
BOOK REVIEWS

Elements of Gasdynamics. Galcit Aeronautical Series. By H. W. LIEPMANN AND A. ROŠKO, California Institute of Technology. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1957. xv + 439 pp. 15.5 × 23.5 cm. Price, \$11.00.

As stated in the preface the book is primarily intended for students in aeronautics and it is not intended to be a reference handbook; however, it should also prove satisfactory as a rapid introduction to the important fundamentals of the aerodynamics of compressible fluids for any scientist who suddenly finds himself involved in this field. Because of this objective no systematic reference to existing literature has been attempted; instead a selected list of reference works have been given in order to provide the necessary leads for specialized study in the various phases of compressible aerodynamics.

The book presents the fundamentals of gas dynamics in the manner and sequence which should prove most successful for an introductory text. For example the first six chapters (Concepts from Thermodynamics, One-dimensional Gasdynamics, One-dimensional Wave Motion, Waves in Supersonic Flow, Flow in Ducts and Wind Tunnels, Methods of Measurement) are written in such a manner that they could be introduced in the senior year of an undergraduate engineer.

Selected topics could then be used from the remaining eight chapters in the first year of a graduate course in high speed aerodynamics. These chapters include the complete equations of motion, the method of characteristics for two-dimensional and axially symmetric supersonic flow, small perturbation theory, similarity rules, transonic flow, viscosity and the kinetic theory of gases.

The increasing complexity of the problems involved in high speed aerodynamics is apparent in comparing this book with its predecessor, "Aerodynamics of a Compressible Fluid" by Liepmann and Puckett, which is now out of print. Although removed from one another by less than a decade, the differences are striking. Non-steady flow, shock tubes, dissociation and other real gas effects, and three-dimensional problems provide all new material. However the most indicative feature illustrating the modern trend in high speed aerodynamic research is the introduction of the kinetic theory of gases and the expansion of less than nine pages of descriptive comments on viscous effects in Liepmann and Puckett into 78 pages on the development of the fundamental theory and equations of viscosity, heat conduction and the related molecular phenomena (mean free path, relaxation time, slip and accommodation, etc.).

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Messen und regeln in der Chemischen Technik. Unter Mitwirkung zahlreicher Fachwissenschaftler herausgegeben von. Edited by Dr. rer. nat. J. HENGSTENBERG, Ludwigshafen/Rh., Dr. phil. B. Sturm, Leverkusen, Dr. phil. O. Winkler, Marl. Springer-Verlag, Reichpietschauer 20, Berlin W. 35, Germany. 1957. xix + 1261 pp. 25 × 18.5 cm. DM, 146.

This encyclopedic compilation of methods of measurement and controls in the chemical industry was planned by the German organization NAMUR (Normenarbeitsgemeinschaft für Mess- und Regeltechnik in der Chemischen Industrie). Some thirty-one experienced persons from recognized chemical industries in Germany served as the authors. One is immediately impressed by the thorough and extensive treatment of the selected topics. The emphasis is mainly on German methods and equipment but many American and British instruments are also described. Extensive use is made of line drawings together with photographs and, in many cases, a mathematical treatment pertinent to the subject under discussion is well presented.

The book is divided into nine chapters as follows, each divided into two to eight subdivisions. 1. Temperature measurements. 2. Measurement of mixtures, fluid flow and volume (263 pages). 3. Pressure and pressure difference. 4. Analytical determinations based on physical properties. 5. Electrochemical methods of measurement. 6. Special techniques (measurement of viscosity, thickness of sheets, speed of revolution and frequency of vibration). 7. Principles and techniques of automatic control. 8. The design of control panels. 9. Organizations for the control of technical operations.

It is difficult to present in a short review a complete picture, but a few examples selected somewhat at random can convey an impression about the comprehensiveness of the text. There is a tabulation of standard temperatures based on the international temperature scale of 1948. Thermocouples, inductive and magnetic compensators, resistance thermometers, radiation and optical pyrometers are all discussed. Methods of weighing large (box cars) or small items (torsion balance) are given. Flow meters of all types are described together with a discussion of the effect of compressibility and viscosity on flow measurements. Throttles of different shapes and sizes are discussed fully with equations and graphs as they are used in flow measurements. There are descriptions of all sorts of proportioning equipment or tables for determining the volume in partially filled tanks of various shapes.

