
REVIEWS AND NOTICES OF BOOKS

Physical Acoustics—Principles and Methods.

Edited by Warren P. Mason. (Academic Press, Inc., 111, Fifth Avenue, New York-3.)

Volume 1, Part A—*Methods and Devices*. Pp. xii + 515. Price \$18.00.

Volume 1, Part A—*Methods and Devices*, 1964. Pp. xii + 376. Price \$13.50.

This multi-volume work is intended to provide an integrated treatment of the techniques, applications, and analytical results obtainable by the use of physical acoustic methods. It describes high frequency sound waves in gases, liquids, and solids, and their uses as tools for analyzing the molecular, defect, domain wall, and other types of motions that can occur in these media. Low and high amplitude waves in these media are also described in their device applications, including such uses as delay lines for storing information, mechanical and electromechanical filters for separating communication channels, ultrasonic cleaning, testing inspection, measuring, machining, welding, soldering, polymerization, homogenizing, medical diagnosis, surgery, and therapy.

Volume 1, Part A, covers the propagation of infinitesimal and finite waves in fluids and normal solids, modifications caused by boundaries, transducers required to generate low and high amplitude waves, and methods for measuring the properties of such waves. Their uses in dispersive and non-dispersive delay lines, in mechanical and electromechanical filters, and in the control of the frequencies of oscillators and time standards are also presented.

Volume 1, Part B, deals with low and high amplitude uses of acoustic waves in inspection and processing. Methods for producing and utilizing hypersonic waves by means of piezoelectric semiconductors and cavity resonators are described. High frequency devices produced by semiconductor transducers of the depletion layer, diffusion layer, or epitaxial layer type are presented in their device applications and in the fundamental investigation of very rapid liquid and solid state motions. C. V. R.

Partial Differential Equations of Mathematical Physics, Vol. 1. By Tychonov and Smarski. Translated by S. Radding. (Holden-Day, Inc., San Francisco, California), 1964. Pp. 380. Price \$11.75.

This text provides a thorough treatment of the partial differential equations of mathemati-

cal physics. The canonical forms of these equations are first derived and then followed by a discussion of their principal features. The study of each type of equation is motivated by its physical origins and the various methods for its solution are presented. The relations between some of these methods are also demonstrated. The questions of existence and uniqueness of the solution of an initial value or boundary value problem are carefully stated, together with their physical significance.

Each chapter contains worked-out examples which are drawn from different disciplines, and a wealth of problems to emphasize the methods developed. The text should appeal to the university students of mathematics, physics, engineering and chemistry, as well as to those who desire to be self-taught. It is unique in providing a smooth transition from the undergraduate level to the more advanced treatises of partial differential equations. It should also be welcomed by the experts as a convenient reference text. C. V. R.

The Proteins: Composition, Structure and Function, Second Edition, Vol. 2. Edited by Hans Neurath. (Academic Press, Inc., 111, Fifth Avenue, New York-3), 1964. Pp. 802. Regular Price \$26.00; Subscription Price \$24.00.

The first volume of the second edition of this treatise was reviewed in *Current Science* in September 1964. The second volume is contiguous with the first, since it deals with the fundamental properties of proteins, both in solution and in the solid state. It contains five long chapters of which the authors and the subjects dealt with by them are the following. John A. Schellman and Charlotte Schellman have written on the conformation of polypeptide chains in proteins; Jacinto Steinhardt and Sherman Beychok discuss the interaction of proteins with hydrogen ions and other small ions and molecules. The behaviour of interacting protein systems is dealt with in detail by L. W. Nichol, J. L. Bethune, G. Kegeles and E. L. Hess. Polyamino-acids considered as protein models are surveyed by E. Katchalski, M. Sela, H. I. Silman and A. Berger. The final chapter in the volume by Richard E. Dickerson on the X-ray analysis of protein structure presents a timely and penetrating account of a field of study which it is hoped will lead to the

solution of the basic problem of the fine structure of the protein molecule. Richly illustrated with X-ray diffraction pictures and diagrams of molecular structure, this last chapter will, in particular, be studied with great interest by a wide circle of readers. C. V. R.

