

Introduction to Bessel Functions

By F. Bowman. Pp. x+135. (London, New York and Toronto: Longmans, Green and Co., Ltd., 1938.) 10s. 6d. net.

THIS book is designed to provide a readable introduction to the subject for non-mathematical specialists. Beginning with functions of zero order, the author sets forth in a clear and straightforward manner the solutions of Bessel's equation of zero order. The student is thus introduced not only to $J_0(x)$, but to Neumann's Bessel function of the second kind of zero order, and this leads to the general solution. The properties of the functions are then considered as far as the use of the Fourier-Bessel expansion, and some valuable illustrations of their application are made to the vibrating membrane and the hanging chain.

The modified function of zero order is next discussed and well applied to the flow of an alternating current in a wire of circular cross-section. Then follows a brief consideration of the simplest definite integrals involving $J_0(x)$, such as those of Parseval, Lipschitz and Weber, which are applied to the problem of the electrostatic potential of an electrified disk. The next chapter is devoted to asymptotic expansion with as much relevant theory as is essential to an intelligent understanding of the need for such expansion. Finally comes a clear, though brief consideration of the Bessel functions of any real order with an exposition of their chief properties. This is followed by some interesting applications, including Kepler's problem, the critical length of a thin uniform elastic rod clamped vertically and the normal modes of vibration of a circular membrane with its circumference fixed.

Each section contains some well-chosen exercises for the student's use and there is a useful index. The book is excellently printed with some clear diagrams, and should certainly prove very useful not only to students of physics and engineering, but also to mathematical students in general. F. G. W. B.

Plant Growth-Substances:

their Chemistry and Applications, with Special Reference to Synthetics. By Hugh Nicol. Pp. xii+108+4 plates. (London: Leonard Hill, Ltd., 1938.) 3s. 6d.

PLANT growth-promoting substances are now becoming of increasing importance not only to the research physiologist but also to the practical horticulturist. It has been the topic of international conferences and of discussions held at the Royal Botanic Gardens, Kew, and elsewhere.

Though full of information of value to the research worker, Dr. Nicol's book will prove of even greater value to the professional horticulturist. The subject-matter is based on a series of articles published in the *Manufacturing Chemist*. The following subjects dealt with in the book will appeal to students: synthesis of growth substances; results of work on the effect of such substances; growth-substances from natural sources; some constituents of urine; chemistry in relation to growth; classification,

nomenclature and identification of growth substances. The practising horticulturist will find these well-written chapters of interest and value also, and he is offered still further help in the first two chapters. The tabular index at the end is very useful.

Dr. Nicol is to be congratulated on a very useful book which his publishers have issued at a reasonable price. It can be strongly recommended to students of, and research workers in, plant physiology, and to the horticulturist who is alive to the opportunities which scientific research is offering him to his advantage.

Cataloguing in Special Libraries:

a Survey of Methods. By John L. Thornton. Pp. xii+268. (London: Grafton and Co., 1938.) 10s. 6d. net.

THIS book, by the assistant librarian of St. Bartholomew's Hospital, will interest all librarians who have charge of special collections. It is an investigation of the cataloguing methods used in various types of special library—national, government, university, learned society, commercial, technical and school—with examples of how their special difficulties are met. Representative libraries of each type are dealt with in detail. In addition there are chapters on alphabetization, treatment of serial publications and co-operative cataloguing.

The survey reveals a great diversity of cataloguing systems and a great shortage of cataloguing staff. Mr. Thornton's comments are shrewd and at times outspoken. He does not, happily, belong to the school which aims at transforming librarianship from a useful art to an arcane science. His style is clear, concise and free from jargon, and he keeps the library user always in the foreground. The book is illustrated with specimen card and other catalogue entries. Except for some minor details, it is well produced and printed. B. S.

Varieties of British Butterflies:

a Selection of Rare and Interesting Specimens of Aberrations, including Gynandromorphic and Homoeotic Forms; Albinism and Melanism. By F. W. Frohawk. Pp. 200 (48 plates). (London and Melbourne: Ward, Lock and Co., Ltd., 1938.) 42s. net.

MR. FROHAWK'S object is apparently to figure rare and interesting varieties and other unusual forms, including gynandromorphs, of British butterflies. In so far as this object is concerned, the task has been well carried out. Mr. Frohawk is a highly skilled entomological artist and the forty-eight colour plates illustrating this book bear ample testimony to his artistic ability. Abnormal forms of butterflies have, in recent years, become highly prized by collectors and consequently fetch considerable prices at auction sales. For the collector, therefore, this work is certainly admirable. We regret that a book so highly priced should contain very little scientific information on the subject treated. The real student who desires to know something regarding modern views as to the underlying causes producing these remarkable 'forms' will have to go elsewhere for information.