

well as theoretical information is given. Such topics as the energy loss of charged particles, bremsstrahlung, multiple scattering, Compton scattering, and pair production receive comprehensive, lucid treatment, and the large bibliography should prove useful. It might be mentioned that S. K. Allison and S. D. Warshaw have an article in the October 1953 *Reviews of Modern Physics* designed to supplement the Bethe-Ashkin work and to "bring the experimental picture more up to date".

Part III, *Nuclear Moments and Statistics* (109 pp.) by Norman F. Ramsey, is an able presentation of this field that fills a definite gap in the literature. Theory, experimental methods, and the results of the various measurements that have been made are given in that order. A table of nuclear magnetic moments complete to January 1, 1952 is included, along with tables of magnetic shielding corrections, nuclear moment ratios, and hyperfine structure separations.

The contents of Part III have been reprinted in *Nuclear Moments*, a separate book, together with additional material on the application of nuclear moments to chemistry and to solid-state physics. Information on the nature of molecular bonds, chemical exchange, crystal structure, electron distributions in metals, and allied subjects can be obtained from studies of nuclear resonance spectra, and Ramsey deals with the interpretation of such data in the new section. The result is a comprehensive monograph of interest to a somewhat different audience from that of *Experimental Nuclear Physics*.

Part IV, *Nuclear Two-Body Problems and Elements of Nuclear Structure* (90 pp.), also by Ramsey, covers just that. First nucleons and nuclear forces are introduced, followed by a thorough discussion of two-body problems: the deuteron and its photodisintegration, neutron-proton scattering, neutron-proton capture, proton-proton scattering. Meson theories of nuclear forces are described, with another section devoted to nuclear three- and four-body problems and various aspects of the theory of the heavier nuclei. The author has a flair for integrating theoretical, experimental, and intuitive material, so that the resulting presentation is instructive and illuminating.

Part V, *Charged Particle Dynamics and Optics, Relative Isotopic Abundances of the Elements, Atomic Masses* (207 pp.) by K. T. Bainbridge, is essentially an exposition of the mass spectrograph and its applications. Extensive tables of known relative isotopic abundances, experimental upper limits of isotopic abundances for the more scarce isotopes, mass spectrograph doublet measurements, nuclear reaction  $Q$  values (24 pages of them), and isotopic weights supplement the text.

Part VI, *A Survey of Nuclear Reactions* (207 pp.) by Philip Morrison, is one of the two sections that make up Volume II. Starting with the conservation laws and progressing through nuclear models, the statistical and dispersion theories of nuclear reactions, radiative processes, fission, and high-energy reactions, this mono-

graph gives a comprehensive picture of its complicated subject. Morrison is another author who is very much concerned with the physical meaning of theory, and his contribution should make a good introduction to more advanced works and to the original papers.

Part VII, *The Neutron* (374 pp.) by Bernard T. Feld, completes Volume II. An immense amount of experimental information has been collected in numerous tables and graphs, with the whole organized and provided with a running commentary and interpretation. The fundamental properties and interactions of the neutron are first discussed, then neutron sources and detectors, neutron interactions with matter in bulk, and coherent scattering phenomena. The adjectives clear, complete, and useful again apply.

The present two volumes of *Experimental Nuclear Physics* and Ramsey's *Nuclear Moments* are beautifully styled and printed. When completed, the *Experimental Nuclear Physics* series seems likely to become as standard an item in laboratories devoted to this field as a slide rule or an oscilloscope; it is to be hoped that frequent revisions will enable it to maintain this position.

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### Space Travel

*Space Travel*, by Kenneth W. Gatland and Anthony M. Kunesch (205 pp.; Philosophical Library; New York, 1953; \$4.75), is a popular book on the technical aspects of space travel. It starts with a historical survey of ancient work with rockets, and carries this through the German and American work of the last quarter of a century. The problems that will have to be faced in establishing a satellite vehicle, and in the subsequent escape from the earth's gravitational field, are considered realistically in all the detail that is possible in a nonmathematical work. The book is illustrated and contains a short and useful bibliography.

### Mathematics

*Elementary Mathematics From An Advanced Standpoint*, Vol. I, *Arithmetic, Algebra, Analysis*, by Felix Klein, is a reprinting of the English translation of the third (1924) German edition. The able translation achieves passing on to the reader the inspiring style of Felix Klein—mathematician, lecturer, and teacher who more than any other influenced the teaching of elementary mathematics in modern times. The presentation is a mixture of historical and logical development of the fundamental operations and notions underlying arithmetic, algebra, and analysis. These comprise three of the four sections of the book—the fourth being a supplement containing some remarks on the theory of assemblages and complete proofs of the transcendence of  $e$  and  $11$ . (Translated from the third German edition by E. R. Hedrick and C. A. Noble; 274 pp.; Dover Publications, Inc., New York, 1953; clothbound \$3.25, paperbound \$1.50.)