Variational Methods for the Study of Non-Linear Operators. By M. M. Vainberg. Translated and supplemented by Amiel Feinstein. (Holden-Day, Inc., San Francisco, California), 1964. Pp. x + 323. Price \$ 12.95.

This book deals with the general theory of non-linear equations in real Banach spaces. The author first defines various forms of continuity and compactness for general non-linear operators, and then applies them to the study of the Gateaux and Frechet derivatives of operators. Following this, it is shown how the existence of solutions of operator equations is related to the existence of extreme points for certain associated functionals. This connection is further developed by considering conditionally critical and extreme points of functionals. These general results are then applied to various specific types of non-linear integral operators. The final chapter is taken from the book *Functional Analysis in Normed Spaces* by L. V. Kantorovich and G. P. Akilov; it deals with the application of Newton's method for obtaining approximate solutions of non-linear equations in Banach spaces. An appendix by the translator contains a resume of some basic facts from the theory of Banach spaces which are freely used by the author, as well as certain more special results which are needed in the chapter on Newton's method. C. V. R.

Information and Information Stability of Random Variables and Processes. By Pinsker. Translated and annotated by Amiel Feinstein. (Holden-Day, Inc., San Francisco, California), 1964. Pp. xii + 243. Price \$ 10.95.

Since its creation by C. E. Shannon, information theory has important applications in several branches of mathematics which could hardly have been anticipated at the time of its birth. We may mention the entropy variant in ergodic theory, which has settled several problems of long standing, the use of entropy concept in discussing various questions centered about Hilbert's thirteenth problem, Linnik's proof of the central limit theorem using the information functional, and a short proof of the equivalence-singularity dichotomy for Gaussian measures.

In this book the author develops the concept of information stability, which underlies several

of the above-mentioned applications of the theory (as well as the classical coding theorems), and then applies it with particular reference to stationary processes and Gaussian processes. The treatment presupposes no familiarity with information theory, and special efforts have been made in this translation to include proofs for all results which are used, for which no suitable reference exists in English. Most of the results presented, of which many are due to the author himself, have appeared only in Russian scientific journals. Incorporated in this translation are numerous corrections by the author. C. V. R.

Tensors in Mechanics and Elasticity. By Leon Brillouin. Translated from the French by Robert O. Brennan, S.J. (Academic Press, Inc., 111, Fifth Avenue, New York-3), 1964. Pp. xviii + 478. Price \$ 12.50.

In this book, Professor Brillouin covers the field in twelve chapters. In the first five chapters, the reader is led from elementary concepts of vectors to tensor algebra and calculus in affine space. In later chapters, after the introduction of metric and a study of differential operators in Riemann space, analytical mechanics is dealt with in tensor notation. The last three chapters concern themselves with the theory of elasticity, elastic waves in solids and the quantum theory of the solid state. C. V. R.

Stability Constants of Metal-Ion Complexes. (Special Publication No. 17, The Chemical Society, Burlington House, London W. 1), 1964. Pp. xviii + 754. Price £ 8 or \$ 23.

When the first edition of this useful book of tables was published by the Chemical Society in 1957-58 it was widely welcomed by chemists working in many different fields, as it brought out in two handy volumes essential data on the stability constants of metal-ion complexes, the sources of which were till then scattered in the literature. The importance of Complex Compounds not only in co-ordination chemistry but in such fields as analysis, catalysis, biochemistry and even biology, especially where trace concentration of metal ions are concerned, is being increasingly recognised and, looking at the rate at which investigations in these fields are mounting it is not surprising that copies of the first edition of this publication on Stability Constants have been depleted.

The present second edition promptly brought out by the Chemical Society is in one volume which in size is more than double that of the combined first edition. Section I on Inorganic

ligands has been compiled by L. G. Sillen, and Section II on Organic ligands by A. E. Martell. More material has been incorporated and the literature is covered completely up to end of 1960, and in some cases includes references up to 1963. A special feature of this second edition is the inclusion of material from Russian literature which was not available to the compilers at the time of the first edition.

A. S. G.

Soils of India. By S. P. Raychaudhuri, R. R. Agarwal, N. R. Datta Biswas, S. P. Gupta and P. K. Thomas. (Indian Council of Agricultural Research, New Delhi), 1963. Pp. x + 496. Price not given.

