tion. Many experiments now available present the same physical principles to the student in a much more exciting way. For example, wave phenomena can be examined in the laboratory with a microwave apparatus and linear motion can be investigated with a linear air track.

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The reviewer, physics chairman at the University of Nebraska, has taught physics for more than a dozen years.

Authoritative introductory summarys and discussions

ADVANCES IN ATOMIC AND MOLECULAR PHYSICS, Vol. 2. D. R. Bates, I. Estermann, eds. 484 pp. Academic Press, New York, 1966. $16.50

by Bruce W. Shore

Students searching the literature for suitable topics for theses or research papers often find the task frustrating. Confronting journals or conference proceedings, they encounter a veil of jargon and brevity that shrouds the essential problems. Taking up a monograph, they sense a finality and completeness that leaves no room for their own effort. Fortunately, these difficulties have been recognized, and students are well advised to consult serials such as *Reports on Progress in Physics, Annual Reviews of Nuclear Science, Annual Reviews of Astronomy and Astrophysics, Progress in Optics* and, most recently, *Advances in Quantum Chemistry* and *Advances in Theoretical Physics*. The present volume, second of its series, is another such collection of research surveys. In my opinion, it is the best of this genre, and it will be widely appreciated by students as well as elder members of the physics community.

Each of the seven articles in the present volume provides thorough encyclopedic coverage of a specialized topic, with annotated compilations of data (both theoretical and experimental) and lengthy up-to-date bibliographies. The level of presentation is comparable to that in *Reports on Progress in Physics*. The individual topics are sufficiently specialized to permit discussion in depth; yet the collection as a whole has such breadth that anyone studying spectroscopy, atomic structure, collision processes, or transport phenomena should find here several articles applicable to his work. The authors particularly stress practical results, methods of computation, and applications of quantum theory. Thus their writings complement conventional texts on atomic physics, which concentrate more on formalism. The exposition of theory includes careful definitions and numerous footnotes, so that students with a working knowledge of intermediate quantum mechanics should have little difficulty following the discussion.

The lead article, by A. Dalgarno and W. D. Davison, "The Calculation of Van der Waals Interactions," points out the surge of interest over the past five years in the calculation and measurement of interatomic and intermolecular forces. Despite considerable effort by theoreticians, particularly Dalgarno and his colleagues, predicted forces are not entirely in accord with observations, and these authors suggest several possibilities for future work to resolve the discrepancy.

The fourth article, "The Measurement of the Photoionization Cross Sections of the Atomic Gases," is particularly timely. The author, J. A. R. Samson, has collected a wealth of illustrations and tabulations of published data. The resulting survey, basically empirical, should stimulate further experimental as well as interpretive effort.

W. R. S. Garton, covers "Spectroscopy in the Vacuum Ultraviolet" with thoroughness that belies the author's brevity. He proceeds beyond a review of contemporary laboratory equipment and illustrative spectra to a discussion of atomic structure as revealed by ultraviolet spectra. It is apparent that opportunities abound for investigations in the ultraviolet.

"The Theory of Electron-Atom Collisions" by R. Peterkop and V. Veldre is an excellent survey of collision theory, outlining the various practical methods that can be used to compute cross sections. This article is particularly useful for the numerous references to Russian work. A complementary article by F. J. de Heer reviews "Experimental Studies of Excitation in Collisions Between Atomic and Ionic Systems." These two surveys can serve well as the basic reference for a graduate course in atomic collisions.

In the remaining two articles S. N. Foner discusses "Mass Spectrometry of Free Radicals" and E. A. Mason, R. J. Munn, and F. J. Smith discuss "Thermal Diffusion in Gases."

I commend the authors and editors of this collection for providing seven examples of what a review article *should* be: an authoritative yet understandable introduction to a topic of current interest; a summary of past and contemporary work; balanced discussion of theory and observation; indications of problems requiring further work; and (rarest of all) a detailed index of subjects and authors. The book should be on the shelves of all physics libraries.

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The reviewer is a research fellow at the Harvard College Observatory and teaches graduate courses on atomic physics and spectroscopy in the Harvard astronomy department.

NEW BOOKS

NUCLEI

Many-Body Description of Nuclear Structure and Reactions. (Enrico Fermi School, Varenna, July 1965). C. Bloch, ed. 589 pp. Academic Press, New York 1966. $26.50

Neutron Noise, Waves, and Pulse Propagation. Conf. proc. (Gainesville, Fla., Feb. 1966) Robert E. Uhrig, ed. 771 pp. US Atomic Energy Commission, Washington, D. C., 1967. Paper $3.00

ATOMS & MOLECULES

Hyperfine Interactions. Conf. proc. (Aix-en-Provence, France, Aug. 1966) Arthur Freeman, Richard Frankel, eds. 758 pp. Academic Press, New York, 1967. $16.00

FLUIDS, PLASMAS

Electricity from MHD. Conf. proc. (Salzburg, July 1966) 2931 pp. in three volumes. International Atomic Energy Agency, Vienna, 1966. Paper $60.00 the set

Advances in Plasma Dynamics. Conf. proc. (Evanston, Ill., Aug. 1965) T. P. Anderson, R. W. Springer, eds. Northwestern U. Press, Evanston, Ill., 1967. $15.00