author has the control laboratories report to the plant manager, "Verboten" in the pharmaceutical industry! Kehoe in "Automation in Industrial Analytical Chemistry" gives five excellent theses which should be recommended reading for anybody considering or working on laboratory automation. Thesis number four states: "The best automatic analyzer still requires intelligent supervision to detect subtle errors and to recognize gradual decay of accuracy."

I hope that the instructive and well-written chapters on "Design of Laboratories for Analytical Chemistry" by Mellon, "Design of Laboratories for Radiochemical Work" by Fenninger and Hale and "Safety in the Analytical Laboratory" by Stalzer, Martin, and Railing find a wide readership since the information presented reaches beyond the confines of the analytical laboratory.

"Development of Raw Material and Product Specifications" should be required reading for all purchasing agents. Patek makes the memorable point that "it is almost impossible to develop a good purchase specification without the assistance of an analytical chemist." In the final chapter on "Testing of Consumer Products" by Schwartz and Gaffney the reader not only is treated to the cigarette puffing machine but also will learn that there is a gadget called the Handle-O-Meter to measure the fluffiness of towels.

The print of the book is readable and the drawings are clear. However, the paper used does not lend itself too well to photographic reproduction. This particularly detracts from the nice gesture of presenting the authors' portraits.

The book then contains an abundance of information over a wide range of subjects. I can visualize that a future historian might use the volume as a rich source to study the role and organization of analytical chemistry in the chemical process industry in the mid-20th century. To the contemporary pharmaceutical analyst the book offers a broad view of the adjoining pasture.

Reviewed by K. Florey
Squibb Institute for Medical Research
New Brunswick, N. J.

Fractional Solidification. Vol. I. Edited by M. ZIEF and W. R. WILCOX. Marcel Dekker, Inc., 95 Madison Ave., New York, NY 10019 1967. xvi + 714 pp. 16 × 23.5 cm. Price $28.75.

Fractional Solidification is the first of two volumes. Twenty-two authors from England and the United States have contributed to the text. The contributions of Paul Jannke are of special interest to the pharmaceutical scientist. Each chapter is well documented with references—a majority being recent.

The book is divided into six parts. Part I is devoted to basic principles with contributions dealing with phase diagrams, mass transfer in fractional solidification, constitutional supercooling and microsegregation, polyphase solidification, and heat transfer in fractional solidification. Part II deals with laboratory scale apparatus used in fractional solidification with specifics that deal with batch zone and continuous zone melting, progressive freezing and column crystallization, and zone precipitation and allied techniques. Part III deals with industrial scale equipment. Different authors discuss the Proabd Refiner, Newton Chambers' Process, Rotary-Drum Techniques, Phillips Fractional-Solidification Process, and desalination by freezing. Part IV deals with applications of fractional solidification. Ultrapurification and its relation to pharmaceuticals are discussed by Jannke *et al.* Chapters are devoted to ultrapurity in crystal growth and to bulk purification. Part V is devoted to the economics of fractional solidification, and Part VI contains tables listing the purification and operating parameters for zone melting of inorganic and organic compounds. A great many of the organic compounds are important pharmaceuticals.

This book is of value because the basic knowledge and methods used to produce chemicals of ultrapurity are presented. The processes required to produce ultrapurity are examined in detail. The material should be valuable to those in pharmaceutical and other industries in order to develop and maintain strict specifications on raw materials. This book should prove to be valuable to the researcher in producing ultra-pure crystals in either very small or large scale batches.

The book is printed on paper which provides easy reading, and the print is of adequate size. The authors have used many figures to illustrate their concepts and discussions.

I recommend this book as a reference to the scientist in research, teaching, and industry.

Reviewed by John A. Biles
School of Pharmacy
University of Southern California
Los Angeles, Calif.

Take as Directed. Edited by F. E. SHIDEMAN and written by JOHN P. RUSSO. The Chemical Rubber Company Press, 18901 Cranwood Parkway, Cleveland, OH 44128, 1967. xiv + 457 pp. 16 × 23.5 cm. Price $14.75.

The editor has fulfilled the objective given on the book cover, "Our modern medicines explained for the layman." Diseases and physiological conditions have been described clearly in terms the layman will understand. The fundamental information given about the drugs is presented in a sound, reasonable way that is a pleasant contrast to the dramatic presentations that frequently are offered to the lay public. This book is an excellent, simplified discussion of drugs and their use in medical treatment today. Pharmacists and pharmaceutical scientists can confidently suggest this book in response to requests from laymen to recommend a simplified—yet authoritative—text discussing drugs in current use.

Staff review

Aromatic Amine Oxides. By EIJI OCHIAI. Translated by Dorothy U. Mizoguchi. Elsevier Publishing Company, 52 Vanderbilt Ave., New York, NY 10017, 1967. ix + 456 pp. 15 × 23 cm. Price $30.00.

