This need the author has striven to fill with remarkable success in the book under review. Dealing as it does with a field belonging rather to that of the engineer than to the basic physicist, the approach and viewpoint is colored by these circumstances. Nevertheless, the condensation of the development of the many complicated derivations in a clear, neat, logical and concise fashion in some 217 pages is, in itself, a remarkable achievement. Thus the material does not make light reading, but with the help of excellent references an interested graduate student, or investigator well grounded in basic mathematics, will find all the information he needs.

As to approach—the concisely worded preface presents the content about as clearly and accurately as possible so that again I quote—"In this book characteristics of gas flow are determined from an assumed molecular model and the distribution of velocities of the molecules. The macroscopic properties of a frictionless compressible (isentropic) flow are obtained from a simple spherical molecule and Maxwell's distribution law. A more complicated molecular model (a point center of force) and small order modification of Maxwell's distribution function are required in the corresponding calculation for a viscous compressible (slightly non isentropic), flow. The weak shock transition and boundary layer are examples of this type of motion. The molecular concept permits determination of both equations of motion of a gas and the boundary conditions at the surface of a body. These results lead to the concepts of slip flow and temperature accommodation of the gas. The same basic ideas are used to develop the theory of free molecule flow. At present molecular theory is limited by lack of details regarding encounters between complex molecules. Lacking complete collision information for diatomic molecules, the mathematical development in this book is complete only for a monatomic gas. However, the results apply equally well to a diatomic gas (air), if appropriate changes are made in the values of the ratio of specific heats and the Prandtl number. Some discussion of strong shock waves is included in which effects arising from more complex molecules are considered. In free molecular flow no intermolecular collisions occur and the diatomic gas can be included in the discussion. The molecular theory of turbulent flow which involves encounters between clusters of molecules does not appear to be sufficiently developed for inclusion in this book."

Chapter headings are as follows: 1. The Fundamental Equations. 2. Isentropic Flow. (Maxwell's distribution, transfer equation, a basic parameter of mass motion—the speed of sound, specular reflection, expansion wave in one dimensional unsteady flow, the same in a two dimensional steady flow.) 3. Basic Equations for Non-Isentropic Flow. (Point centers of force, velocity distribution in non-isentropic flow, mean speed and mean free path in non-isentropic flow, rate of flow of molecular momentum and energy, viscosity and heat conduction.) 4. Non-Isentropic Flows. (Experimental studies of viscosity and heat conduction, equations of steady flow in one dimension, the shock transition, diffuse reflection from solid boundary, boundary layer equations, momentum and energy transfer in the boundary layer, experimental investigations, effects associated with more complex molecules.) 5. Mechanics of Rarified Gases. (Flow at low density, effusive flow of free molecules, transfers of mass, momentum and energy by free molecules, momentum and energy exchange at surfaces, drag and heat transfer tests in free molecule flow, effect of Knudsen's number on heat transfer, momentum transfer with slip flow, energy transfer with a temperature jump.)

While all this material is developed in a unified systematic form with consistent notation, obviously much of it is classical kinetic theory which is treated in diverse, now classical sources. Of particular value, however, is that the relations that are developed are specifically adapted to be essential to applications to the aerodynamic problem for the present and the future and that applications to all existing experimental and theoretical data in this field are made wherever possible. The book will be indispensable to workers and students in this field who are indebted to the author for a useful system of analysis applicable to their problems.

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Entwicklung und Gegenwärtiger Stand der Systematik der Transurane. BY H. GERLACH. Akademie-Verlag, Mohrenstrasse 39, Berlin W 8, Germany. 1955. vii + 256 pp. 17 × 24 cm. Price, DM 29, —.

This book, from its title, purports to describe the historical development and current status of the actinide hypothesis and the chemistry of the transuranium elements. The volume has little to offer the American reader. While the historical aspects of the subject are treated in an interesting and readable fashion despite the author's strange ideas of the geography of the United States (Appendix), the technical aspects are hopelessly dated. For the most part, the present volume consists of a paraphrase of the several volumes of the "National Nuclear Energy Series" dealing with the actinide elements. Unfortunately, this book was prepared just before the Geneva Conference on the Peaceful Uses of the Atom was held, and as a result, none of the vast amount of scientific material released at that time is included. Thus, there is no discussion of the chemistry of plutonium–fluorine compounds for instance, or the recent chemistry of neptunium and americium. Nothing of the wealth of chemical details relating to the processing of irradiated uranium is discussed.

The book under review can therefore not be recommended. This is regrettable, since a real need exists for a book on a similar level of treatment. The present volume, however, does not satisfy this need.

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The Chemistry of Heterocyclic Compounds. Volume IX. ARNOLD WEISSBERGER, Consulting Editor. Acridines. By R. M. ACHESON, University of Oxford, England. With a chapter by L. E. Orgel, Cambridge University, England. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1956. xii + 409 pp. 16 × 23 cm. Price, $12.50; $11.25, Subscription price.

This is the ninth volume to be published in the series Chemistry of Heterocyclic Compounds. It maintains the high standards set by the earlier volumes and will serve to make the series more complete. Although comparisons are said to be odious, the question will arise, "How does this volume compare with that by Adrian Albert published in 1951?" As a matter of fact it compares quite well, as of course it should. Having the previous volume to build on, it is to be expected that the new work would be better organized.

The system of numbering the ring used by *Chemical Abstracts*, is employed by Acheson and an excellent case is made for its adoption. One may take this opportunity, however, to deplore our tendency to rename (or renumber) compounds for technically unimportant reasons. The confusion thus created and the possible errors introduced far outweigh the small technical advantage secured. Since *Chemical Abstracts* adopted the new numbering in 1937, it has become the favorite method and the author is wise, therefore, to have adopted it.

