BOOK REVIEWS

Advanced Mechanics of Fluids. Edited by HUNTER ROUSE, Iowa Institute of Hydraulic Research, State University of Iowa, Iowa City, Iowa. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1959. xiv + 444 pp. 16 × 23.5 cm. Price, $9.75.

This book is a companion volume to an earlier text, by Hunter Rouse, entitled "Elementary Mechanics of Fluids" and was written by members of the Iowa Institute of Hydraulic Research at the State University of Iowa, under the editorship of Hunter Rouse. As the title indicates, the book is concerned with the mechanics of fluid motion from an engineering viewpoint. The discussions in general are concerned with the basic problems and not usually with the solution of specific engineering problems.

The text opens with an interesting discussion of the author's views on the interrelations of theoretical and experimental studies and some comments concerning the present status of the theory of fluid mechanics. This is followed by a chapter on the fundamental concepts and equations. Here the equations of continuity and motion are presented in considerable detail. It is interesting, however, that no mention is made of the concept of temperature or of thermal conductivity. Since this is a discussion of the mechanics of fluid motion and in almost all applications the temperature can be assumed constant, this omission is perhaps justifiable. It is, on the other hand, hard to understand how this point can be ignored completely in a description of the fundamental concepts.

There are then several very excellent chapters on the basic mathematical methods of solving the equations under various special conditions. The book concludes with chapters on boundary layer theory and turbulence.

The book is well written and brings together a great deal of information on fluid mechanics. It is a valuable reference book as well as a text for advanced courses in fluid mechanics.

THEORETICAL CHEMISTRY LABORATORY
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF WISCONSIN C. F. CURTISS
MADISON 6, WISCONSIN

Semiconductors. American Chemical Society Monograph No. 140. Edited by N. B. HANNAY, Bell Telephone Laboratories, Murray Hill, New Jersey. Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y. 1959. xxiii + 767 pp. 16 × 23.5 cm. Price, $15.00.

This is another in the rapidly growing list of books on solid state physics, and particularly in the semiconductor field. This one is unique in that it emphasizes the chemical aspects of the field, and is written partly by, in the language of, and for the benefit of chemists.

The important contributions of both chemistry and physics to the field of semiconductors are well recognized. Not so well known, perhaps, is the difference in point of view taken by these two groups. A thought-provoking statement, to a physicist, appears in the introduction to the second chapter, "Although the primary emphasis in much of this book is given to the interpretation of chemical phenomena observed in semiconductors, a broader point of view should be kept in mind. The study of semiconductors has added enormously to our knowledge of the chemistry of solid solutions." This is an interesting idea which might not occur to a physicist, who would be more likely to say, "Physics has added enormously to our knowledge of semiconductors."

This book, or rather compilation, consists of 17 chapters, written by authorities in their respective fields. A greater unity is preserved than in most collections of review articles, and the notation is consistent throughout. The first chapter (Hannay) is entitled "Semiconductor Principles," and summarizes some of the physical concepts involved. Chapter 2 (Lander) is a "Survey of Semiconductor Chemistry." Chapter 3 (Tanenbaum) reviews "Semiconductor Crystal Growing," and chapter 4 (Thurmond) discusses purification techniques under the title "Control of Composition in Semiconductors by Freezing Methods." Chapter 5 (Fuller) is devoted to "Defect Interactions," chapter 6 (Reiss and Fuller) to "Diffusion Processes," chapter 10 (Hrostowski) to "Infrared Absorption," chapter 11 (Shulman) to "Recombination and Trapping," chapter 16 (Law) to "Surfaces," and chapter 17 (Dewald) to "Semiconductor Electrodes." Chapter 7 (Thomas) discusses "The Chemistry of Some Compound Semiconductors." "Group IV Semiconductors" are treated as a class in chapter 8 (Geballe), and the III-V's and a few others are covered in chapter 9 (Whelan). Oxides and sulfides are the subject of chapter 13 (Hutson), the special properties of the oxides of the 3d transition metals are discussed by Morin in chapter 14, and organic semiconductors are treated in chapter 15 (Garrett). Imperfections in Ge and Si, including dislocations, are the subject of chapter 12 (Hobstetter).

The discussions of most topics are reasonably up-to-date, though the new material presented at the International Conference on Semiconductors, Rochester, 1958, is not generally included.

The purpose of the book is to emphasize the chemical aspects of the field for workers in this branch of solid state science, and this goal is attained. Another stated objective is to satisfy the requirements of graduate students, or chemists working in other fields, who wish to learn something about the field of semiconductors. Most of the latter group will probably have difficulty in understanding some of the theoretical aspects, in which a considerable background is assumed.

INSTITUTE OF OPTICS
UNIVERSITY OF ROCHESTER D. L. DEXTER
ROCHESTER 20, N. Y.

Nuclear Reactions. Volume I. Edited by P. M. ENDT, University of Utrecht, and M. DEMEUR, Université Libre de Bruxelles. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1959. xii + 502 pp. 16 × 23 cm. Price, $12.50.

Most of the information which we have about nuclei and most of our general ideas about nuclear structure stem directly or indirectly from a study of nuclear reactions. During the past ten years in particular our entire notion of how a nuclear reaction proceeds and how in general a nucleon interacts with a nucleus has changed. We know now that the interaction between nucleons in a nucleus is not really strong as had been supposed by Bohr when in 1936 he founded his compound-nucleus theory of reactions; many nuclear reactions for example are explainable as direct interactions (one-step processes instead of the two-step reaction of the compound-nucleus theory), and the essentially weak interaction responsible for this is directly correlated with the weak interactions exhibited in the nuclear shell model. Experimental techniques have of course also improved enormously and one now seeks, for example, by measuring angular distributions and angular correlations, to learn quite subtle things about nuclei.

The present book, the first of two volumes, is really the first book to be devoted to this exciting field. The only other comprehensive account is contained in the recent "Handbuch der Physik" volumes and there is fortunately not too much overlap between them since the Handbuch articles cover a wider field and are mostly by different authors. It might be noted however that two of the articles in the present book are written by people who are coauthors of essentially similar, though longer, articles in the two Handbuch volumes which the reviewer has seen.

The book contains ten articles, all of them written by very competent people. One of the articles, perhaps the best written of the ten, concerns the theory of the nucleus as a many-body system and describes the recent advances made in producing a really sound theoretical basis for the various models. Three of the articles are about nuclear models, the shell model, the collective model and the statistical model. The last of these really concerns nuclear reactions since the