Usp. Fiz. Nauk **68**, 737-746 (August, 1959).

Gol'danskiĭ, V. and **Leĭkin, E.**, Превращения атомных ядер, (Transformation of Atomic Nuclei), U.S.S.R. Acad. Sci., Moscow, 1958, 12 rub.

There are many excellent books on nuclear physics, written for the prepared reader, the specialist. Yet the ever expanding field of applications of nuclear physics calls for a familiarity with its principles on the part of large circles of engineers and scientific workers, who have neither sufficient preparation nor sufficient time to study the complex subject of nuclear theory. This circle of readers is forced to be satisfied with popular brochures, even though they need more serious literature. This book is an important step forward toward satisfying this need.

The book contains a sufficiently elementary and extensive survey of nuclear reactions. It is preceded by a summary of the principal information on the structure and properties of nuclei and of their excited states. Two chapters are devoted to experimental methods of beam production and particle counting. The last chapter considers thermonuclear reactions and nuclear fission.

An undisputed advantage of the book is the simplicity and clarity of the treatment. The book can be easily read by a very large circle of readers. At the same time, it covers a large circle of problems and gives a good idea of the principal problems in modern nuclear physics. The only important group of problems which, unfortunately, escapted the attention of the authors is the theory of the passage of particles and radiation through matter, so important to the analysis of experiments. Naturally, a formal justification for this omission may be the fact that these problems do not pertain directly to the subject of nuclear transformations. Neither are problems in the theory of beta decay, which are important to modern science, included. Nothing is said of polarized beams and polarized targets.

Calling for more serious criticism is a somewhat superficial treatment of several important problems. Thus, the fundamental concept of isotopic spin is applied in this book only to elementary particles. The reader remains in the dark on how to apply this concept to nuclei. Nothing is said of isotopic-spin selection rules, which are so useful in the study of nuclear reactions. Thus, the concept of isotopic spin is presented in a much less complete form than it deserves.

Let us cite a few other examples. On page 97, the absence of a moment of inertia in spherically symmetrical nuclei is motivated by the purely classical analogy with the liquid drop. Actually, as is well known, the moments of inertia of deformed nuclei are considerably higher than would correspond to the model of the liquid drop. On the other hand, in the spherical case the moment of inertia vanishes for perfectly general quantum-mechanical reasons, connected with the principle of indistinguishability of particles. On page 253 the eigenvalues assigned to the rotational momentum are $\sqrt{l(l+1)}$. It would be more correct to say that the eigenvalues of the square of the rotational momentum are $l(l+1)$. In the discussion of the Breit-Wigner formula, the authors do not distinguish between the widths of elastic and inelastic emission of particles. In this form, the formula is suitable only for elastic scattering and radiation capture.

Along with similar shortcomings, which can readily be corrected in the second edition, one cannot fail to note several places that are very lucid and successful from the pedagogical point of view. Thus, there is a splendid exposition of single-particle levels, starting with Weisskopf's formulation of Pauli's Principle (pp 79 — 80). The stripping reactions are well described. "Giant resonance" is very clearly described.

The book by Gol'danskiĭ and Leĭkin will find a large group of readers. Although it does not give exhaustive answers to certain problems, it nevertheless serves as a useful introduction to the more specialized literature.

— D. A. Frank-Kamenetskiĭ

Academy of Sciences, Ukrainian S. S. R., Сессия по мирному использованию атомной энергии (Session on Peaceful Use of Atomic Energy), 1958.