subject-matter (example: on page 169, "tempered distributions" are translated as "smooth distributions") and very little of the German language (example: also on page 169, "denn" which means "because" is translated as "then"). Such examples can readily be found on almost every page of the translated papers. Sometimes a sentence is so garbled that its meaning has been entirely lost (example: speaking of the reviewer, the translators write on page 170, "He replaces the original, not the elementary proof of the authors.").

In short, the book under review is a disgrace to American scholarship and to the American publishing industry. I believe it is an excellent thing if such collections of reprints, including translations, are made available to the public, provided that they are competently edited. But the public has the responsibility and the duty to make sure that the work of reprinting is not usurped by opportunistic and incompetent people.

Quantum Mechanics. By Eugen Merzbacher. 544 pp. John Wiley and Sons, Inc., New York, 1961. $12.00. *Reviewed by Stuart A. Rice, University of Chicago.*

MERZBACHER'S *Quantum Mechanics* is a very good introductory text arranged in canonical format. There is little that cannot be found in other texts, but the author has written a very readable and coherent account of quantum theory, in several cases bringing together topics usually separately treated. In particular, I found the treatments of scattering and of angular momentum particularly suited for a first course. The chemist will find, among other special subjects of interest, a concise and clear treatment of the double-oscillator problem, interesting comments on the violation of parity and a nice discussion of the Stark effect. Although the book contains more than enough material for a first course, it would have been advantageous to have included a chapter or two on quantum statistics and the basic ideas involved in the approach to the study of the many-body problem (i.e., resolvent operators, Hartree-Fock and Bruckner methods, etc.). Aside from this deliberate omission, the text can be unreservedly recommended for use in a first course in quantum mechanics.

Introduction to Mechanics, Matter, and Waves. By Ugo Ingard and William L. Kraushaar. 672 pp. Addison-Wesley Publishing Co., Inc., Reading, Mass., 1960. $9.75. *Reviewed by M. W. Friedlander, Washington University.*

FOR a considerable time we have been in possession of a comprehensive view of physics and have realized the importance of many very general principles which tie together topics otherwise apparently unrelated. We have also been prepared to change very radically our descriptions and views when the weight of experimental data so indicates as, for example, following the asymmetries observed in some interactions, which are ascribed to a nonconservation of parity. Considering all of this, it is surprising how conservative has been our approach to the teaching of physics at an elementary level and how persistently so many have clung to the traditional exercising of students in the trivia of phenomenological physics. Only very recently has there been a concerted effort to bring the introductory courses up to date; the PSSC course has been widely discussed and attempts (with a large measure of success) to do for the high school what still generally needs to be done for the university. It is surely unnecessary to belabor again the many reasons for the PSSC course being overwhelmingly superior to its high-school forerunners, and the same general comments can be applied to many university courses. By now it really should not be necessary to plead the same case with every new approach to university physics teaching; we shall consider this as done, and discuss the book under review on this basis.

It is clear from the many excellent sections that the authors have a very clear idea of what they have wanted to do and have themselves a much clearer and deeper understanding of their material than is sometimes apparent in such books. The progression from one chapter to the next follows a logical chain from basic dynamical concepts, through oscillators, gravitation, inertial forces, rigid body motion, to temperature, heat, basic atomic and molecular ideas, to kinetic theory, elementary thermodynamics, motion of fluids, and the last three chapters on waves. There is a great amount of fine material and a truly enormous selection of problems at the end of each chapter.

On re-reading the notes made during a detailed reading of the book, some strong general impressions emerge. Foremost of these is satisfaction at some elegant presentations which demonstrate a strong physical feeling. Such, for example, is the section 8–8 in which forced and damped oscillations are described. Another example is the treatment of Rutherford scattering (pp. 283–297). Tempering this good impression, however, there is a persistent trickle of petty annoyances. In the first few chapters, there is much recourse to specialized apparatus—cars for 1-dimensional cases and pucks for 2-dimensional—where this apparatus is by no means universal and where a demonstration in front of the class will illustrate the particular points desired. In fact, as on p. 48, rather crude experimental data so derived are used to lend credence to some basic principles being discussed. But does this really help? Would it not be better to discuss idealized experiments first, and leave the very rough experimental checks to classroom demonstrations?

On several occasions, one gets the impression that the authors have started out with too general a coverage and have had to curtail abruptly their treatment when the generalized case proves too complicated. There are also many places where perfectly correct statements are made but with little or no justification (e.g., p. 191, the introduction of the $1/(1-\beta^2)^{\frac{1}{2}}$ factor or, p. 460, the introduction of Planck's $\hbar$). The chapters dealing with waves (Ch. 21, 22, 23) are perhaps deceptively


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simple in starting with pulses and then proceeding to traveling waves. No explicit mention is made of dispersion, and the qualifying remarks on p. 578 could easily be overlooked. Group velocity does not enter, but could surely have been included, with its important consequences.

There are many more places at which one can pick upon more or less minor points. What, then, is the over-all impression? As an attempt to break away from the traditional fragmentary treatment of freshman physics, this approach is refreshingly original and is to be commended. While there is considerably more than enough text for a two-semester course, one might also query whether there is enough. There are many sections one might be tempted to omit, were it not for their use in introducing new ideas. In a general introductory course, though, a different balance might be desired, and many sections one might wish to cover are not included here. For instance, wave motion does not get as far as light waves and interference and diffraction; the dynamics and the generally good treatment of frames of reference does not get extended into special relativity—this would be an algebraically simple step, yet of major importance conceptually, and there is no reason why this great upheaval in our thinking should not be discussed in a first course.

This might be a hard book to use as the sole text for a one-year course, unless extensive additional notes were produced; as the basis of the first year of a two-year course it seems more reasonable but even then with qualifications; as a source-book for teachers it is stimulating. Altogether, it is hard to foresee it gaining an adoption as widespread as the more staid best-sellers, although it is superior in its approach and treatment of most topics.

Quantum Mechanics. By John L. Powell and Bernd Crasemann. 495 pp. Addison-Wesley Publishing Co., Inc., Reading, Mass., 1961. $9.75. *Reviewed by Eugene Guth, Oak Ridge National Laboratory.*

AFTER a period of dearth, quite a number of new books, for the most part introductions at the senior-graduate level, have appeared on quantum mechanics. None of these books discuss the fundamentals as profoundly as the classic expositions of Dirac, Pauli, and Kramers. Nor do they describe applications as extensively as, for instance, Bethe's well-known *Handbuch* article (and its up-to-date successor: Bethe-Salpeter). Some of them are curiously alike in content; others reflect the preference of the authors in their contents.

This book is among the better ones in the new crop. The first five chapters follow somewhat the historical development of quantum theory, and contain a good introduction to wave mechanics, including the uncertainty relation and one-dimensional problems. Unfortunately, no applications of the correspondence principle are given, nor is matrix mechanics mentioned in these early chapters. In this book (as in some of the other newer texts) the idea prevails that matrix me-