# REVIEWS

**Table of Sines and Cosines to Ten Decimal Places at Thousandths of a Degree.** By H. E. Salzer and N. Levine. (Pergamon Press, Headington Hill Hall, Oxford), 1962. Price 70 *sh.*

The use of the decimal subdivision of the degree, instead of minutes and seconds, has been found to be more convenient in a number of computational problems in applied mathematics, especially those connected with the various aspects of space research and technology. The present publication of about 900 pages, gives the sines and cosines correct to ten decimal places of angles at thousandths of a degree. Sines and cosines are given side by side on the same page and in each entry all the ten digits are explicitly given.

This *Table* will meet the demand where such accuracy is needed in the application of these two trigonometrical functions.

There is an errata slip which contains only two corrections of significance. This shows that the *Tables* have been prepared very carefully.

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**Dispersion Relations and the Abstract Approach to Field Theory.** Edited by Lewis Klein. (Gordon and Breach, Science Pub. Inc., 150, Fifth Avenue, New York 11; N.Y.), 1961. Pp. x + 273. Price $ 4.95.

This volume, the first of the International Science Review Series published by Gordon and Breach, contains a selection of fifteen original papers on field theory by authors who are chiefly responsible for its formulation and growth. These papers appeared in various scientific journals between the years 1954 and 1960. In the selection of papers an attempt has been made to give the interested reader a coherent picture of the origin of the theory, the initial difficulties encountered in its development, the knowledge it has added to our understanding of the physics of elementary particles and the outlook for the future of the theory.

The papers may be divided into two groups, namely, the first group of seven giving the axiomatic approach of the subject and the second group of eight papers concerned with the application of the abstract formulation to the problem of providing dispersion relations. Among the contributors are H. Lehmann, K. Symanzik, W. Zimmermann, A. S. Wightman, R. Haag, H. J. Bremermann, J. G. Taylor, F. J. Dyson, S. Mandelstam, I. Pomeranchuk and S. Gasiorowicz.

As the Editor Lewis Klein says in the Preface the selection of papers would present a survey of the fundamental physical ideas and mathematical techniques adequate to permit the reader to become conversant with this new and rapidly changing field of physics.

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**Introductory Atomic Physics.** By M. R. Wehr and J. A. Richards. (Addison-Wesley Publishing Co., Inc., Reading, Mass.), 1962. Pp. xi + 420. Price $ 6.50.

This book closely follows the authors' book *Physics of the Atom* published earlier. The chief difference between the two books lies in the mathematical level, the present one requiring on the part of the student only an elementary background knowledge of trigonometry and not calculus. The book will form a good introduction to modern physics to the degree students of Indian Universities. It includes amongst other topics, solid state physics, nuclear energy and nuclear reactors, cosmic radiation and fundamental particles. At the end of each chapter there are elementary problems to stimulate interest in the understanding of the text.

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**Theoretical Electromagnetism.** By R. H. Atkin. (M/s. William Heinemann, 15-16, Queen Street; London W. 1), 1962. Pp. vii + 260. Price 30 *sh.*

The author's two previous books *Mathematics and Wave Mechanics* and *Classical Dynamics* have been well received by University students of mathematics and physics, and there is no doubt that the present volume on *Theoretical Electromagnetism* will also appeal to the more serious-minded students. It can be used as a subsidiary text-book in Electricity and Magnetism for the Pass and Honours Courses in Physics in Indian Universities. It assumes on the part of the student who uses it a good knowledge of the fundamentals of vector field theory, complex functions, tensor theory and its matrix representation.

There are six chapters in the book dealing respectively with electrostatics, magnetostatics, current electricity, electro-magnetism, Maxwell's field equations, and special theory of relativity.

The fundamentals of the theory and the important theorems are explained in a concise, but at the same time clear, way in the beginning of each chapter; then follow a large number of worked problems which have been carefully selected to cover every aspect of the theory for a correct understanding of the subject. Finally, at the end of each chapter there are exercises which comprise questions selected from papers set in the university examinations of Cambridge, Oxford and London.

