chanics and the theory of special relativity as *unifying principles*. Within this constraint, he has done quite well.

In two introductory chapters he reviews prerequisite material in complex-function theory, the relevant phenomenology and the mathematical physics of relativistic and nonrelativistic scattering processes. The main section is devoted to a range of standard topics from pion–pion scattering to production-process models. The various topics are treated by first setting the applicable mathematical formalism and then discussing the physical aspects. There are useful discussions of the disagreements with experimental data, and adequate bibliographic selections are conveniently located. The treatment, though compact, is adequate.

The book is somewhat comparable in intent to A. O. Barut's book, *The Theory of the Scattering Matrix* (Macmillan, New York, 1967). Barut gives a more comprehensive picture of the formal mathematical apparatus; Burkhardt emphasizes and attempts to provide a unified view of the essentially heuristic character of the present state of the art.

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Mechanics

By Ray Skinner
744 pp. Blaisdell, Waltham, 1969. $14.50

This book is one of five written by Ray Skinner for a four-semester course for science and engineering students. It is comparable to the *Mechanics* volume of the Berkeley series in the average level of sophistication, but it is far more detailed and starts at a somewhat more elementary level.

I feel very strongly, as Kenneth Ford does (PHYSICS TODAY, January, page 94), that "no textbook can be properly reviewed until it has been used." The following comments are therefore given with some feeling of hesitancy: All one *can do is rely on past experience in* using other standard books.

I think that the book contains too much material. Its 744 pages would create an impossibly heavy burden in a one-semester course. True, there is much material that would generally be covered in "Intermediate Mechanics," and this material could be omitted (there are a couple of impressive flow charts to permit this) but then I question whether the advanced material should have been included. I think that it would tend to frighten and confuse a sizable fraction of the students. It is not sufficient for an instructor to say "We will omit sections X, Y, Z," if these sections make up one-third of the book.

I question also the need for many of the exhaustive details. These struck me most forcibly: the pronunciation of Greek letters, the prefix "atto" (good heavens, another prefix; this one means 10^{-18} something, but, as far as I can tell, it is not used), the unit "Franklin" (Franklin? It is 3.36×10^{-10} C, but who uses it?) and the constant "Dirac" ($\hbar$ in MKS units). This is surely a matter of judgment, but physics has enough complex notations so that one should not stick freshmen with more than is absolutely necessary. And the same goes for units: Although MKS is emphasized, other units, "slugs" included, are used also and certain problems (such as A1.1) require filling in the spaces, to four significant figures, in tables showing the relationships between various units. This sort of thing drives the good students up the wall and into the social sciences and takes too much of the time of the poor ones.

There are many problems and worked examples in each of the chapters, but having most of the problems, as well as the examples, as a part of the running text is distracting. I prefer the conventional approach where the problems all appear at the end of a chapter.

At the same time there are some very good aspects of Skinner's book: the discussions of nongravitational forces, of masses and of motions under central forces appear particularly interesting and clear.

Skinner has painstakingly and carefully written a very complete book that brings in both the mathematical and physical concepts needed for a thorough elementary to intermediate understanding of mechanics. The presentation and the exhaustive coverage lead me, for pedagogical reasons, to recommend it for the faculty and for the library reserve shelf of a tough first-year course rather than for its students.

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Elementary Wave Optics

By Robert H. Webb
268 pp. Academic, New York 1969. $11.50

Based on a course taught by the author, Robert H. Webb, this new textbook presents the standard topics of classical physical optics and optical instruments, and introduces the student to modern coherent optics and the mathematical ideas of quantum mechanics. The exposition is unusual in that wave theory is covered in general, in addition to the specialized treatment of optical phenomena.

As expected in a good textbook, many problems of varying difficulty are included with each chapter, and the given solutions extend the material in the text. Detailed solutions to selected problems comprise 20% of the book. The exposition is clear and well illustrated, and the usual brief bibliography and subject index are included.

The text begins with a summary of geometrical optics. A general discussion of wave theory is next, and is followed by treatments of the expected topics of superposition, electromagnetic waves, scattering, polarization, interference and diffraction. The final chapter introduces coherent optics, and various mathematical derivations are relegated to appendixes. Not too large, this book contains sufficient material for a one-semester, intermediate, undergraduate course in optics. It is an attractive additional choice for those instructors teaching such a course who continually search new book lists for a suitable textbook.

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Crystals and Their Structures

By Arthur P. Cracknell
231 pp. Pergamon, Oxford, 1969. Cloth $7.00, paper $5.50

In the preface to his book, Arthur P. Cracknell notes the ever expanding frontiers of knowledge and the consequent changes in courses of instruction at all educational levels. In the belief that the study of crystal structures and some aspects of solid-state physics should be in the curriculum for sixth formers (roughly, equivalent to high-school seniors in the US), Cracknell has written a book that is intended for use as ". . . general background reading for parts of both physics and chemistry courses. . . ." Unfortunately I do not believe the book measures up to the author's aspirations.

In about 200 pages the subject matter ranges over the crystallographic point groups; Bravais lattices; space groups; diffraction of x rays, electrons and neutrons; forces in crystals; wave mechanics; metals, semiconductors and insulators; crystal defects; color symmetry, and group theory. So many topics are covered in a superficial way that the result is often misleading or confusing —when it is not simply incorrect.

I do not intend to document this harsh judgment page by page but will merely cite a couple of irritating examples from chapter 3, "The Internal Structure of Crystals," that are typical of every chapter. On page 85 it is asserted that only Bragg planes with low Miller indices may be densely populated with atoms. Nonsense! Cited as a reference for this chapter is *Theory of*