Chapter 4 (171 pages) dealing with analytical techniques describes methods based on the following eight physical properties of matter: absorption of radiant energy, paramagnetism, density, heat conductivity, heat of reaction, volume, electrical conductivity and saturation pressure (dew point). Here one finds a method for determining oxygen (0-0.1%) in gases by measuring the heat of reaction with chromous chloride. In another section there is a table of liquid boundary potentials to the extent it has a use in the determination of pH of solutions. The composition of thirteen pH standards is given together with their variation of pH over a wide range of temperatures. Even a short section discusses the autoprotolytic constants of non-aqueous solvents and the bismuth electrode for pH measurements is also discussed.

In the section on viscosimetry the meaning of Newtonian flow is explained with the help of a tensor (mathematical). The Hagenbach correction is not overlooked. The Koppers capillary viscosimeter and the theoretical basis for the same receives a full treatment. Even Bridgman's method of measuring viscosities under extremely high pressures is mentioned. The chapter on principles of automatic control (251 pages) contains a complete discussion with equations and transform functions for such system as proportional and integral controllers.

For one who can handle the language barrier the text is a valuable source of information. There are extensive references to journal articles and other texts.

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Comprehensive Inorganic Chemistry. Volume Six. The Alkali Metals. By JOHN F. SUTTLE. Hydrogen and its Isotopes. By ROBERT C. BRASTED. Edited by M. Cannon Sneed, Professor Emeritus of Chemistry, School of Chemistry, University of Minnesota, and Robert C. Brasted, Professor of Chemistry, School of Chemistry, University of Minnesota. D. Van Nostrand Company, Inc., 126 Alexander Street, Princeton, New Jersey. 1957. viii + 234 pp. 16.5 × 23.5 cm. Price, \$6.00.

The first thing I do in examining a new technical book is to leaf through it, looking for topics with which I may be familiar so I can compare what the author has to say with what I think I know. I then look for topics about which I know little or nothing to see how well the author can teach me or introduce me to a new subject. Finally, I try to analyze the

book for completeness, and by this I mean not thoroughness in breadth and depth of coverage, but how completely has the author lived up to the objectives set forth in his preface. (A major objective of the books in this series is to have each serve as a *vade mecum* to a particular field of chemistry.)

This particular volume is, of course, two books; one on the Alkali Metals and the other on Hydrogen. I was impressed and quite pleased with the section on the Alkali Metals, written by Prof. John F. Suttle. I found no areas of disagreement on those subjects I was familiar with, and I feel I have been introduced graciously and well to unfamiliar subjects by Prof. Suttle's lucid exposition and easy-to-read style of writing. Of particular importance to any technical guide are its references to the pertinent technical literature, both survey and specific, and I consider this section to be particularly well documented. Coverage of the general field of the chemistry of the alkali metals is certainly extensive and, I believe, well balanced in depth. I feel the author has done an outstanding job in achieving the objectives set forth by the editors of this series.

I was somewhat disappointed in the section on Hydrogen, written by Prof. Brasted. Not that it is bad, for it isn't, but I feel it could have been considerably better. Most of the information presented appears to be valid data, with the exception of a few instances in which out-dated and erroneous material from the literature has been used, but the emphasis on relatively trivial points and the omission or relative neglect of important subjects is disturbing. For example, this section is quite short, comprising less than 20% of the book, yet ten pages out of the forty are devoted to methods for the preparation of hydrogen and, in spite of the preface telling us that this book is to be a guide for advanced workers, much of this discussion of preparative methods is very elementary and of the sort found in introductory high school chemistry books. On the other hand, there is no discussion in this section of the chemical behavior of hydrogen ion in solution, *i.e.*, acids and bases, and the discussion of the chemical bonding of hydrogen is exceedingly skimpy. Other examples could be cited of elaboration of trivia and neglect of the significant. I also noted the absence of certain definitive or survey references to the literature which would be of considerable help to those seeking further information on particular subjects. For example, in the short discussion of hydrogen in metals, there is no reference to Smith's book on "Hydrogen in Metals."

To sum up: the section on the Alkali Metals more than makes up for the shortcomings of the section on Hydrogen, and the book will be a valuable addition to any chemist's bookshelf. I'm happy to have it.

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Médicaments de Synthèse. By H. P. KAUFMANN, Directeur de l'Institut de Chimie pharmaceutique et de Technologie chimique de l'Université de Munster. Masson et Cie., Editeurs, 120, Boulevard Saint-Germain, Paris VIe, France. 1957. viii + 853 pp. 17 × 25.5 cm. Price, 11.500 Fr.

