NUCLEAR SCIENCE AND ENGINEERING: **13**, 398–402 (1962)

Book Reviews

Theory of Elastic Thin Shells. By A. L. GOLDENVEIZER. Translation from the Russian edited by G. Hermann. International Series of Monographs on Aeronautics and Astronautics. Pergamon Press, New York, 1961. 658 pp. $15.00.

The book appears to have been produced by the photo-offset process from a typewritten manuscript. Although the monograph is legible, except for a few blurred areas, it is not generally conducive to pleasant reading.

The author has subdivided the content of the book into five major parts. The first part contains an introduction into the theory of surfaces, and the derivation of the geometric and load relationships present in a general shell element. These relationships are presented in arbitrary curvilinear coordinates and in orthogonal curvilinear coordinates. Part I concludes with the equations of compatibility, the equations of equilibrium, and the mathematical specification of boundary conditions.

Part II is devoted to the membrane theory of shells. In contrast to the direct approach in the development of shell membrane theory the author has chosen to treat this facet of shell analysis as a limiting condition that can be obtained from the general theory of shell flexure. In this section the author has restricted himself to shells of cylindrical, spherical, and conical configuration. He has, intentionally, not included typical surfaces of revolution such as roof domes and liquid containers which are analyzed by membrane theory.

The third part of the monograph deals exclusively with circular cylindrical shells. The relationships and equations developed in Parts I and II are applied to cylindrical shells, generally the simplest type to analyze. Trigonometric series are used principally in the analysis of these shells, and approximate methods are developed for the solution of the problems. These methods, which are used extensively in the text that follows, are first introduced here, since the methods are best demonstrated when applied to a simple geometrical configuration. The development of the approximate methods of treatment of shell problems is one of the primary objectives of the book.

In Part IV of the monograph a detailed mathematical study is made of the approximate methods used in shell analysis. The author examines the methods of asymptotic integration as the shell thickness approaches zero. Part of the text is devoted to a discussion of the circular cylinder equations which have received considerable attention in America, and are known here as the Donnell equations.

The methods developed in the preceding parts of the book are applied in Part V to the solution of problems by membrane theory and by bending theory. The approximate methods are applied to edge effect problems and to the bending of cylindrical and conical shells.

The author has confined himself to a very general but mathematically comprehensive treatment of the theory of shells. Since a rigorous solution of these problems is normally not possible, the mathematical analysis is largely concerned with asymptotic and approximate methods. In his effort not to duplicate material that has already been adequately covered in other Russian books dealing with this subject he has produced a rather specialized monograph on the generalized mathematical approach to the solution of shell problems. For this reason the book is not useful as a general reference text.

The average engineer with a limited mathematical background will find this book too difficult to cope with. Other books on the subject, such as Timoshenko's "Theory of Plates and Shells," or Fluegge's "Statik und Dynamik der Schalen" will generally be of greater practical value to the average shell designer. For those that need to dig deeper into the subject, the mathematical techniques presented in this book will be of great value.

DAVID BURGREEN
United Nuclear Corporation
Development Division
White Plains, New York

(About the Reviewer: David Burgreen is a Consulting Engineer at the Development Division of the United Nuclear Corporation. For the past 12 years he has been concerned with the applied mechanics aspects of nuclear engineering, including the statics and dynamics of structures.)

Introduction to Nuclear Science. By ALVIN GLASSNER. Van Nostrand, Princeton, N. J. 213 pp. $3.75.

The preface to this book indicates the level and organization of the text with the observation that the book resulted from a series of courses or lectures presented to high school science teachers at Argonne National Laboratory. "Lectures were usually given by experts in the field, who took pains to keep them at an appropriate non-technical level. Mathematics was employed only to the extent that the diversified backgrounds of the teachers would permit." Thus the text is an elementary survey of nuclear science and engineering topics with little analysis. A tremendous amount of material is covered but only in a descriptive manner. It is a book, therefore, which would be of interest to a beginner who would like to get a speaking knowledge of a large portion of the nuclear field.

Topics covered in the book include nuclear particles, reactions of nuclei, radioactive decay, detection of radiation, accelerators, reactors, reactor fuels, and biological effects of radiation. There are no problems in the book and few example problems. The language of the text is rather complete in nuclear terms and should be a good reference book