

Advanced Mathematics for Technical Students

By A. Geary, H. V. Lowry and Dr. H. A. Hayden.
Part 1. Pp. viii+419. (London, New York and
Toronto: Longmans, Green and Co., Ltd., 1945.)
12s. 6d.

THE mathematical historian of the future will undoubtedly mark the present epoch as one characterized by the rapid development of the practical aspect of mathematics, in contrast to the earlier period of purely abstract research. The Second World War has contributed very materially to this important phase, and the pure mathematician of the future will have to broaden his outlook in order to appreciate fully this essential side of his subject.

The volume under review is a significant pointer to the modern trend. It not only emphasizes, in a skilful manner, the applications of mathematics to the present-day problems confronting technical students, but also, incidentally, sweeps away the artificial barriers traditionally erected to segregate the many departments of the subject. Here, in a single volume of more than four hundred pages, is contained an admirable treatment of the elements of the practical theory in outline of functions, series, calculus, co-ordinate geometry, rectification and quadrature, approximations to the roots of equations, complex numbers and functions, simple differential equations, and the elements of applied mechanics. The course is specially designed for students of science and engineering above the university intermediate stage, and the authors have sought to reduce pure theory to a minimum in order to develop the fundamental principles upon which the intelligent solution of practical problems depends. The commendable stress on this application of principles rather than their academic aspect is excellently carried out. Even the symbol denoting $\sqrt{-1}$ is given as the more technical j instead of the usual i .

Each chapter is well provided with exercises, many of which are taken from University of London papers, and answers are supplied. The book is a sequel to the authors' more elementary volume, "Mathematics for Technical Students", published in three parts a few years ago.

Technical students will find here a course thoroughly useful to them, and the treatment should stimulate considerable interest in the subject.

Atomic Spectra

By Dr. R. C. Johnson. (Methuen's Monographs on Physical Subjects.) Pp. viii+120. (London: Methuen and Co., Ltd., 1946.) 5s. net.

THIS little book endeavours to give a comprehensive, but not too advanced, treatment of the theory of atomic spectra. The subject is presented so as to avoid the need for much mathematical knowledge, and the author, in the words of the preface, has not hesitated to use the picturesque language of the older quantum theory. Modern wave mechanical ideas are conspicuous by their absence.

Most of the monographs in this series are short treatments of limited fields by authoritative writers. This is an attempt to write a small and simple textbook on a large complex subject. Some selection of material is unavoidable; the omission of recent work on line broadening and contours is a pity, though. Dr. Johnson has done well in leaving out much confusing historical background, but clearer definitions of symbols and notation would have

helped. We may guess that h and c mean Planck's constant and the velocity of light, but the tendency to use a notation before its meaning is given may be confusing; for example, the description of the spectrum of Mercury (? why capital M) on page 41 as $2^3P_{1,2} - m^1D_2$, etc., before the notation is explained on page 47. The printing is satisfactory and the figures are clear; the index is scarcely adequate.

The book may be helpful to chemists and many who require a pictorial description of atomic spectra; physicists will probably prefer a more modern and more thorough treatment. A. G. GAYDON.

Manometric Techniques and Related Methods for the Study of Tissue Metabolism

By W. W. Umbreit, R. H. Burris and J. F. Stauffer. Chapters on Specialized Techniques by P. P. Cohen, G. A. LePage and V. R. Potter. Pp. vii+198. (Minneapolis, Minn.: Burgess Publishing Company, 1945.) 3.50 dollars.

THIS book has been designed to give the graduate student a working description of the methods used as a routine in the study of tissue metabolism. Only methods which are likely to need the minimum equipment found normally in a biological laboratory such as a respirometer, colorimeter and centrifuge are described. In addition to details of manometric, Thunberg tube and related electrometric techniques, much information is given on the preparation of physiologically important metabolites and particularly on the preparation and estimation of the phosphorylated carbohydrate intermediates. Methods are given for preparing animal, plant and microbial tissues and the homogenate technique is described. The wider use of manometric methods for the estimation of particular metabolites, which with specific enzyme systems utilize or produce gases, such as the estimation of urea with urease and of succinic acid and xanthine by their oxidases, is advocated. A very extensive bibliography follows each of the sixteen chapters.

Biological Field Stations of the World

By Dr. Homer A. Jack. (Chronica Botanica, Vol. 9, No. 1.) Pp. vi+74. (Waltham, Mass.: Chronica Botanica Co.; London: Wm. Dawson and Sons, Ltd., 1945.) 2.50 dollars.

BIOLOGICAL stations are perhaps the most important intellectual catalysts for biological research. The informality of work under simple conditions, the mixing of experienced workers and young students, the holiday feeling of meal-times and discussions, all combine to make the atmosphere exhilarating and to generate ideas. It would be interesting to know how many important advances in biology began in summer schools at biological stations. This is about the only information not given by Dr. H. A. Jack in his essay.

It seems a curious subject to write about; like collecting snuff-boxes or fans; but it is useful to have assembled in one place information on the history, administration, facilities and even 'educational philosophy' of biological stations. The most useful part of the work is a directory of 271 biological stations in all parts of the world, as they were operating in 1939. About a quarter of the stations listed are in the United States. There are some omissions; for example, it is not realized that every national park in the U.S.S.R. is a biological station, with an expert scientific staff. E. ASHBY.