A very unhappy result occurs in naming the benz[b]acridines. In the case of the [a, c and kl]benzacridines the numbering starts with the benz radical, but in the case of the [b] compound numbering starts with the acridine ring itself, Table I, page 7. The Roman numerals for the tables, by the way, seem a bit old fashioned: these might well be reserved for the formulas.

The size of the page (6 × 9) makes for more convenient reading as do the references at the bottom of the page. The larger page used by Albert does have an advantage in permitting more comprehensive tables. The collection of references alphabetically at the end serves as an author index in Albert's book. The present work lacks an author index. The subject index (for at least the two letters checked) also is less complete.

The antimalarial properties of acridines are very thoroughly treated and clearly presented by Acheson. Chapter IV, The Acridine Alkaloids, is probably the best account available of these compounds. In forty-five well written pages the author gives a comprehensive survey of the subject. A good account is given of acridines in cancer therapy and carcinogenesis but the word cancer is not listed in the index.

Chapter VII, Visible and Ultraviolet Absorption Spectra, is exceptionally well handled by Orgel. There is also a short section on infrared absorption which it is to be hoped will stimulate interest in this rather neglected phase of acridine research.

The formulas while small are perfectly clear because the numbering is outside the ring. An excellent job of proof reading and printing has been done for the most part.

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Advances in Protein Chemistry. Volume X. Edited by M. L. ANSON, Cambridge, Massachusetts, KENNETH BAILEY, University of Cambridge, Cambridge, England, and JOHN T. EDSALL, Biological Laboratories, Harvard University, Cambridge, Massachusetts. Academic Press, Inc., Publishers, 125 East 23rd Street, New York 10, N. Y. 1955. viii + 425 pp. 15.5 × 23.5 cm. Price $9.00.

"Advances in Protein Chemistry" is an annual publication of reviews which I read because I want to, and not because of a duty to keep up with recent work in the field. There are a number of reasons for this. The nature of protein chemistry is one of these: research on this subject is carried out by persons trained in many different disciplines, with the result that it is more difficult to understand the original publications of one's colleagues than in most fields of research. Another reason is undoubtedly the fact that the editors of "Advances in Protein Chemistry" are themselves active workers in the field. They have a knack of picking the right authors to review the right topics at the most appropriate time. There also appears to be no attempt to enforce uniformity either in style or length, so that each author is free to choose the method of presentation he deems best.

Volume X of "Advances in Protein Chemistry" contains a review by Gertrude E. Perlmann on the nature of the phosphorus linkage in phosphoproteins. The review concentrates on elucidation of the phosphorus linkage in ovalbumin, casein and pepsin. Another review dealing largely with a few specific proteins is by Bert L. Vallee on zinc and metalloenzymes. It features the preparation and properties of four enzymes containing zinc as an essential constituent: carbonic anhydrase, carboxypeptidase, alcohol dehydrogenase and a zinc protein from leukocytes. There is also a brief discussion of the general coördination properties of zinc.

J. Steinhardt and E. M. Zaiser present a review called "Hydrogen Ion Equilibria in Native and Denatured Proteins" which deals only superficially with the general subject indicated by the title. Its main virtue lies in a summary of the authors' own work on the thermodynamics and kinetics of the acid denaturation of hemoglobin.

C. E. Dalgliesh presents a review of the metabolism of the aromatic amino acids, considering the degradation, transformation and biosynthesis of these compounds in various organisms. The incorporation of these amino acids into proteins is not considered. The review contains over 1000 references.

The remaining two chapters deal with marine proteins. G. Hamoir summarizes the present state of knowledge on fish proteins, especially those from skeletal muscle. Lionel A. Walford and Charles G. Wilber discuss the sea as a potential source of protein food. More than half of their discussion is concerned with economics and sociology rather than chemistry.

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Elementary Nuclear Theory. Second Edition. By HANS A. BETHE, John Wendell Anderson Professor of Physics, Cornell University, and PHILIP MORRISON, Professor of Physics and Nuclear Studies, Cornell University. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1956. xi + 274 pp. 15.5 × 23.5 cm. Price, $6.25.

The first edition of this book was inflated out of the notes for a series of lectures and was intelligible to the relatively uninitiated only with difficulty; it was an outline of the elements of nuclear theory and their application in a few selected areas which was incisive and compact, but suitable only for one already well versed in the subject matter.

The second edition of this book is still an outline and it still covers only a selected group of topics; however, in the revision a great deal of connective and elaborative material has been added. The text reads extremely well and would be suitable for use in introductory courses or for self study. The authors have been true to the spirit of the original selection of topics and have resisted the natural temptation toward encyclopedic coverage. I would guess that about half of the almost 100% increase in size of the book can be ascribed to a real effort at clarification and improvement in literary style; the other half is employed to up-date the text and add a few new subsections.

The book is divided into three major sections. In the first, Descriptive Theory of Nuclei, the factual and some of the theoretical material on nuclear size, β-disintegration, spin and statistics, etc., are covered; a new sub-section on π and other mesons is included. The second section, Quantitative Theory of Nuclear Forces, deals with topics such as: the physical properties of nucleons, ground state of the deuteron, scattering, non-central forces, etc.; the new subsections here deal with nucleon scattering at high energies and polarization of neutrons. The third main section of the first edition dealt with β-disintegration and the compound nucleus; in this second edition, this section surveys models for the structure of the nucleus, nuclear reactions and scattering, and β-disintegration. A table of nuclear species is appended.

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