BOOK REVIEWS

ROENTGENOGRAPHISCHE CHEME. By Brandenberger and Epprecht
Publisher : Birkhauser Verlag, Switzerland.

"Roentgenographische Chemie" by Brandenberger and Epprecht is a monograph on the application of X-ray diffraction methods in chemistry. At first it gives in short the various experimental methods in X-ray studies of crystalline materials. A short chapter is added to describe the electron diffraction and neutron diffraction studies of crystals. The application of X-ray diffraction studies to identify the type of the crystalline materials are explained subsequently. The authors then elaborate the distinction between the X-ray diffraction patterns of mixed crystals and explain how this can be used to analyse the mixtures of various crystalline materials. Another chapter gives the methods that may be used to follow chemical reactions. The characterisation of the condition of perfection in the crystals by X-ray and electron diffraction method is also described in some details. The last chapter describes in short the general method of determination of atomic arrangements in crystals. The monograph is useful so far as the practical application of X-ray diffraction methods for the identification and analysis of crystalline phases in various types of materials are concerned. The subject matter is presented without the details of the mathematical theories of X-ray diffraction. Every chapter contains at the end, a list of references which is the best asset of the book. In the chapter on identification and analysis of mixtures, it would have been more useful for the beginners to have some practical examples indicating the whole procedures as applied to a few typical unknown mixtures. The book is a lucid and easy reading presentation of the topics mentioned above for which the authors are to be congratulated. The printing and the paper is very good. The photographs and figures are well reproduced.

R. K. Sen

MATHEMATICAL APPARATUS OF THE THEORY OF ANGULAR MOMENTUM. By A. P. Yutsis, I. B. Levinson and V. V. Vanagas, Published by the Israel Program for Scientific translation : Price...

The book under review, an English translation from the original Russian, is an important and fruitful contribution to the current literature on the highly useful and specialized branch of quantum mechanics—the theory of angular momentum. It starts with a brief discussion of the relation between angular momentum operators and spatial rotations. The subsequent chapters mainly deal to begin with the problem of vector addition of two angular momenta, then with the problem of addition of an arbitrary number of angular momenta, and

finally discuss the various properties of vector coupling co-efficients. A major part has been devoted to the highly useful graphical methods for operations with Jm- and 3nJ-coefficients, and properties of irreducible tensor operators and their matric elements. The book, thus, may be considered as a review of the properties of vector coupling co-efficients—the so-called Clebs-Gordon and Wigner co-efficients, an important mathematical apparatus in the quantum mechanical calculations involving the coupling of a number of angular momentum operators. In vector coupling problem, one usually finds various terminologies, used by different workers such as Clebs-Gordon coefficients, Wigner coefficients, Racah's W-coefficients, 3J-coefficients, Jm-coefficients, 3nJ-coefficients etc., between which confusion in definitions is often met with in literature. The authors have, carefully preserved their distinction to their as well as readers' convenience with specific definition for each of them.

The authors appear to have assumed the reader's preliminary acquaintance with the methods of group theory and the properties of quantum mechanical angular momentum operator and one encounters the frequent reference to Condon and Shortby's book "The Theory of Atomic Spectra", Wigner's book "Group theory" and Recah's work (1942, *Phys. Rev*). Moreover, many of the results and mathematical inferences have been simply quoted without giving their proofs, perhaps to avoid cumbrous and tedious algebraic compulation. Stress has been laid on the methods of calculation rather than on the derivation of these methods. Of course, the authors did not fail to give the complete references of the original works where an inquisitive reader may find the necessary proofs to his satisfaction. On the whole, the book will be highly useful to the scientific workers engaged in advanced research in many branches of Theoretical Physics, and interested more in having the ready formulae and methods of calculation rather than in their complicated derivations.

As stated earlier, the present contribution is a translation from the original Russian and the reviewer is unable to assure the faithfullness to the translations. However, the translator in his note admits that "translation, unlike rotation, cannot be always represented in a 'unitary' form". Even assuming unavoidable deviations from the original Russian, the translation lacks no clarity, continuity and lucidity of exposition.

U. S. Ghosh

INTRODUCTION TO PHYSICS—A. Kitaigorodsky; Foreign Languages Publishing House, Moscow; 720 pages. Translated from Russian by O. Smith.

The book is meant for those who after leaving the secondary school have taken up engineering as their subject of study. It covers the entire field of Physics except those which are taught in high schools. The book is divided into three main parts. Part one deals with mechanical and thermal motion and includes

in it the fundamental laws of mechanics, mechanical energy, momentum, rotation of a rigid body, vibrations, travelling and standing waves, accoustics, temperature and heat, thermodynamic processes and entropy, kinetic theory of gases and processes of transition to equilibrium.   Part two deals with electromagnetic fields which includes electric and magnetic fields, electromagnetic fields, energy transformation in electromagnetic fields, electromagnetic radiation, phenomena of interference and scattering, diffraction of X-rays by crystals, double refraction, theory of relativity and the quantum nature of a field.   The third part deals with structure and properties of matter and includes in it motion of charged, particles, wave properties of microparticles, atomic structure, molecules, atomic nulci, nuclear transformations, atomic structure of bodies, phase transformatins, deformation of bodies, dielectrics, magnetic substances and effect of electronic structure on properties of bodies.   The book thus covers practically the whole of Physics and the different basic aspects of it have been developed in a fairly logical sequence. But attempt has nowhere been made to make the treatments of different subjects exhaustive obviously because it is not meant for students of Physics degree course. Experimental physics and the historical development of different physical ideas have also not been considered in this book.   The omission was intentional because firstly the author feels that in understanding of the modern techniques employed for an experiment in any branch of physics, knowledge of practically all the branches of physics is required and in consequence, 'experimental physics can not be subdivided' but should be treated as a separate subject; secondly since the book is not meant for those who want to be physicists inclusion of historical development was thought to be unnecessary.   Inspite of the omissions the basic physical ideas of the different branches have been explained in sufficiently clear and concise language.   The book is undoubtedly a useful text book for students for the engineering degree courses and a helpful book for subsidiary reading by the students of physics honours courses.

A. K. D.