The organization of this monograph is based essentially on the physiological functions of the human organ systems. Classes and groups of chemical agents are arranged in accordance with their influence on such functions. Thus the principal chapters comprise: substances acting on the central nervous system, as narcotics, hypnotics and spasmolytics; substances acting on the peripheral nervous system, as local anaesthetics; substances acting on the cardiovascular system; diuretics; substances acting on the gastrointestinal tract; antimittic agents; vitamins and hormones; disinfectants and chemotherapeutic (in the classic sense) agents; and antibiotics.

Each chapter is introduced with a rather extensive discussion of anatomical, physiological and pharmacological aspects of a given activity; illustrations with pictures, drawings and schematic sketches will be greatly appreciated by readers with no formal medical education.

The book is obviously and primarily directed to the pharmacist and pharmaceutical chemist. Preparative and synthetic aspects of man-made and natural products form the core of this treatise, as indicated by its title. Practically all the chapters are concluded with well arranged tabulations of structural formulas, series of closely related deriva-

tives, trivial and trade names, clinical indications and dosages of medication. Efforts have been made to approach and elucidate the mechanism of action, and to correlate structural and functional features of the chemical agents with their specific activities. In this connection it must be regarded unfortunate that so little attention has been paid to the modern theories of antimetabolite action. It also is felt that more discretion might have been exercised in deciding between important and unimportant, and modern and antiquated. Many readers would probably have preferred seeing the chapters on antipyretics, antimalarials, sympathomimetic agents, the vitamins (particularly the B complex) with their long preparative procedures shortened in favor of, *e.g.*, the cardioactive glucosides, the tranquilizing drugs and the so-called cancer-chemotherapeutic agents which have been allotted unduly little or no space at all. The somewhat unfortunate policy of omitting the double bonds in the benzene nucleus will be misleading in a number of instances as with Prominal and Evipan (p. 47) or with Ritalin and the diethylaminoethylamido analog of Dolantin (p. 105) where the phenyl group is depicted as a benzene ring and a cyclohexane ring, respectively. Confusing are the formulas of Cignolin (p. 635) of Parpanit (p. 123), Spasmodex and Artane (p. 124). Furthermore, a moderate number of mistakes and misprints have been overlooked: see eupaverine (p. 116), the antique formula of santonin (p. 272), the formulas of lumisterol and pyrocalciferol (p. 392), of androsterone (p. 419), of digitoxigenin (p. 485), of pseudodiosgenin diacetate (p. 486) and the steroidal formulas of the tabulations (pp. 493-496) where the indication of the allo configuration is missing.

"Médicaments de Synthèse" is a translation of H. P. Kaufmann's "Arzneimittel Synthese (Springer Verlag 1953)" by the well known French chemist F. Winternitz who has succeeded in bringing this monograph completely up to date by including the very recent literature as, *e.g.*, pertaining to the morphine alkaloids, the antibiotics and, in particular, the steroidal hormones. This is no small achievement in a field of such vastness and rapid development. The monograph is furnished with an author index, a most detailed and complete subject index and an up-to-date index of American and European patents. It will bring a wealth of information to students and teachers of pharmaceutical and medicinal chemistry, to men engaged in academic and particularly industrial pharmaceutical research and finally to all the practitioners and clinicians who have more than a casual interest in the chemistry and pharmacology of the drugs at their disposal.

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Some Principles of Energetics in Biochemical Reactions.

By IRVING M. KLOTZ, Professor of Chemistry, Northwestern University, Evanston, Illinois. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1957. vii + 64 pp. 14.5 × 22 cm. Price, \$3.00.

This book is intended for biologists without knowledge of even elementary concepts of physical chemistry. It introduces them, in the space of 64 pages, to a variety of topics: the first and second laws of thermodynamics, statistical mechanics, free energy and its dependence on concentration, the conversion of ATP to ADP, electrochemistry, osmotic pressure, sedimentation equilibrium, the melting of ice, the stretching of rubber, protein denaturation, etc. The object is to give the biologist a "reading knowledge" of thermodynamics with which he is supposed to be able to "understand the acknowledged classics in the field."

The title of the book suggests that biochemical reactions may be given a somewhat detailed treatment, but this is not the case. For instance, in the discussion of the conversion of ATP to ADP, there is no mention of how one computes the activity of the solvent, though water appears in the reaction equation. Nor is it pointed out that pH may alter the nature of the participating ions.

Presumably there must be biologists who will derive benefit from this book's cursory glance at thermodynamics. Biochemists, however, will require a much deeper treatment, such as is contained in Professor Klotz's "Chemical Thermodynamics" or a text of equivalent stature.

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