In 1942 the Indian Council of Agricultural Research sanctioned a scheme for collection, critical examination and collation of available data on the soils of India. These data were published as a bulletin in 1953. In 1952 the Council sanctioned another scheme for amplifying the data and bringing them up-to-date. The present publication *Soils of India* under review is based on the data collected up to the year 1960 under these two schemes.

The soils have been dealt with State-wise and accordingly there are 21 chapters in the book which include besides the 16 major States, Delhi, Pondicherry, Manipur, Tripura and Andaman and Nicobar islands.

The collected information includes geology, climate, vegetation, irrigation, soils—their fertility, characteristics, properties, structure, classification, reclamation, etc. Soil maps and rainfall maps have also been included.

The volume will be useful not only to research workers on soils but also to agricultural departments in the States and to general administrators and planners of land use and soil management programmes.

A. S. G.

Indian Woods, (Vol. 2)—*Linaceae* to *Moringaceae*. (The Manager of Publications, Delhi, for Forest Research Institute and Colleges, New Forest P.O., Dehra Dun), 1963. Pp. x + 366. Price Rs. 32-50 ; 75 sh ; \$ 11.70.

The arduous but very useful undertaking by the Forest Research Institute and Colleges, Dehra Dun, to bring out under the title *Indian Woods* six substantial volumes which will contain comprehensive information on the woods of India, was widely welcomed when the first volume in the series was published in 1958. It dealt with 280 species. The present volume deals on the same lines with a further 263 species of Indian woods their identification, structure properties and uses.

The delay in publishing successive volumes in the series is understandable, because collection of authentic data involves the co-operation of a number of experts, institutes and laboratories not to speak of users of timber in various industries.

The volume deals with 23 families which include *Linaceae*, *Simarubaceae*, *Burseraceae*, *Meliaceae*, *Celastraceae*, *Anacardiaceae* and *Moringaceae*. There are 33 plates, each plate containing 6 end grain photomicrographs of timbers. Four appendices deal respectively with mechanical properties of woods, classifications according to anatomical structure, and uses, and latest changes in nomenclature.

A. S. G.

Advances in Clinical Chemistry, Vol. 6. Edited by H. Sobotka, and C. P. Stewart. (Academic Press, New York), 1963. Price \$ 14.00.

This volume, the sixth in this series, covers subjects of topical interest.

"Micromethods for measuring Acid-base values of blood" describes the determination of acid-base of capillary blood, special attention being paid to the technique of pH determinations with a capillary electrode, and discusses the use of nomograms to facilitate calculation of the relevant acid-base values and registration of clinical results.

There is a wide gap in our knowledge of the role of magnesium in activating cellular enzymes and in intracellular transport. This has been partly due to the absence of a suitable technique to measure accurately and conveniently the magnesium concentrations. This difficulty is now overcome by the use of flame spectrophotometry. Absorption, distribution and excretion of magnesium in the body, the functions of Mg, its osmotic role, influence on enzyme systems, nerve conduction and muscular contraction, clinical effects of magnesium imbalance and methods for the determination of magnesium in biological materials are presented in the review on 'Magnesium'. The technique of flame spectrophotometry to determine magnesium concentration is explained.

The article 'Enzymatic determinations of glucose' is primarily concerned with enzymatic measurements of glucose with glucose oxidase and reviews the properties of this enzyme, clinical test systems for measurements of glucose in urine and blood, and possible applications of this enzyme to other fields of study.

Amongst the inherited metabolic disorders, the study of inborn defects in the metabolism of phenylalanine and tyrosine has provided

wealth of information for the development of biochemical genetics and the concept of molecular diseases. The comprehensive review on phenylalanine and tyrosine metabolism deals with the clinical features, pathology and biochemical aspects of phenyl ketonuria, tyrosinosis and allied disorders, alkaptonuria and albinism. Besides presenting simple laboratory procedures for the diagnosis of these diseases, the author has highlighted the implications of these studies in the wider context of many other types of clinical disorders.