The above-mentioned features of the book will be of special value to university students as they will satisfy their examination requirements in this subject.

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**Radical Polymerisation.** By J. C. Bevington. (Academic Press, New York and London), 1961. Pp. viii + 185. Price 40 *sh.*

After a general introduction followed by a chapter on methods of production of radicals, the various component steps in addition to polymerisation, *e.g.*, initiation; propagation, chain transfer, termination, inhibition and retardation are discussed in separate five chapters. Results of extensive researches in the field are examined critically and salient features summarised. The admirable scope which a study of vinyl polymerisation kinetics offers to draw general conclusions illustrative of the varying reactivities of radicals and types of radical reactions generally, is also well utilised. The treatment is concise avoiding derivations of detailed kinetic equations and is hence likely to be most useful to the polymer chemist already familiar with radical polymerisation, while others may find difficulty in many places. Choice of data and figures presented is more illustrative than comprehensive. The emphasis of course varies throughout the book and some parts like copolymerisation are rather loosely treated. There is a good account of the application of radioactive isotopes to elucidate the reacting and reactivities of radicals in the polymerising systems, especially those from labelled initiators and as is well known the author's own contributions in this field are notable. It is rather surprising to find that living polymers are incorrectly described as being produced by sodium naphthalene by a '*Cationic mechanism*' (p. 26).

References are grouped at the end of the book and names of authors and years of publications are given as codes in the body of the book. This system certainly increases the difficulty of the reader and must be considered as a drawback. It is however an up-to-date compilation of all the important research papers in this field published up to mid 1960.

Get-up and printing are excellent. The book should be useful to the specialist as a refreshing review of some significant advances in radical polymerisation.

S. L. KAPUR.

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**Techniques for Electron Microscopy.** Edited by Desmond Kay. (Blackwell Scientific Publications, Oxford), 1961. Pp. xvii + 331. Price 63 *sh.*

Rapid strides have been made in recent years in the application of the electron microscope to diverse fields of scientific study, particularly biology and metallurgy. The well-known volume on "The Practice of Electron Microscopy" edited by Drummond in the fifties has gone out of print and the need for an up-to-date successor to it has been felt keenly for some time. The present book is, therefore, bound to be welcomed by all interested in the use of the electron microscope.

The volume contains a comprehensive treatment of all electron-microscopic techniques by seven different contributors. There are also chapters on the operation of the electron microscope, the ancillary apparatus and special attachments. Every chapter is written by one or more experts in the respective field, *viz.*, Agar and Horne on instruments, Bradley on replica, Glauert on biological preparations and Phillips on thin metal foils. A very useful feature of the book is the two-page appendix giving names and addresses of suppliers of special materials and apparatus for electron-microscopic work.

It can safely be predicted that this most attractively got-up volume will become a handbook to electron microscopists all over the world.

T. R. ANANTHARAMAN.

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**Surface Phenomena in Metals and Alloys.** By V. K. Semenchenko, Translated from Russian by N. G. Anderson and edited by R. Kennedy. (Pergamon Press, Ltd., Oxford, London and New York), 1961. Pp. xx +466. Price 105 *sh.* ($ 17.60).

This book is based on the active research and development work of the author and his Russian colleagues in the last decade on surface and interfacial phenomena in liquid and solid metals and alloys. The editor, the translator and the publishers are all to be congratulated for making this book available to readers in English in

quick time through the photo-lithographic production method.

The treatment of theoretical and experimental data by the author is most comprehensive. Most of the standard expressions have been derived and a number of general formulæ also obtained in connection with experimental measurements of surface equilibria. Experimental techniques have been critically analysed and data for pure metals and metallic solutions have been extensively given.

This book is a notable addition to the library on surface physics and can be recommended to specialists as well as students on this subject.

T. R. ANANTHARAMAN.

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**Cerebral Sphingolipidoses.** (*A Symposium on Tay-Sachs' Disease and Allied Disorders.*) Edited by S. M. Axonson and B. M. Volk. (Academic Press, New York), 1962. Pp. xvii + 456. Price $ 18.00.

