from start to finish would not also be able to attack the same material in the more conventional form. As for the graduate student studying the theory of metals and alloys, there is no doubt that another book by the same author ("Atomic Theory for Students of Metallurgy," The Institute of Metals, 1952), which covers essentially the same subject matter in conventional text-book form, would be a far more useful volume. Nevertheless, the present book may provide one who has already been exposed to the subject matter with a pleasant way to review the material and to increase his physical insight into the principles of quantum theory.

A. S. Nowick

Nuclear and Radiochemistry. Gerhart Friedlander and Joseph W. Kennedy. John Wiley and Sons, Inc., New York (1955). 468 pages. $7.50.

This book is a new, revised edition of the widely used *Introduction to Radiochemistry*, written primarily as a text book of a graduate or senior undergraduate course in radiochemistry. The book is divided into thirteen chapters. It begins with a general survey of radioactivity, nuclear structure, and the elementary principles and methods for studying nuclear reactions. The rate equations of radioactive transformations are then derived and applied to a number of problems. This section is followed by an elementary but instructive survey of nuclear states and the related radioactive processes and a discussion of the interaction of radiation with matter with many useful applications. The theory and methods for the detection and measurement of radiation are then taken up in the three consecutive chapters. A brief but well-written review of radioactivity applied to chemistry is given in Chapter 11. Two new chapters have been added to this edition: Chapter 12 gives a survey of the design and operation of nuclear reactors, and Chapter 13 contains a stimulating discussion on some cosmic problems, viz., the production of energy in stars, cosmic rays, geo- and cosmochronology, and the genesis of the elements.

The effectiveness of presentation and the clarity of discussion which characterized the earlier edition is maintained in the present book. The list of references at the end of each chapter has been revised and expanded. An up-to-date table of nuclides is given in Appendix G. The isotopic masses listed in this table should be very useful and convenient for computations regarding nuclear reactions. Answers to most of the exercises are given. These exercises are often as instructive as the text itself and were included by the authors as an integral part of the course. Undoubtedly, *Nuclear and Radiochemistry* will continue to be the most widely used text book of introductory radiochemistry for many years to come.

J. H. Wang

Thermodynamics from the Classic and Generalized Standpoints. Joseph Louis Finck. Bookman Associates, New York (1955). 224 pages. $7.50.

This book is of interest to advanced students and those engaged in research in thermodynamics and applied fields. It is clearly written, well organized, and does not contain any difficult mathematics. The result of the author's own work in the field, which has extended over many years, the book represents an attempt to extend the range of applicability of thermodynamics particularly to include metastable states.

The first part of this two-part book is devoted to classic thermodynamics, of which the treatment is excellent. It covers, with emphasis on its difficulties and limitations, the most important concepts in the field, such as the equation of state; the law of conservation of energy; temperature; entropy; the Kelvin-Planck and Clausius principles; and the general thermodynamic system of Gibbs.

The second part is a presentation of generalized thermodynamics. The author's basic postulate is that a thermodynamic system has more degrees of freedom than are usually assigned; by virtue of this metastable states may be incorporated into the equation of state, enlarging the scope of this equation and the scope of thermodynamics. Agreement of the generalized point of view with the laws of conservation of energy and the Kelvin-Planck and Clausius principles is demonstrated and is followed by a discussion of systems in which energy is dissipated, of systems in which energy changes occur under equilibrium and nonequilibrium conditions, and of phenomena at low temperature and absolute zero.

A discussion of the potential character of entropy leads to the conclusion that entropy is not a function of state in a system of more than two independent variables and that this demands new criteria of equilibrium and stability of systems. Near the end of the book the enthalpy and latent heat are calculated for ammonia and water from an explicit equation by use of pressure, volume, and temperature as the independent variables. The agreement is excellent for ammonia and good for water.

The author is to be complimented for a thought-provoking work.

HOWARD LITTMAN

Reader Reaction

HEAT TRANSFER

The introductory paragraph of the article "Heat Transfer to Water in an Annulus" by Miller, Byrnes, and Benforado, published in the December issue of the *Journal*, contains a statement which I fear might mislead someone into repeating old research. The statement that ". . . literature contains only a limited amount of data for annular flow heat transfer . . ." seems hardly appropriate to me when the proper paragraph in "Perry" [J. H. Perry, "Chemical Engineers' Handbook," McGraw-Hill Book Company, Inc., New York] lists about nine articles, in the bibliographies of which will be found at least thirty other references to similar work.

The general tone of these articles parallels the conclusions reported in this article, to the effect that the conventional equation underpredicts the coefficient, but further research would show that the divergence is not neatly relatable to any physical dimension.

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