

NEW BOOKS

edited by F. W. Quackenbush

ORGANIC SCINTILLATORS, Edited by Donald L. Horrocks (Gordon and Breach, Science Publishers, Inc., New York, 1968, 422 p., illus. \$40.00).

"Organic Scintillators" could serve as a chapter in the history of the development of liquid scintillation counting techniques. The book consists of papers presented at the International Symposium on Organic Scintillators held at Argonne National Laboratories, Argonne, Illinois, in June 1966 and reflects the state of the art at that time.

The first section of the book contains 20 papers on theory and mechanisms of the scintillation process which are grouped under four subheadings: energy transfer, quenching studies, lifetime studies, and triplet, excitation and other studies. For the most part, this section of the book will be of great interest and value to the researcher who is involved in studies of the scintillation process and should point out research areas that need further study. The treatment of the subjects will probably be far in excess of the need of individuals who use liquid scintillation counting techniques as a quantitative tool. However, the in-depth treatment would provide insight for better understanding of quenching problems associated with liquid scintillation counting.

Four papers in the second section on applications will be of interest to a wider audience than those in the previous section of the book. Of particular interest is the article dealing with complete synthesis of liquid scintillation solvents to enhance the detection of low level activities of ^{14}C , ^3H and ^{36}Cl . Other articles in this section deal with the use of anthracene to indicate low level gamma-ray dose, a new scintillator with faster response and higher efficiency, and plastic scintillators from crosslinked epoxy resins.

The last section on other recent advances presents papers evaluating compounds for their scintillation properties in the p-Oligophenylene series, some of the *trans*-1,2-Diarylethylene compounds, and of the new Oxazoles, Oxadiazoles and Pyrazolines. In addition, performance parameters of new efficient and highly soluble solutes for liquid scintillators are reported along with useful information on self-quenching-structure correlations and quenching properties of alcohols in liquid scintillation solutions.

In summary, Organic Scintillators, should be a welcome addition to the library of persons actively studying the liquid scintillation process and a good reference volume for users of liquid scintillation counters.

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THE CHEMISTRY OF IMIDOYL HALIDES, by Henri Ulrich (Plenum Press, New York, 1968, 238 p., \$12.50).

This book focuses attention on the imidoyl halides—compounds whose utility in organic synthesis has almost been forgotten since they were first studied by von Braun and his students during the early part of this century. Admittedly, their nomenclature is not yet clearly established. By definition, they are a group of reactive organic compounds characterized by the presence of a halo group attached to the carbon atom of a carbon-nitrogen double bond. They resemble acid chlorides in their chemical reactions.

The book contains eight chapters, each divided into five parts, including extensive literature references for senior students and research workers engaged in the synthetic aspects. There are separate chapters on the carbonimidoyl dihalides, the imidoyl halides, the haloformamidines, the haloformimidates and 1-halothroformimidates, the hydroxy-amoyl halides, the hydrazidoyl halides and the cyclic imidoyl halides. In the cyclic series, imidoyl halides are

reported only for five-, six- and seven-numbered ring systems, with emphasis focused on their reactions rather than on synthesis. The six preceding chapters deal primarily with synthesis, physicochemical properties and chemical behavior in reactions with oxygen-hydrogen, sulfur-hydrogen, nitrogen-hydrogen and carbon-hydrogen bonds. These six chapters include tables listing the method of preparation, yields and physical properties of individual compounds in each class. There is also an appendix section reviewing the most recent literature.

The author has included a number of working examples that should enable researchers to utilize the chemistry without consulting the original references. His selections are undoubtedly influenced by his own personal interests in reactive intermediates such as the carbodiimides, ketenimines, nitrile imides and nitrile oxides, and in electrophilic reactions of iminium imides. This should be of value to all researchers engaged in these areas of research.

In conclusion, it appears that imidoyl halides are an unusual, versatile class of compounds, which could be of considerable importance in organic synthesis. The book is well organized and provides a comprehensive review of syntheses and reactions. It can serve as a basis for discussions that may provide impetus for clearly needed, more detailed studies.