Sphingolipidoses are hereditary diseases in which there is an accumulation of sphingolipids in one or more tissues of the body. Tay-Sachs' disease (infantile amaurotic idiocy), Niemann-pick disease and Gaucher's disease are well-known examples of this class. More extensive application of modern diagnostic techniques has enabled the identification of a host of neural, neurovisceral and purely visceral lipidoses and of diseases which may closely simulate them. These fatal disorders have not yet been systematically investigated and considerable confusion exists in descriptive clinical manifestations and in the quantisation of the biochemical derangements, specific for each type of disease.

This manual, presenting the papers of the symposium on Tay-Sachs' disease and allied disorders, highlights the salient features of the sphingolipidoses in general and of some specific disorders in particular.

Profound astrocytosis and supratentorial megalencephaly, the accumulation of granules of lipid resembling neuronal lipofuscin, electron microscopic observations on the fine structure of abnormal nervous tissue cytoplasm and the nature of vacuolised blood lymphocytes in Tay-Sachs' disease depict interesting development in the study of this vaguely understood disease.

"Concepts of dysmyelination and leucodystrophies" and the chemical nature of spingolipids focus attention of the existence of close interrelationship in these diseases.

The biochemical attack, too, is well reflected in the chapters on 'improved procedures for the determination of lipid phosphorus in tissues; fractionation of complex lipid mixtures by chromatography; isolation and characterization of new gangliosides in Tay-Sachs' disease; the cationic interaction of strandin and its biological functions and the lipid analysis of cerebrospinal fiuid and serum from patients of proven sphingolipidoses.'

The comprehensive documented reports of Tay-Sachs' disease depict the epidemiological and genetic aspects of these hereditary diseases.

M. SIRSI.

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**Cell Mechanisms in Hormone Production and Release.** (*Memoirs of the Society for Endocrinology*, No. 11.) Edited by P. C. Williams and C. R. Austin. (University Press, Cambridge), 1961. Pp. x + 171. Price 40 *sh.*

This eleventh number of the *Memoirs of the Society for Endocrinology* covers the proceedings of a symposium held in May 1960. The central theme of the symposium was the role of hormones in cellular metabolism. Fifteen invited speakers made contributions on various aspects of the relationship between cell mechanisms and hormone production and action. Two papers by S. F. Jackson and L. Weiss, dealt with the newer knowledge of Cell structure, available especially through Electron microscopy. The effects of hormones were dealt with in several papers, by A. C. Allison, P. N. Campbell and A. Korner. The metabolism of thyroid hormones formed part of two papers, by R. Pitt-Rivers and J. R. Tata. The effects of hormones and especially the modes of their action have formed the subject-matter of several papers, of which those by Howard Smith, Battaglia, Emmens and Reid are important.

The symposium does not cover the whole field of hormones and cellular metabolism. Nevertheless it serves to focus attention on the basic mechanisms of hormonal action on cell structure and cell function.

B. R. S.

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**The Algae.** By V. J. Chapman. (Macmillan and Co., London), 1962. Pp. 472. Text-Figures 229. Price 32 *sh.*

The book succeeds the author's earlier publication *An Introduction to the Study of Algæ* with addition of fresh material. In this book he follows the type method of instruction used by him earlier in dealing with individual orders, and families. He had included chapters which provide a survey of many aspects of algæ which may be of great use for the undergraduate

student in his efforts to get an overall picture of the biology of algæ.

The book is divided into a number of chapters on Classification, History, Euphycophyta, Chrysophycophyta, Pyrrophycophyta, Myxophycophyta; Reproduction and Evolution, Ecology of Rocky Coasts, Ecology of Salt Marshes, Freshwater Ecology and Soil Algæ, Ecological Factors, Physiology including Symbiosis, Geographical Distribution and Life Forms, and lastly on the Utilization of Algæ. Euglenophyta are conspicuous by their absence in the earlier chapters on Morphology and Life-history though these organisms are dealt with in the second half of the book. At the end of each chapter the author has given certain references for specific information and in this, of course, as the author states, the choice may not necessarily please every worker.

