statistical model is more nearly a model for a reaction than it is for nuclear structure; but the first two pay very little attention to reactions. An excellent pair of articles considers resonant reactions from an experimental and from a theoretical viewpoint. Three articles are devoted to reviews of experimental results including an interesting account of the experiments being done with heavy-ion accelerators. One article is devoted to the modern formalism of angular correlations and polarization.

For the most part the different chapters are not well correlated with each other and the book must be viewed as a collection of separate papers. Since, with one or two exceptions, the articles are well written and stimulating, the book, judged in this manner, is altogether successful; it will appeal both to the student and to the research worker who wants an authoritative, but for the most part not too technical, account of nuclear reactions. With the second volume we will presumably have a rather complete account of the subject.

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Electroanalytical Chemistry. Second Edition—Revised and Enlarged. By JAMES J. LINGANE, B.Chem., Ph.D., Professor of Chemistry, Harvard University. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1958. xiv + 669 pp. 16 × 23 cm. Price, $14.50.

This book makes a rather comprehensive survey of the field of electroanalytical chemistry, both classical and modern. Included are chapters on potentiometry, conductimetry, polarography, controlled potential electrolysis, coulometry, and chronopotentiometry.

The second edition differs from the first primarily in that it is intended to be used as an advanced text rather than as a reference book. New chapters have been added dealing with electrical measurements, polarography, amperometry and chronopotentiometry. The material dealing with coulometry has been extensively revised and brought up to date.

The style is fluent, and the new material has been blended skillfully into the old. The treatment is authoritative. Much of the book is on the level of an advanced textbook, and the discussion is fairly general. However, the chapters dealing with coulometry and controlled potential electrolysis are more in the nature of excellent monographs.

Some sections of the book may be criticized for unevenness of treatment, particularly the chapters on electrical measurements and polarography. But it is hard to see how this could be avoided without unduly expanding the book. One of us is currently using this book as a text, with satisfactory results.

Professor Lingane has rendered a real service in preparing this authoritative survey of a field for which no comparable textbook exists.

DEPARTMENT OF CHEMISTRY
FLORIDA STATE UNIVERSITY CHARLES K. MANN
TALLAHASSEE, FLORIDA ERNEST GRUNWALD

Nuclear Spectroscopy Tables. By A. H. WAPSTRA, G. J. NIJGH and R. VAN LIESHOUT, Institute for Nuclear Physics Research, Amsterdam. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1958. vii + 135 pp. 20 × 27 cm. Price, $8.90.

This book is indeed quite puzzling; the puzzle concerns the audience for which it was written. It is clearly not written for the non-expert in the field of Nuclear Spectroscopy, for the treatment of the topics is so cursory as to make most of the tables all but useless for the individual who is not steeped in the subject. On the other hand, the introduction is useless for the expert who is quite familiar with the material and is in fact for him quite trite. Indeed, those sections of the book which would be readily understandable are essentially trivial.

The book is divided into ten chapters. The first "Mathematical Data" has (for reasons incomprehensible to the reviewer) tables of four-place logarithms, powers of ten, powers of two and cube roots. The chapter is rounded out by two subsections on the least squares method and quadratic interpolation followed by cursory tables of the Gaussian distribution and χ^2. If the book has a highlight it is the section on the least squares method which is written in a delightfully airy vein (it is also understandable). The first chapter is followed by one on "Atomic Constants" which has a short listing of the same—one should be careful here of the MKS system which really seems out of place in the atomic domain. This is followed by a chapter entitled "Elements and Isotopes" containing information readily available in 1001 other places. Chapter 4 on "Heavy particles" contains useful (but readily available in more complete form elsewhere) data on the ranges and magnetic rigidities of protons, deuterons and α-particles. The fifth chapter entitled "Electrons" is devoted principally to a discussion and tabular presentation of data relevant to β-decay and K-capture. The next chapter on "Gamma Rays" is devoted to a cursory discussion of proton absorption, γ-decay half-lives and internal conversion. The seventh chapter on X-Rays and Anger electrons has quite conventional data. Chapter eight on "Angular Distributions and Correlations" is completely unintelligible to the uninitiated and not in the best form for the initiated. The next to last chapter on "Nuclear Models" is a hodgepodge of items for which there did not seem to be any logical place elsewhere and the last chapter, "Calibration Standards" is an excellent example of presentation of facts well known to the expert and in non-usable form for the non-expert.

It is really not clear why this book was written, for fully at least 75% of the material presented is in the working library of any physicist (or readily available to him) concerned with nuclear physics. The remaining 25% which is of use only to the specialist is surely already in his possession. It does not appear to me that the argument of compactness of this information is sufficiently strong to warrant the investment. It should be noted that the physical make-up of the book is excellent.

DEPARTMENT OF PHYSICS AND ASTRONOMY
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Elements of Heat Transfer. Third Edition. By the late MAX JAKOB, Research Professor of Mechanical Engineering, Illinois Institute of Technology, and GEORGE A. HAWKINS, Dean of Engineering, Director, Engineering Experiment Station, Purdue University. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1957. xxv + 317 pp. 16 × 23.5 cm. Price, $6.75.

