmidt. World Scientific, River Edge, NJ, 1992. xviii, 422 pp. \$46. Advanced Series in Mathematical Physics, vol. 13.

**Visions of Caliban.** On Chimpanzees and People. Dale Peterson and Jane Goodall. Houghton Mifflin, Boston, MA, 1993. xii, 367 pp. + plates. \$22.95.

**William Henry Welch and the Heroic Age of American Medicine.** Simon Flexner and James Thomas Flexner. Johns Hopkins University Press, Baltimore, MD, 1993. xiv, 539 pp. + plates. \$29.95. Reprint, 1941 ed.

**Women and the Use of Military Force.** Ruth H. Howes and Michael R. Stevenson, Eds. Rienner, Boulder, CO, 1993. viii, 247 pp. \$38.

**World Forests for the Future.** Their Use and Conservation. Kilaparti Ramakrishna and George M. Woodwell, Eds. Yale University Press, New Haven, CT, 1993. xx, 156 pp., illus. \$18.50. From a workshop, Woods Hole, MA.