The book is well illustrated. In authenticating the figures in many places the author departs from the normal practice and gives the names of authors of Text-books rather than the original authors of those figures.

The author includes Chlorophyceæ, Charophyceæ, Phæophyceæ and Rhodophyceæ under the phylum Euphycophyta as he considers that these are distantly related. He derives the Rhodophyceæ and Phæophyceæ from simple filamentous and branched heterotrichous green algal types respectively. Phylogeny among algæ has generally been based on pigmentation, comparative morphology, and ontogenic features. The only feature of commonness between these groups is the presence of Chorophyll *a*; so do the Chrysophycophyta and the Myxophycophyta, which are separated by the author from the Euphycophyta. Many workers have in the past separated the blue-greens and placed it closer to the bacteria based especially on cell-structure.

Nomenclaturally Florideæ and Protoflorideæ should be Florideophycideæ and Bangiophycideæ. Botryococcaceæ (Wille, 1909) has priority over Heterocapsaceæ (Pascher, 1912). Prof. Chapman, in the sense in which he has defined the family, still includes *Botryococcus* among the Xanthophyceæ. *Botryococcus* has been shown to be a green alga by the presence of starch (Blackburn, 1936) and Chlorophylls *a* and *b* (Belchior and Fogg, 1955) and it would, therefore, be appropriately included in the Chlorophyceæ under the Chlorococcales.

In the chapter on Reproduction and Evolution, Prof. Chapman has expanded at length his ideas on the evolution of the present-day green, brown, and red algæ. He gives elaborate and intricate charts giving expression to some of his ideas on Evolution of the algæ. The existence of parallelism in evolution of the major groups of algæ has been recognized for a long time. Similarity in life-cycles and a study of phylogeny has led Prof. Chapman to the hypothesis that the Chlorophyceæ, Phæophyceæ and Rhodophyceæ may be interrelated and hence he includes them in Euphycophyta. It would be out of place here to go into these interesting theories.

Prof. Chapman has intensively studied for the past many years the Ecology of the Rocky Coasts and of the Salt marshes. Chapters in this book dealing with these aspects are very welcome.

Prof. Chapman has had considerable experience in teaching Algæ at the Auckland University and as such his book would be most welcome for the undergraduate student coming as it does from an experienced teacher. He has endeavoured to provide in this book material that may enable the student to see more of the algæ than is needed by the syllabi and thus the book is bound to create an interest for a further study of these interesting group of organisms.

T. V. DESIKACHARY.

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**College Botany, Vol. I.** By H. C. Gangulee, K. S. Dar and C. Datta. (The Central Book Agency, Calcutta-12). 1961. Pp. 1087. Price Rs. 27·50.

This text-book written on conventional lines is geared to meet the needs of students of the degree courses in Indian Universities. The authors, who are teachers, have experience of the needs and difficulties of the students. The descriptions, based as they are, on Indian plants ought to appeal to the teachers and students alike. The publication of a second revised edition within a period of two years reveals its popularity. The volume is profusely illustrated and its price is moderate.

M. K. S.

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**The Wealth of India.** *Raw Materials*, Vol. VI. Pp. xxxii + xiv + 483. Price Rs. 40·00; (*Supplement*) *Fish and Fisheries*, Vol. IV. Pp. iii + xv + 132. Price (not given).

The Sixth volume, the biggest so far issued, of this monumental publication—*The Dictionary of Indian Raw Materials and Industrial Products*—maintains the same excellent standard as the previous volumes both in the nature of its contents and in its get-up. There are 388 entries—367 on plant species, 11 on animals and animal products, and 10 on minerals. There

are 14 plates (seven of which are coloured) and 185 text-figures.

A close study of some of the articles shows that great care has been taken to make the information both authoritative and accurate. The compilers have indicated that in the preparation of this volume nearly 400 books and about an equal number of original papers have been consulted. Besides, a number of specialists have also helped in clearing doubts wherever such existed in the published records, and making the entries authentic.