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SOLID-LIQUID SEPARATION, J. B. Poole, D. Doyle (Chemical Publishing Co., Inc., New York, 1968, 934 p., \$19.50)

This is a review and bibliography of the theory and practice of filtration, sedimentation, hydrocyclones and centrifugation.

The first 257 pages contain 25 reviews by a variety of authors. The emphasis is on principles rather than hardware. The basic theory is well presented and the authors explain where additional work is needed. The application reviews are by their very nature, general and show trends, rather than specifics.

The remainder of the book is a series of abstracts of over 5,000 selected articles on solid liquid separation. As many of the articles are in a foreign language, the Appendix presents a list of foreign literature sources and suggests where copies or translation might be obtained. All abstracts are cross referenced by author and subject.

This book fulfills a need for a literature study in the important field of liquid solids separation. It will be very helpful to those seeking general guidance on such problems. Unfortunately, most of the specific information in this field has not been published and is retained by the equipment manufacturers. However, a general knowledge of the fundamentals would be of considerable assistance to all those with a liquid solid separation problem.

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ADVANCES IN CHROMATOGRAPHY, Vol. 7, edited by J. Calvin Giddings and Roy A. Keller (Marcel Dekker, Inc., New York, 1968, 292 p., \$15.75).

The vast areas covered by chromatographic techniques and the large number of innovations in application and simplification of chromatography that appear in the literature each year have made most persons need to rely heavily on critical reviews. "Advances in Chromatography" not only encompasses the broader aspects of a review but also

(Continued on page 521A)

• New Books . . .

(Continued from page 506A)

includes the author's emphasis on his own contributions. The text is divided into two sections, one dealing with general chromatography and the other with gas liquid chromatography.

K. H. Altgelt (Richmond, Calif.) discusses the theory and mechanics of gel permeation chromatography. Altgelt deals with general mechanisms and models, relations between elution volume and molecular size, peak resolution, sample size, flow rates and molecular weights. G. Pataki (Basel, Switzerland) covers the subject of thin layer chromatography (TLC) of nucleic acid bases, nucleotides and related compounds. He describes recent advances in the TLC resolution of these biologically important compounds on cellulose, ion exchange and silica gel layers. The detection and quantitative measurement of such separations are also discussed. V. C. Weaver (Kent, England) reviews current and future trends in paper chromatography. The historical, theoretical and experimental aspects of traditional paper chromatography are well organized and include procedures for altering the cellulose support, such as impregnation of fibers and small pores, chemical modification of the cellulose fibers, and the loading of powders into the cellulose (e.g., silica gel). The author points out the advantages of making better use of temperature as a controllable factor and he feels that temperature gradients may offer significant advantages with ion exchange papers. In the last chapter of the first section, G. Nickless discusses the chromatography of inorganic ions and complexes. The author reviews developments in this field since 1962.

The second section of the book on gas liquid chromatography has three chapters that deal with process control, pyrolysis of involatile substances and exchange labeling on chromatographic columns. I. G. McWilliam reviews analytical instruments (including accessory hardware) and on-line systems used in process control by gas chromatography. The article includes a tabular listing of published applications, manufacturers of process chromatographs available. S. G. Perry's chapter on pyrolysis assesses the current status of this field; he focuses on the basic procedures of pyrolysis methods and the application of pyrolysis to the analysis of plastics, elastomers and related polymers and compounds of importance in the biochemical and biomedical field. Dr. Perry feels that in addition to the success of pyrolysis in "fingerprint" identification, its future in the area of structural studies of organometallic compounds will be important. The final chapter by H. Elias covers the subject of labeling by exchange on chromatographic columns, first proposed in 1960, and aims primarily toward practical applications. Isotopic exchange reactions are described for both radioactive and stable isotopes; emphasis is placed on the labeling of organic and inorganic halides, deuterium, tritium and oxygen-18 labeling of organic compounds.

