

Book Reviews

Annual Review of Nuclear Science. Volume 15. Edited by E. Segre, Annual Reviews, Inc., Palo Alto, California (1965). 500 pp., \$8.50.

The most recent volume of this renowned series covers the range from fundamental physical questions to practical problems like waste management and radiobiological questions. All articles are written by competent authors and exhibit a high standard.

About one-fifth of the whole volume is devoted to an article by Lee and Wu dealing with the weak interactions. It gives an excellent survey of the fundamental theoretical concepts and describes the experiments clarifying the nature of this interaction. The authors, well known for their prominent contributions to the development of this field, present here a concise and clear summary including the symmetry properties, the effective Lagrangian, and the selection rules of the interaction. The leptonic decays of hadrons and mesons are discussed from the experimental point of view. This article will be continued by a second installment and it is only to be regretted that this important contribution is not available as a separate monograph.

A detailed article by Tripp deals with the methods to determine the spin and parity of elementary particles. The techniques used are discussed for fermion and boson states emphasizing the investigation of unstable states and resonances. Some representative experiments are discussed in detail. A short review article on the masses of metastable elementary particles by Barkas supplements the above-mentioned contribution very nicely. The determination of masses of particles that undergo weak and electromagnetic decays are discussed and recent results are presented. Both articles will be useful to physicists working in this particular field of spectroscopy.

Low-energy nuclear physics is represented by three articles. The first deals with photonuclear reactions (Danos and Fuller) and takes previous review articles as a starting point. Recent experimental results using new techniques and giving parameters not previously amenable to experimental studies are interpreted in terms of the shell model or as collective phenomena. The development of the understanding can be characterized by the terms "unification" and "solidification." The properties of nonspherical nuclei are discussed in an interesting article by Rogers. The experimental results are interpreted in terms of various models, although some of the most recent developments have not been taken into account. The third article in low-energy nuclear physics refers to reactions between complex nuclei (Greider). Because of space limitation, the contribution is restricted to elastic scattering and direct-reaction transfer processes. The attention is focused on reaction mechanisms rather than on nuclear models. By using semiclassical pictures extensively, the author is able to illuminate the sometimes very complicated phenomena. Another interesting article deals with the

formation of particle tracks in solid crystals. This somewhat neglected technique might find important applications in nuclear sciences and geophysics.

The remaining five contributions cover the boundary region between nuclear physics and other sciences. An article by Harbottle deals with chemical reactions induced by recoil and post-recoil effects in inorganic crystals, and discusses the chemistry of hot atoms. The radiation chemistry of aqueous solutions is reviewed by Hart. The emphasis is placed on the properties and reactions of the hydrated electron, hydrogen atom, and hydroxyl radicals generated by ionizing radiations. An up-to-date survey is given by Blomeke and Roberts on the technical methods used to dispose of radioactive wastes of different activity levels, originating from the exploitation of nuclear power. An assessment of airborne radioactivity is given by Comar in an article dealing with the distribution of fallout in the biosphere and in man. The movement in soils and plants is considered, as well as the metabolism in man. Emphasis is put on the behavior of ^{90}Sr , ^{137}Cs , and ^{131}I . Finally, the dose-response relationship is reviewed by Mole, including both the response of individual living cells and whole animals.

Here, the reviewer met a difficulty. The range of topics treated in this volume (and the same applies to previous volumes) is so wide that it is practically impossible for one scientist to appreciate and assess all the articles. Certainly this is true also for the majority of the readers and it might be worthwhile to think over the editing policy. Although it is certainly valuable to have a publication in which the fields on the boundary between various sciences are cultivated, perhaps a somewhat restricted choice of subjects could make this popular series even more attractive. Another achievement which should be aimed at is the reduction of time between the receipt of manuscripts and the publication. If the survey of the literature for some of the articles was concluded more than one year before the publication the articles will not be completely up-to-date.

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About the Reviewer: Professor Schopper is a member of the faculty at the Technische Hochschule Karlsruhe and is Director of the Institute of Experimental Nuclear Physics of the Research Center. His graduate studies were completed at the University of Hamburg. At various times he was at the Institute of Technology (Stockholm) with Lise Meitner, at Cornell with R. R. Wilson, and at the Cavendish Laboratory. Dr. Schopper has also served on the faculty of the University of Erlangen and of the University of Mainz.