The items under minerals include lignite, limestone, manganese and mica. There is also some interesting information on mineral springs. Lac insects and locusts figure prominently besides lions and leopards and monkeys in the entries under animals. The bulk of the book is on plants of economic and medicinal values, and some of the chief items are lichens, linum (linseed), Madhuca (Mohwa), Malus (apple); Mangifera (mango), and Musa (plantain).

This series which forms a veritable source of information should be in the possession of not only all scientific libraries but also in every public library so that interested readers may have easy access to them.

*Fish and Fisheries.*—This is a Supplement to Vol. IV, of *Raw Materials*, which was published in 1957. It is paper-bound and contains 132 pages besides an index of XV pages giving the names of the fishes and fish products dealt with in the text. The first 55 pages deal concisely with fishes giving their names and habitat. Then in another third part of the book are explained the marine and inland fisheries, fishing craft and gear. The remaining pages deal with preservation, processing, marketing and trade.

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## Books Received

From : (Academic Press, Inc. Pub., 111 Fifth Avenue, N.Y. 3):

*Mathematics in Science and Engineering* (Vol. V)—*Optimization Techniques with Applications to Aerospace Systems.* Edited by G. Leitmann, 1962. Pp. xiii + 453. Price $ 16.00.

*The Bacteria—A Treatise on Structure and Function* (Vol. III)—*Biosynthesis.* Edited by I. C. Gunsalus and R. Y. Stanier, 1962. Pp. xv + 718. Price $ 19.50.

*Italian Physical Society Topics of Modern Physics* (Vol. I)—*Geometrodynamics.* By J. A. Wheeler, 1962. Pp. xxiii + 334. Price $ 6.50.

*Trace Elements in Human and Animal Nutrition* (2nd Edn.). By E. J. Underwood, 1962. Pp. vii + 429. Price $ 9.50.

*Advances in Nuclear Science and Technology.* By E. J. Henley and H. Kouts, 1962. Pp. xi + 355. Price $ 12.00.

*Differential Geometry and Symmetric Spaces.* By S. Helgason, 1962. Pp. xiv + 486. Price $ 12.50.

From : (Addison-Wesley Pub. Co., Reading, Massachusetts, U.S.A.):

*Study Guide for Basic Concepts of Physics.* By Beiser-Beiser. 1962, Pp. viii + 120. Price $ 2.25.

*Basic Concepts of Physics.* By A. Beiser, 1962. Pp. x + 341. Price $ 7.75.

*An Introduction to Mathematical Machine Theory.* By S. Ginsburg, 1962. Pp. ix + 148. Price $ 8.75.

*Collection of Problems in Physical Chemistry.* By J. Bares, C. Cerny, V. Fried and J. Pick, 1962. Pp. xvii + 603. Price $ 9.75.

*An Introduction to the Chemistry of Complex Compounds.* By A. A. Grinberg, 1962. Pp. xxi + 363. Price $ 15.00.

*Ordinary Differential Equations.* By L. S. Pontryagin, 1962. Pp. vi + 298. Price $ 7.50.

From : (Cambridge University Press, London, N.W. 1):

*The Nature of Biochemistry.* By E. Baldwin, 1962. Pp. xiii + 110. Price 13 *sh.* 6 *d.*

*Clouds, Rain and Rain Making.* By B. J. Mason, 1962. Pp. 145. Price 22 *sh.* 6 *d.*

*The Theory of Electromagnetic Flow Measurement.* By J. A. Shercliff, 1962. Pp. xi + 146. Price 27 *sh.* 6 *d.*

*Discovery Reports* (Vol. XXXII)—*The Natural History and Geography of the Antarctic Krill* (Euphausia superba *Dana*). By J. W. S. Marr, 1962. Pp. 33–464. Price 200 *sh.*

*Discovery Reports* (Vol. XXXIII)—*Rhizocephala.* By H. Boschma, 1962. Pp. 55–94. Price 22 *sh.* 6 *d.*