

siderable theoretical progress made in the past few years in analysing the properties of ferro-electric types of crystals and in locating the causes of the ferro-electric anomalies in Rochelle salt, potassium dihydrogen phosphate and barium titanate is clearly presented. Dr. Mason also discusses the electrostrictive effect in Rochelle salt and barium titanate, and presents data on the behaviour of these new ceramics as electro-acoustic transducer elements. Applications of ultrasonics for the measurements of the physical properties of gases, liquids and solids are given in the remaining part of the book, which contains much new information. The application of tensor calculus to the equations of liquids, gases and solids is included in an appendix.

This book is not written as a text-book but as a report of the comprehensive work carried out in the Bell Telephone Laboratories during the past few years. It should appeal not only to the crystal technologist and physicist but also to the crystallographer and chemist. Dr. Mason states that "the book can be regarded as an introduction to the study of piezo-electricity"; he is a very modest man.

R. BECHMANN

FRACTIONAL DISTILLATION IN THE LABORATORY

Laboratory Fractional Distillation

By Thomas P. Carney. Pp. ix+259. (New York: The Macmillan Company; London: Macmillan and Co., Ltd., 1949.) 42s. net.

MANY organic chemists having no great background of physicochemical knowledge, and little facility in even elementary mathematics, have during the past ten years become aware that the technique of fractional distillation, perhaps the most ancient art of the organic laboratory, is in process of a rapid improvement that cannot be ignored. Nevertheless, to do no more than pick from the mass of published papers the few worthy of closer study has not seemed easy.

The declared purpose of the author of this book is to bring to the research worker and to the student an up-to-date and practical knowledge of the art of fractional distillation. It may be agreed that this purpose is in large measure fulfilled for those readers in the United States for whom the book was written in the first instance. British readers will find that this book has a number of shortcomings.

The twenty-two chapters deal with most of the aspects of the subject which one would expect to find treated. Space has been found for a good deal of matter which is not now of great practical importance, and there are many figures of obsolete equipment that could well be dispensed with. The author's reluctance to use more than the irreducible minimum of mathematical development in his treatment of column operation, while understandable, does lead to difficulties of exposition. It is a pity that space could not be found for adequate deductions of the Rayleigh equation and the Fenske equation, from first principles.

There are occasional obscurities of language, for example, on p. 18, and some statements which are quite misleading, as on pp. 28 and 105. The British reader will be surprised to find no mention of the Dixon packing, which is certainly one of the most

effective and is in wide use. A rather odd feature of the bibliographical apparatus is that reference is not made to a number of standard text- and hand-books which give ampler treatment to many rather important distillation topics that Carney treats cavalierly or not at all; while, on the other hand, a large proportion of papers cited in the general bibliography in no way supplement textual material.

There is much in this work that could be read with profit by any chemist who feels deficient in knowledge of the possibilities and limitations of fractional distillation. Some readers will think it could have been a shorter, better and cheaper book.

E. A. COULSON

THE SUGARS

Structural Carbohydrate Chemistry

By Dr. E. G. V. Percival. Pp. viii+246. (London: Frederick Muller, Ltd., 1950.) 25s. net.

THIS volume contains a readable account of modern views on carbohydrate chemistry and is well illustrated. Within recent years considerable advances in technique and in the interpretation of the structure and reactions of mono- and polysaccharides have been made; the more important of these advances are described in this book. The subject has been developed in a logical manner; the first chapter deals with the general properties and configurations of the monosaccharides. For the student to possess a satisfactory knowledge of carbohydrate chemistry it is essential that he should be familiar with the configuration of the different sugars and with the changes which occur when pyranose and furanose rings are formed. The first two chapters deal with these problems in an exceptionally lucid manner. The next two chapters describe the characteristic reaction of the sugars. The important reaction leading to the formation of sugar anhydrides is described in some detail, together with their conversion into amino sugars of known constitution. Then follow chapters on the structure of oligosaccharides and polysaccharides.

Since Dr. E. G. V. Percival, a pupil of the late Sir Norman Haworth, was among the first to determine the structure of a polysaccharide by the classical methylation procedure, it is no surprise to find that his experience has been embodied in these chapters, and that he has given an excellent account of the problems involved. Chapter 8 describes the preparation, reactions and occurrence of the uronic acids. This chapter contains a very useful account of the chromatographic separation of sugars and their derivatives by adsorption and partition procedures. This is the first time a detailed account of this technique has appeared in a text-book of carbohydrate chemistry.

The last three chapters deal with the chemistry of the glycosides and of other important sugar derivatives, and with the chemistry of some of the rarer polysaccharides. In particular, a very useful account of inositol and its derivatives is included. The reviewer considers that a little more emphasis might have been placed on the use of atomic models, especially in connexion with the reading of the first two chapters.

This book should be in the hands of all honours students and on every library shelf. The large number of references it contains makes it invaluable.