"Advances in Chromatography" is highly recommended to chromatographers and to all research workers who apply chromatography in any field. The series has continued to maintain its high quality by the excellent selection of the contributors and by maintaining high editorial standards.

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APPLICATION OF INFRARED RADIATION IN FOOD PROCESSING, A. S. Ginzburg, Translated by A. Grochowski, C. R. C. Press, Cleveland, 1969, 412 p., \$36.00)

Thorough mathematical treatment of the theoretical principles of infrared heating of food products as well as a presentation of the fundamentals of engineering calculations and much tabular and graphical information makes the first half of this book quite useful. Application of the principles presented would cut down trial and error type of experimentation that has, in the reviewer's opinion, sometimes been associated with infrared application in the food industry. It provides a good insight into the effect of the wave length of the radiation used and product composition and characteristics on depth of infrared penetration.

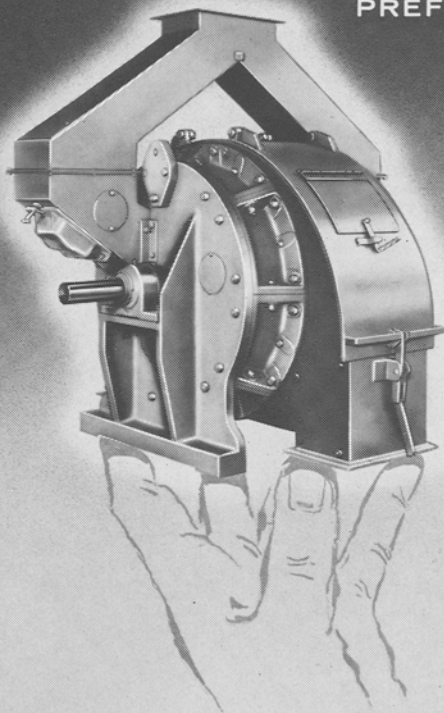
This book is an English translation from the Russian. Information on infrared sources is generally limited to Russian equipment though some West German and French equipment is mentioned. This should not be a major handicap in the use of this book by the English speaking technologist since detailed specifications on specific infrared sources and associated equipment, generally available from equipment manufacturers, would be needed in designing a specific installation.

A detailed theoretical analysis of bread baking with infrared lamps, which includes both convection and radiation aspects, provides a valuable model for analysis of the heating of a typical food product since this combination is generally involved in real installations. Detailed Russian work is presented on drying of grain, sunflower seed, hard seeds, flour, barley malt, sesame kernels, macaroni, marmalade gels, tartaric acid, fish and meat. The roasting of cocoa beans with infrared is described. Information given on possible deterioration of food products due to infrared heating is quite limited. Peroxide values are, however, presented for infrared roasted peanuts and almonds.

(Continued on page 523A)

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(Continued from page 521A)

References are difficult to follow. Identification of work by the authors' name or by reference to a particular Russian organization is generally made. Sometimes it is possible to relate a text citation to one of the nearly 200 general references given in the back of the book, but often it is not. Most of the references given are not readily available to the English speaking reader.

This book makes considerable Russian technological information available that would otherwise be unavailable due to the language and political barriers. The few references to U.S. applications are too sketchy to be of value to the U.S. reader. The reader will need to go to other sources to assess the state of the art outside of Russia.

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PRACTICAL DETERGENT MANUFACTURE, Marshall Sittig (Noyes Development Corporation, Park Ridge, N.J., 211 pages, 1968, price \$35)

The print in this book is large and easy to read. The table of contents serves as an index. After a brief introduction, chapters are divided into descriptions of routes for the manufacture of various detergents and detergent raw materials. The types described include: branched chain olefins, linear alpha olefins, linear paraffins, straight chain alcohols, alkyl aromatics and alkyl phenols. A chapter is devoted to sulfonation and sulfonation processes. Small chapters are devoted to detergent formulation and future trends.

