deliberately draws on the experience in "solid-state studies performed at the Deutsches Electronen-Synchrotron (DESY)" and in doing so apologizes "for the insufficient credit given other workers, particularly those at the Tokyo, Frascati and the National Bureau of Standards synchrotrons."

As the title of the review indicates, it is "user" oriented, considering the synchrotron "as a giant light bulb." For this reason the properties of the radiation emitted by the orbiting electron are condensed into about 11 pages. The author approaches the formalism of the characteristic properties of synchrotron radiation by using intuitive physical arguments. The reader who wishes a more formal approach can use the abundant reference list. This is followed by practical consideration and advice about the use of the radiation. The review mainly is devoted to solid-state experiments carried out in Germany.

The documentation is quite good and up to date. All in all about 170 references are given, with a good number published in 1968, and even a few in 1969. Sokolov and Ternov's book is mentioned, with adequate reference to the voluminous Russian literature on this subject.

The second review in this slim volume is a 45-page examination of the electron-phonon interaction and the Boltzmann equation in narrow-band semiconductors. It is a purely theoretical investigation of the interaction of electrons, or holes, with acoustic and polar phonons in electronic bands with a width ΔE, which is of the order of $k\theta$ or even smaller than $k\theta$. The Boltzmann equation is derived and applied to a one dimensional model. A few remarks are added on the three-dimensional case.

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Advanced Physical Chemistry: A Survey of Modern Theoretical Principles

By S. M. Binder
554 pp. Macmillan, London, 1969. $13.95

This book is written at the graduate level and covers the following topics: a mathematical introduction (about 400 pages); classical and quantum mechanics (60 pages); theory of gases (100 pages); thermodynamics (100 pages) and statistical mechanics (130 pages). The material is set out well and the topics are sensibly chosen.

It was interesting to examine where this book introduced material not normally treated in physics courses. I think I could identify 5% as such, meaning that 95% overlaps with physics. Then one has to say that the title "Physical Chemistry" must be justified by the difference in the treatment. It is true that the approach is different, and it is a little more colloquial than most texts. Now and again some clear immaturities are found; for example, a whole page is devoted to how a hypodermic syringe can be used to fill ink capsules. Also some strangely opaque statements occur: For example, in discussing standard states (dear to physical chemists) the author states that "For real gases, a hypothetical standard state is defined: the state of unit fugacity. Fugacity is the thermodynamic analogue of pressure in nonideal gases."

As a physicist engaged in biology, I looked in vain for the regions where normal physics treatments do *not* cover areas of chemistry, notably the liquid state. For students, an exposition of Frenkel's work would be most valuable and some idea of the whole concept of water and how its conformations interact with ions and nonpolar substances would be extremely useful.

I could not help thinking that the kind of course for which this book would be used represents a bypass of what should be given by physicists in a physics department. Maybe the whole collection is not to be found in such departments, and, if so, I suggest physicists get the message and introduce the course needed.

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Type II Superconductivity

By D. Saint-James, G. Sarma, E. J. Thomas
294 pp. Pergamon, New York, 1969. $14.00

Interest in type-II superconductivity has recently been encouraged by the discovery that many type-II superconducting compounds have high critical fields that allow their use in superconducting magnets. In addition, many of these compounds have exceptionally high transition temperatures. D. Saint-James, G. Sarma and E. J. Thomas have made considerable contributions to the theoretical and experimental understanding of type-II superconductors. In *Type II Superconductivity*, the authors present the results of their research and give an interesting survey of the available information.

The first half of the book, written by Saint-James and Sarma, covers reversible properties. The opening chapter is a general introduction to superconductivity, similar to the development in the initial chapters of P. G. deGennes's book, *The Superconductivity of Metals*

and Alloys. Among the topics covered in the subsequent chapters are vortex line structure and surface superconductivity. In selecting material for the book, the authors have drawn heavily on their own work and on work done in cooperation with deGennes. Their treatment is based on the Ginzburg–Landau theory of superconductivity, with which they are able to give a theoretical explanation for many of the reversible properties. The microscopic theory of superconductivity is introduced primarily to derive and justify the Ginzburg–Landau theory.

The second half of the book is mainly descriptive, because there is often no satisfactory theoretical analysis of the irreversible properties of type-II superconductors. Among the topics covered are flux trapping, flux movement and critical-current characteristics. In the final chapter, Thomas describes various possible applications for type-II superconductors.

The bibliography at the end of each chapter, as well as the author's detailed treatment of certain topics, makes the book suitable as a reference. However, enough introductory material is included to make the book self-contained and accessible to individuals without prior knowledge about superconductivity. Although the treatment of the reversible properties is somewhat mathematical, the book has been written with experimentalists in mind and should be useful to anyone with an interest in superconductivity.

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Dispersion Theories of Strong Interactions at Low Energy

By D. V. Shirkov, V. V. Serebryakov, V. A. Meshcheryakov
362 pp. Wiley (North-Holland, Amsterdam) New York, 1969. $19.50

This monograph describes work done by the authors and their colleagues during the last ten years. The work was carried out in some isolation from the informal discussions, although not from the published work, of theorists outside the Soviet Union. Those who have worked on similar problems will find it interesting to examine more closely the authors' ideas about physics, as well as some mathematical techniques, even though many will find nothing very new in the way of results. As an introduction to the authors' contributions, I have certainly found it more readable and lucid than their original papers. No doubt this is not only because it is a more extended and complete presentation, but also because the authors have themselves provided the translation.

The "Low Energy" in the title means that the authors restrict their attention to pion–nucleon and pion–pion scattering at energies where inelastic processes can be either neglected or replaced by a few parameters. They are concerned in part with the phenomenological description of the data, and in part with a critique of the bootstrap idea—that is, that hadron properties involve a self-consistent satisfaction of dispersion relations. Their point is that a closed, unique bootstrap is not possible within the low-energy domain as they consider it; very few would argue with this conclusion, although others ascribe two different reasons that are more directly motivated by experiment. Linearly rising Regge trajectories seem to force themselves on our attention, suggesting support for the Chew–Mandelstam idea of Regge poles as a fundamental concept and perhaps as a "boundary condition." Certainly with the advent of SU(3) it became clear that no dynamical scheme could possibly be complete that did not treat strange and nonstrange particles on an equal footing.

Although the book's topic may seem almost old-fashioned, low-energy hadron phenomenology is always in ferment, and renewed attention is being given to exploitation of analyticity properties in extracting significant parameters from experimental results. This book includes some original techniques and ideas that may be quite useful for this purpose. The discussion often utilizes kinematical approximations to clarify qualitative features; these approximations are now avoided by most workers, but their presence in a book helps to increase its readability. The calculations are presented clearly and in sufficiently explicit detail that a student preparing for research in this specialized area could read it with profit and understanding.

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new books

CONFERENCE PROCEEDINGS

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