

BOOK REVIEWS

Quantum mechanics. By L. I. Schiff. New York, McGraw-Hill, 1949. 404 pp. \$5.50.

The subject matter of quantum mechanics is emphasized in different ways by different professional groups. To the philosopher the field has a personal interest because of its bearing on the relationship between man and the natural world about him. To the mathematician the subject represents a rich field of problems dealing with function space and operator theory. To the physicist it is important as an extension of classical physics into the domain of the microscopic world and as an indispensable tool for solving the many problems of interest.

Introductory books written for each group will exhibit corresponding differences in emphasis. That for the philosopher will stress the statistical interpretation of quantum mechanics and will deal only with the most elementary physical situations. That for a mathematician will stress the character of the boundary value problems and operators which appear, placing emphasis upon mathematical rigor. That for the physicist should expand the connection between classical and quantum mechanics, give ample illustrations of the applications of quantum mechanics to physical problems for which it was invented, and which it has been eminently successful in solving, and should at least lead to that frontier region, dealing with high energy particles, in which quantum theory is being extended at present.

This excellent book is written primarily and emphatically for the physics student so that it falls definitely in the third category. Yet the writer has managed throughout to preserve interest in the philosophical applications of the subject and in mathematical rigor; any reader will recognize that the subject is rich in philosophical connotation and that mathematical neatness and rigor have an important place in its evolution.

Perhaps the importance of the book in contemporary graduate education is best illustrated by the fact that about a half dozen theoretical physicists with whom the reviewer has spoken have commented on the fact that the text is closely similar to the lecture notes they have employed for a number of years in teaching quantum mechanics to graduate students. All regard it as one of the most important recent additions to graduate training in physics. The writer has no hesitation in saying that it probably will become the standard

reference text in this country for a substantial period of time in the future.

This relatively unique position rests not only on the fact that it is a clear and accurate version of quantum mechanics, for other books such as those of Rojansky and Kemble have the same virtues. This book has the additional virtue that it is intended to prepare the reader for an understanding of the frontier problems of quantum mechanics as they are being attacked at the present time by theoretical physicists. That is, the book has what might be termed vector content in the sense that the student not only obtains an appreciation of the problems in which non-relativistic quantum mechanics has triumphed in treating atomic and nuclear problems, but is also guided systematically to the frontier problems of relativistic field theories which play so important a role in current developments of the physics of high energy particles. Perhaps the last introductory account of the subject which attempted to do this is Pauli's *Die allgemeine Prinzipien der Wellenmechanik* which appeared in the *Handbuch der Physik*, vol. 24, in 1933.

The book contains 14 chapters and may be divided into three parts. In Schiff's own words, "The first three chapters constitute an introduction to quantum mechanics, in which the physical concepts are discussed and the Schrödinger wave formalism is established. The next eight chapters comprise the central part of the book. This part presents exact solutions of the wave equation for both energy-level and collision problems, the Heisenberg matrix formalism and transformation theory, approximation methods, radiation theory, and some applications to atomic systems. Since the first eleven chapters correspond to a typical one-year graduate course, it seemed desirable to include a semi-classical treatment of electromagnetic radiation in the central part of the book (Chapter X) even though some of the results are obtained again in Chapter XIV. The last part of the book corresponds to a short course in what is often called advanced quantum mechanics. It consists of relativistic particle theory and an introduction to quantized field theory and quantum electrodynamics."

FREDERICK SEITZ

Plastic deformation. By L. N. Kachanov, N. M. Beliaev, A. A. Ilyushin, W. Mostow, and A. N. Gleyzal. Ed. by H. H. Hausner. New York, Mapleton, 1948. 192 pp. \$8.00.

This book consists of a set of seven independent papers on plasticity. Five of these appeared originally in Russian periodicals and the