The material is presented in the form of reviews and

it is written in the same manner as the other 26 books on chemical processes by the same author. The reviews are based primarily on patent literature supplemented by other commercial information and data. The book is designed to fill the information gap in journal literature and condense the latest patent information for easy reference. For each process considerable information is presented on feed materials, temperature, pressure, reaction time, reaction medium, catalyst, reaction design and product recovery.

The book is useful to those who are interested in the details of modern detergent processing. The flow diagrams and graphs contained in the 76 figures are well presented and clearly marked. Descriptions of process details are well written and detailed chemical reactions are given to explain various mechanisms. The author attempts to cover the subject of detergent formulation in five pages. This detracts from the overall thoroughness of the book. The two paragraphs on future trends is too short to be of much value. However the book is an excellent review which will be useful to those interested in detergents and detergent raw materials.

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SUGAR ESTERS 1968 (Noyes Development Corporation, 134 pages, 1968, 134 p., \$15.00).

On August 9-11, 1967, a symposium on sugar esters was held in San Francisco, under the cochairmanship of Dr. Willard Marcy, Research Corporation and Dr. John L. Hickson, Sugar Research Foundation, Inc. This volume contains the papers and attendant discussion of that symposium.

(Continued on page 524A)

(Continued from page 523A)

Ignoring, for the moment, the propriety of entitling the proceedings of a 1967 symposium "Sugar Esters 1968," one is forced to ask why was it published at all?

Only two papers in this volume (by Rader and Schwartz) have any scientific merit, and they have been published previously in "Detergent Age" and in JAOCS respectively. The so-called Nebraska-Snell process (which is new) has been the subject of a paper by Osipow and Rosenblatt in JAOCS 44, 307-309 (1967), although the process was reported at the symposium by the Assistant Attorney General, State of Nebraska!

The paper on the Nebraska-Snell process, incidentally, quotes an estimated factory cost for sucrose tallowate, based on a 10 million pound per annum production, although it is made clear in the discussion that the process has not been developed beyond the laboratory scale.

The remaining papers of the symposium vary in content from collections of generalities (not always appropriate to the theme) to fairly specific accounts of applications and properties of the sugar esters, although most of these latter papers are not at all complete, in a scientific sense. An exception is the introduction to the symposium by H. B. Hass, which, although it, too, contains nothing especially new, is at least completely charming.

Reading through this collection with an unjaundiced eye, one finds that after nearly 20 years of intensive development, the sugar esters are, in general, not intrinsically more effective than the many surface-active agents already available (with the possible exception of biodegradability, where, it is generally agreed, they show marked superiority).

In addition, in spite of all the work put into development of a manufacturing process, the actual cost of the sugar esters is many times that of the presently available materials. Nothing in this symposium suggests that the frequently-estimated very low prices are realizable in the near future.

In view of the negligible content, rather unattractive format, and high price, it is difficult to recommend this book.

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EVOLUTIONARY OPERATION, George E. P. Box and Norman R. Draper (John Wiley & Sons, Inc., 231 pages, 1969, \$11.00)

This excellent book should be on the desk of every individual who is concerned with the efficient operation of any industrial plant. Evolutionary Operation (abbreviated EVOP) is a simple but powerful statistical tool which is of wide application in industry. The philosophy of EVOP is that it is inefficient to run an industrial process solely to produce product. A process should also produce information on how to improve the product. EVOP is a simple technique to achieve this, run by process people themselves in the normal routine of production.

The basic evolutionary concept is well proven in other fields. Under the name "patterned search," it has been a powerful tool in computer programming for solving difficult mathematical problems during the last decade. It has also been used by biological evolution for many years. EVOP applies this basic concept to industry. EVOP establishes a set of rules for introducing an evolutionary force into normal plant operation which steadily moves the process toward its optimum conditions. Furthermore, this is accomplished without serious danger of loss through manufacture of unsatisfactory material.