In view of the frequently predictable chemical

effect of the introduction of an *N*-oxide function into a compound, it is disappointing that so few biologically useful *N*-oxides have been found. The two amine oxides having the most widespread use, chlordiazepoxide and 2-mercaptopyridine 1-oxide, are not aromatic *N*-oxides despite the nomenclature of the latter. One of the chapters of Professor Eiji Ochiai's "Aromatic Amine Oxides," reviews in detail the attempts to employ *N*-oxidation in favorably altering biological properties.

Other chapters of this comprehensive and informative treatise cover the history, the preparation, and the reactions of the aromatic heterocyclic *N*-oxides. Electrophilic and nucleophilic substitution of compounds containing *N*-oxides and the effects of an *N*-oxide function upon other substituents are reviewed.

As befits a true expert, Professor Ochiai has called upon another, Dr. C. Kaneko, to provide a chapter on the physicochemical properties of the amine oxides. The book is limited to the aromatic *N*-oxides as its title indicates, but aliphatic *N*-oxides receive some attention for the purposes of differentiation.

It is a tribute to Professor Ochiai's 1953 article in the *Journal of Organic Chemistry* (**18**, 534) that so much of the western synthetic work recorded here was stimulated by that seminal review. Nevertheless, a large part of the original work on *N*-oxides has been published in Japan, and it is helpful that experimental details for many syntheses are provided in this volume.

The personal identification of Professor Ochiai with this segment of organic chemistry—an identification of a type that is rare nowadays—makes this an especially attractive book. Its long-term usefulness makes it well worth owning.

The translation is serviceable but is not always idiomatic and better editorial work by the publisher might have changed such awkward usage as "active to substitution." A grossly incomplete author index is included. The literature has been reviewed through 1963.

Reviewed by Scott J. Childress
Wyeth Laboratories, Inc.
Radnor, Pa.

Fundamentals of Immunology. 4th ed. By WILLIAM C. BOYD. Interscience Publishers, Inc., 605 Third Ave., New York, NY 10016, 1966. xvii + 773 pp. 15.5 × 23 cm. Price $14.95.

"Fundamentals of Immunology" continues to be an excellent text for the beginning student and as indicated in the title, does not require previous knowledge of the subject. Exception must be taken to the phrase on the fly-leaf, "completely rewritten." Although there has been updating in some chapters, it might be more accurate to state that the book has been reprinted. It is difficult to know just how much material on laboratory and clinical techniques should be included in a book of this type, but it is this reviewer's opinion that more techniques should have been added rather than deleted in this issue. This reviewer also feels that development of fluorescent antibody techniques and applications would have been advantageous to the reader.

As in previous editions, all phases of immunology are developed or at least mentioned. The book includes chapters on: Immunity and Immunology, Antibiotics and Antibody Specificity, Antigens, Cell Antigens, Blood Groups, Antibody-Antigen Reactions, Complement and Complement Fixation, Immediate Hypersensitivity, Delayed Hypersensitivity, Non-Immunological Equivalents of Hypersensitivity Reactions, Hypersensitivity and Immunity, Immunological Tolerance and Intolerance, Autoimmunization and Disease, Immunity in Action, Practical Use of Immunity and Hypersensitivity, Laboratory and Clinical Technic, and Quantitation and Statistical Methods in Immunology. Comprehensive references are provided at the end of each chapter for those individuals who wish to delve more deeply into the text material.

Reviewed by Frederick C. Bach
Alcon Laboratories
Fort Worth, Texas

Peptides. Edited by H. C. BEYERMAN, A. VAN DE LINDE, and W. M. VAN DEN BRINK. North-Holland Publishing Co., Amsterdam, Holland. Available in the U. S. from John Wiley & Sons, Inc., 605 Third Ave., New York, NY 10016, 1967. xii + 292 pp. 15.5 × 23 cm. Price $14.50

This book, the latest in the series of publications of the Proceedings of annual European Peptide Symposiums, is a welcome addition to the desk of researchers interested in peptide work. There are eight sections and each section contains the presentations by authors intimately associated with the material presented. Bibliography of most of the articles in this book is most up-to-date and is intended to familiarize the reader with pertinent information concerning various aspects of peptide chemistry.

While the sections of this book devoted to coupling methods, protecting groups, synthesis of peptides with polymeric supports, and mass spectroscopy in peptide chemistry, are of general interest, the medicinal chemists, however, will benefit most from sections on sequential polymers, racemization, and biologically active peptides. Among the peptides with biological activity, a very interesting discussion is focused on the recent developments in the synthesis of biologically active corticotropin fragments. Several peptides with biological activity, such as human gastrin, glucagon, secretin, melittin, and others, have also been discussed from a synthetic and biological activity point of view.

The only improvement in this book would have been the inclusion of subject index.

Reviewed by A. Kapoor
College of Pharmacy
St. John's University
Jamaica, N. Y.

Emulsion Science. Edited by PHILIP SHERMAN. Academic Press, Inc., Ltd., Berkeley Square House, Berkeley Square, London, W.1. U. S. Academic Press, Inc., 111 Fifth Avenue, New