The discovery of a specific foetal hæmoglobin in newborn babies and demonstration of abnormal hæmoglobin in methemoglobinæmia and sickle cell anæmia, has opened up an entirely new field of study. The study of hæmoglobin variants in recent years has been directed towards search for abnormal types and distribution of these variants in the world and of their anthropological significance; refined techniques for the detection and quantitation of normal and abnormal minor hæmoglobin components; elucidations of the complete structures of some hæmoglobin types and of the functional properties of hæmoglobin variants. 'Normal and abnormal human hæmoglobins' is a chapter which presents the developments in all these fields of study and discusses exhaustively the physiological and clinical aspects of the human hæmoglobin types. M. SIRSI.

Easy German Course (for Arts and Science Students). By Dr. Haragopal Biswas, Calcutta University. (The World Press, Private Ltd., Calcutta), 1963. Pp. xv + 373. Price Rs. 12-00 (18 sh. net).

Dr. Biswas, who is an experienced teacher of German language and the author of the books *German Primer for Science Students*, and *Progressive German Reader for Arts and Science Students*, previously published, has now brought out the present volume for the benefit of students of all categories, wishing to acquire a sound knowledge of this foreign language.

The book is divided into three main sections, dealing respectively with grammar, lessons on literary topics, and lessons of scientific interest. In the grammar section the author has made an elaborate treatment of the essentials of German grammar; for, German like Sanskrit cannot be properly mastered without a thorough knowledge of its rather complicated grammar. The lessons for the literary and scientific sections have been judiciously selected, and are both appropriate and instructive. These further include biographical sketches of some eminent

scientists in the latter section. Each lesson is provided with its own vocabulary, besides a general vocabulary added at the end.

The book, in the opinion of the reviewer, will not fail to serve as a very good German Self-taught and can be whole-heartedly recommended for the purpose. P. RAY.

Books Received

From: (Academic Press, Inc., Publishers, 111, Fifth Avenue, New York):

The Direct Observation of Dislocations—Solid State Physics (Supplement 6). By S. Amelinckx, 1964. Pp. x + 487. Price \$ 17.00.

Glass Ceramics. By P. W. McMillan, 1964. Pp. viii + 229. Price 47 sh. 6 d.

Advances in Lipid Research (Vol. 2). Edited by R. Paoletti and D. Kritchevsky, 1964. Pp. xi + 499. Price \$ 16.00.

Quadratic Forms and Matrices—An Introductory Approach. By N. V. Yefimov, 1964. Pp. ix + 164. Price \$ 2.45.

Finite Permutation Groups. By H. Wielandt, 1964. Pp. x + 114. Price \$ 2.45.

Non-Euclidean Geometry. By H. Meschkowski, 1964. Pp. viii + 104. Price \$ 2.45.

Elements of Abstract Harmonic Analysis. By G. Bachman, 1964. Pp. xi + 256. Price \$ 3.45.

Introduction to p-Adic Numbers and Valuation Theory. By G. Bachman, 1964. Pp. ix + 173. Price \$ 3.45.

Hormonal Steroids. I. Biochemistry Pharmacology and Therapeutics. Edited by L. Martini and A. Pecile, 1965. Pp. xx + 587. Price \$ 18.00

Nuclear Science and Technology (Vol. 3)—*Numerical Methods of Reactor Analysis*. By M. Clark Jr. and K. F. Hansen, 1964. Pp. xi + 340. Price \$ 10.50.

Experimental Biology (Vol. I)—*Introduction to Thermodynamics*. By D. C. Spanner, 1964. Pp. xii + 278. Price 47 sh. 6 d.

Advances in Hydroscience (Vol. I). Edited by Ven Te Chow, 1964. Pp. x + 442. Price \$ 15.00.

Local Analytic Geometry. By Shree Mam Shankar Abhyankar, 1964. Pp. xv + 484. Price \$ 18 00.

The Solubility of Non-Electrolytes. By J. H. Hilderbrand and R. L. Scott. (Dover Publications, 180, Varick Street, New York-14), 1964. Pp. xiv + 488. Price \$ 2.50.

Electronic Processes in Ionic Crystals. By N. F. Mott and R. W. Gurney. (Dover Publications, New York-14), 1964. Pp. xii + 275. Price \$ 2.00.

Structure of Molecules and the Chemical Bond. By Y. K. Surkin and M. E. Dyatkina. (Dover Publications, 180, Varick Street, New York), 1964. Pp. ix + 509. Price \$ 2.75.