

dimensional Fourier summations. Numerical examples are provided to clarify the mathematical techniques, and there is a very good discussion of the available methods for solution of the phase problem. Since, however, it is the growth of the electronic computer which has made crystallography a truly practical tool, it is unfortunate that these machines are dismissed in one paragraph and that the computational methods described are all based on hand calculations or analog devices.

The question of the accuracy of crystal structure determinations is considered next together with methods of refinement and means of estimating probable errors in bond lengths. This chapter serves as an introduction to the second half of the book, which is devoted to a very thorough discussion of organic molecules whose structures have been determined by X-ray methods. It is this part which has no parallel in the literature and which is likely to be the most valuable to workers in the field of structural analysis. Starting with simple hydrocarbons, the author proceeds through compounds of increasing chemical complexity before arriving at the results of diffraction studies on proteins and other polymeric materials. The crystallographic techniques are described when of particular interest and the implications of the results with regard to the molecular structure are discussed in detail. Particular attention is devoted to the questions of bond order in aromatic systems and of hydrogen bonding. Such a collection of results should prove of great value both to the crystallographer searching for structural analogies and to the chemist who wishes to learn more about precise molecular shapes and dimensions.

A few errors are to be found in the tables and drawings, but the body of the text is remarkably free from mistakes. The drawings are good and the discussion is highly readable.

In summary, this is a book which should be read by any chemist who has wondered what X-ray crystallography could offer for his problems, or who has considered its use and then turned away because of imagined mathematical complexities. The increasing involvement of organic chemistry with X-ray crystallography appears inescapable and the more chemists become familiar with its virtues, the sooner its benefits will be enjoyed by all.

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Radioactive Wastes. Their Treatment and Disposal.

General Editor: J. C. COLLINS, B.Sc., M.S.E., A.M.I.-C.E., Lecturer in Civil Engineering, Faculty of Technology, University of Manchester, Consulting Engineer. John Wiley and Sons, Inc., 440 Park Avenue South, New York 16, N. Y. 1961. xxi + 239 pp. 14.5 × 22.5 cm. Price, \$8.00.

This book fulfills its stated objective—to be of value and interest to a wide range of professional people—engineers, biologists, chemists concerned with water supply and with the disposal of domestic and industrial wastes, industrial executives, health officers, factory inspectors, and students of these professions.

The disposal of radioactive wastes is one of the more troublesome problems in the development and use of atomic energy. In an admirable preface, the general editor states, "Just how the nuclear age ultimately will affect our present way of living is a question present in everybody's mind, but uppermost, perhaps, is the doubt and fear that somehow man may be affecting adversely not only his own health but, worse still, the health of his children and grandchildren. . . Environmental pollution in non-radioactive forms is all too familiar. With the growth of industry and the concentration of population that have taken place in the past half century, it is now a National problem. Only in recent years at the cost of much time and money has a start been made to bring this pollution under control. Radioactive pollution must *never* be allowed to reach such proportions and no amount of energy or expense must be spared to keep it within bounds."

The ten chapters of this book cover a wide range of topics. Three chapters are devoted to fundamental background material—the nature of radioactivity, the hazards of radiation, the measurement of radioactivity. Another chapter outlines the sources of radioactive wastes (e.g., uranium production, reactor operation, fuel element processing, the

radium industry, research establishments, hospitals, etc.). There is a short chapter on the law of radioactive wastes in Great Britain. The last five chapters deal specifically with radioactive waste treatment and disposal (including the biological concentration of radioactivity and its application to the treatment of liquid effluents). There is a 10-page glossary of terms.

In general the book is well written, and reflects a recognition that few readers will be expert in more than one or two of the disciplines which are brought together. Two minor weaknesses: in some chapters the bibliographies are skimpy and the index is not as useful as one might expect in a book of generally high quality.

Since the editor and all of the contributors to this book reside in Great Britain there is naturally emphasis on problems encountered in that country, but problems and practices in the United States receive some attention.

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Telomerization and New Synthetic Materials. By R. KH. FREIDLINA AND SH. A. KARAPET'YAN. Translated from the Russian by Margaret F. Mullins. Translation edited by B. P. Mullins, Senior Principal Scientific Officer, Ministry of Aviation, Farnborough, Hampshire. Pergamon Press Ltd., Headington Hill Hall, Oxford, England. 1961. x + 102 pp. 14 × 22 cm. Price, \$4.50.

The title of this short work may be misleading to many since at first glance it implies a broader scope than it actually covers. It describes in a semitechnical fashion Russian work on the telomerization of ethylene and carbon tetrachloride and the conversion of the telomers into polyamide fibers, nylons 7, 9 and 11. The authors point out in their preface that only a limited knowledge of chemistry and physics is necessary, and consequently much space is given to a brief development of the fundamentals of organic chemistry, polymers, polymerization, fiber technology and fiber physics. The book is not a review as is apparent from its style and lack of documenting references, but those who want review-type information on this subject can find it easily and as up-to-date in the literature.

The translation is readable, and the book is reasonably free from typographical errors. However, the translator is not sufficiently familiar with organic chemical nomenclature or polymer chemistry to have used in many cases the accepted names and spellings for compounds and polymers.

There is little reason for the research scientist or researcher's library to purchase this book, for the information it contains can be found elsewhere in better form for their purposes.

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Fortschritte der Physikalischen Chemie. Band 6. Fortschritte in der Kinetik der Homogenen Gasreaktionen. By Prof. DR. Z. G. SZABÓ, Direktor des Institutes für Anorganische und Analytische Chemie der Universität Szeged (Ungarn). Dr. Dietrich Steinkopff Verlag, Darmstadt, Germany. 1961. xii + 239 pp. 15.5 × 23 cm. Price, DM. 40.

This slender volume was prepared with a somewhat limited objective. It is intended to provide for German-speaking readers a supplement to Schunacher's "Chemische Gasreaktionen" which was published some twenty years ago. The author disclaims any desire to provide a complete treatment such as is attempted in a number of recent books in English and in Russian. In a further effort to reduce the volume of material to manageable size, oxidation reactions, photochemical and radiochemical processes and isotope studies are excluded except when they are pertinent to a reaction under discussion.

Within these limits, a huge volume of literature is summarized competently in a small space. The discussion is