The book is completely self-contained, with two chapters of basic statistical background, so that no previous knowledge of statistics is needed. Other chapters describe the organization of EVOP, its variations and its relation to other optimization procedures. One chapter gives answers to several questions that are frequently asked about EVOP. Two chapters present worksheets and a specific sequence of steps to be followed. There are four appendices, containing further mathematical details and seven statistical tables. A bibliography contains several references to background material, as well as reports of actual industrial experience with EVOP. Numerous drawings, graphs and tables illustrate the book. The book is well written and its principles are clearly presented.

The authors are well qualified to write about this subject. George E. P. Box is well known for his work on response surfaces, which form the foundation on which EVOP is built. Both Dr. Box and Dr. Draper are Professors of Statistics at the University of Wisconsin and are industrial consultants.

The book will be of value to industrial management, including engineers, chemists, foremen and process superintendents. EVOP has immense potential for improving productivity not only in highly industrialized societies but also in the underdeveloped countries.

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ABSTRACTS: BIOCHEMISTRY AND NUTRITION

(Continued from page 522A)

increased 9-desaturation and dietary protein increased 6-desaturation. Insulin treatment of nonfasted rats increased 9-desaturation but not 6-desaturation. High dietary unsaturated fat (20% safflower oil) stimulated 6-desaturation but inhibited the 9-desaturation response to feeding. The results indicate that the two desaturases are distinct and are inducible in response to different substances.

LIPID ABNORMALITIES IN FOAM CELL RETICULOSIS OF MICE, AN ANALOGUE OF HUMAN SPHINGOMYELIN LIPIDOSIS. D. S. Fredrickson, H. R. Sloan and C. T. Hansen (Molecular Disease Branch, NIH, Bethesda, Md. 20014). *J. Lipid Res.* 10, 288-293 (1969). The lipid changes in the inheritable foam cell reticulosis of mice discovered by Lyons, Hulse and Rowe have been reexamined. The major abnormality in thymuses from homozygous-abnormal animals has been identified as an increase in the concentration (per milligram of protein) of sphingomyelin and cholesterol. This increase is associated with normal sphingomyelin-cleaving activity. The lipid compositions of the liver and spleen in the homozygous abnormal animal and of the thymus in the heterozygous abnormal mouse are normal. The disorder appears to be chemically analogous to those forms of human sphingomyelin lipidoses (Niemann-Pick disease) that are not accompanied by a decrease in tissue sphingomyelinase.

SYNTHESIS OF FATTY ACYL CoA AND OTHER THIOL ESTERS USING N-HYDROXYSUCCINIMIDE ESTERS OF FATTY ACIDS. A. Al-Arif and M. Blecher (Dept. of Biochem., Georgetown Univ., Washington, D.C. 20007). *J. Lipid Res.* 10, 344-45 (1969). N-Hydroxysuccinimide esters of long-chain fatty acids have been used to synthesize the CoA and thiolglycolic acid thiol esters of palmitic and 3-ketopalmitic acids in high yield and with a minimum of untoward side reactions.

CHANGE IN SOME INDICES OF LIPID METABOLISM AT ACUTE B₁-AVITAMINOSIS IN RATS. T. Dubina, A. Razumovich and N. Khmara (Gerontology Sector, Acad. of Sciences, Byelorussian SSR, Minsk). *Ukrainian Biochem. J.*, 40, 474-6 (1968). In experiments on young (5-6 months old) and old (24 months) female rats it was found that acute B₁-avitaminosis caused by a thrice repeated administration of oxythiamine to animals during 36 hrs is accompanied by a decrease in the content of total cholesterol (mainly at the cost of free cholesterol and phospholipids) in the liver tissue. The cholesterol level drop was more pronounced after oxythiamine administration in old rats, while the decrease of the phospholipid content was stronger in young animals. The content of ubiquinone in the mitochondria of liver and heart tissue of control animals and those under experiment of both ages was approximately the same.

(Continued on page 526A)