In 1950, Jakob and Hawkins introduced a second edition of their short monograph "Elements of Heat Transfer and Insulation," in which, as the authors declared, the revision consisted of lengthening, detailing and increasing the complexity of certain sections without altering the content or arrangement of the book fundamentally. Apparently much the same attitude has occupied Dean Hawkins in his preparation of a third edition: extensions of the text and new problems have been added, insulation has been de-emphasized (the term has disappeared from the title), and a chapter on mass transfer has been appended, but the book is basically unchanged. Thus it retains most of the advantages of its earlier editions and most of the defects as well. In some cases the new advantage of added material is at least partly off-set by the disadvantage resulting from tacking the new material loosely to the old text instead of integrating it into rewritten text. An example is provided in the chapter on fluids in turbulent flow through pipes: a short section on liquid metals is a proper addition; less than proper, however, is the inconsistency of reading in preceding unrevised passages that the Dittus–Boelter equation is applicable to any fluid, only to learn two pages later that the authors really meant any fluid except a metallic one.

Among the special assets of the book are the following: the inclusion of such bits of modernity as convective heat transfer to liquid metals, the behavior of fluids at Mach number $\geq$ unity, and the application of electrical analogs to heat transfer calculations; the simple development of special forms of the integrated Fourier equation, and detailed elaboration (by example) of relaxation methods; an analysis and explanation of finned surfaces; a very good précis of heat transfer by radiation; direction of the reader to the problems of measuring conductivity and emissivity, and to the general difficulty encountered in temperature measure-

ment (the inclusion of these subjects is praiseworthy indeed—their treatment in this text unfortunately is not); and the concise brevity of almost every chapter.

Among the book's liabilities are: use of units—omission of some from the nomenclature table, the unusual emphasis on the distinction between temperature difference and temperature, the inclusion of specific weight and the slug and the omission of the gravitational conversion factor (the former may puzzle chemists and both former and latter will offend many chemical engineers); the discussions of free and forced convection and boundary layer, which are shallow; the superficial treatment of heat transfer and fluid flow analogy; and the chapter on mass transfer, which seems a questionable addendum to such a highly condensed volume even if it were well presented (this reader found it fuzzy and unauthoritative).

There are two extraordinary features of the Jakob–Hawkins approach. In the first place, *all* of heat transfer is surveyed in the brief span of some 270 pages. The result is something like experiencing a full-course dinner by sampling one bite of each item served. Yet the book does not quite resemble a handbook section, because in the second place most of the topics are presented generally rather than specifically and not many design data are included. It is one thing to recognize these two characteristics and to admit that they are unusual. It is distinctly another to decide whether they are good, bad, or neither, and this reviewer was quite unable to do so. As a result of them, however, one can say that the reader will learn all about heat transfer without being taught much heat transfer, and that he will be given little instruction about the design of heat exchange equipment. Perhaps this means that the book can serve as a useful adjunct to a handbook on one hand and as a high-spot review of a comprehensive treatise on the other.

The book is good in physical structure and appearance, has easy-to-read typeface and illustrations, and contains many fine problems (278 in all). It has only a few typographical or mechanical errors.

DEPARTMENT OF CHEMICAL ENGINEERING
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La Conducibilità Elettrolitica. By RAYMOND M. FUOSS and FILIPPO ACCASCINA. Edizioni dell'Ateneo, Rome, 1959. xi + 295 pp. 15 × 22.5 cm. Price, 3600 lire.

This excellent monograph, which is also about to appear in an English translation, Electrolytic Conductance, Interscience Publishers, Inc., New York, is the result of a collaborative effort by two former students of Professor Charles A. Kraus at Brown University. It was he who encouraged them to work in the field of electrolytic conductance and the book is gratefully dedicated to him. As the authors state in their preface, the monograph deals with the development of the theory of the electrical conductance of dilute solutions of symmetrical electrolytes. It is intended as a source book for part of a course in electrochemistry for graduate students.

The first third of the book is devoted to historical background and to those considerations in electrostatics, hydrodynamics, statistical mechanics and thermodynamics which are particularly pertinent to the subject. This is followed by a clearly presented, detailed development of the recent electrolytic conductance theory of Fuoss and Onsager. It is a successful extension of the limiting Onsager equation and is valid for finite concentrations of strong symmetrical electrolytes, covering a respectable range in the dilute region. Moreover, the theory is also developed to include coulombic ion pair and ion cluster formation and here its validity is demonstrated by an analysis of data in pure and in mixed solvents over a wide range of dielectric constants. Of the three empirical constants in the equations the equivalent conductances at infinite dilution, the association constants for weak or intermediate electrolytes, and the "distances of closest ionic approach," the latter, gratifyingly enough, are in close agreement with the corresponding crystallographic values. This fact presumably indicates that ionic solvation sheaths are squeezed out when anions and cations meet.

A student who studies this book seriously will develop not only a sound knowledge of an important part of electrochemistry, but he will also acquire a useful background for exploring fruitfully other theoretical vistas in the broader fields of physical chemistry.

THE ROCKEFELLER INSTITUTE
NEW YORK, NEW YORK THEODORE SHEDLOVSKY

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