NEW BOOKS

edited by L. H. Going

MARGARINE: AN ECONOMIC, SOCIAL AND SCIENTIFIC HISTORY, 1869–1969, J. van Alphen, J. Boldingh, R. Feron, A. C. Frazer, W. G. Hoffman, K. E. Hunt, J. H. van Stuyvenberg and R. D. Tousley, Edited by J. H. van Stuyvenberg (Liverpool University Press, 341 p., 1969, 84s).

This book follows the reference book format, and consists of chapters written by knowledgeable authors in their respective fields, including History, Raw Materials, Technology & Production, Nutritional & Dietetic Aspects, Research, Marketing, Aspects of Government Intervention.

It is a well written book and covers the overall aspects of margarine, particularly from the point of view of international production and marketing. It is well illustrated, particularly with respect to the oil seeds used throughout the world, and contains usage and other data in tabular form.

It is a good reference for the overall margarine picture, but those fairly knowledgeable in this field will not receive any new or startling information. It will be a good reference for Food Technologists and others in the broad field which encompasses margarine.

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ANCILLARY TECHNIQUES OF GAS CHROMATOGRAPHY, Edited by L. S. Ettre and W. H. McFadden (Wiley-Interscience, John Wiley & Sons, Inc., New York, 373 p., 1969, $17.50).

Gas chromatography is an excellent separation technique but it is limited in terms of identification of the components separated. This book summarizes the status of nine pre- and post-column systems for determining composition, functional groups, structure, etc. The editors have compiled 10 chapters written by individual investigators experienced in the various systems presented. Each chapter has a good bibliography. The emphasis, for the most part, is on the interfacing of the various techniques with the gas chromatograph, rather than a complete presentation of the chemical or physical principles involved.

After an introductory chapter on the general principles of ancillary techniques (Ettre), there are three chapters on pre-column methods. First, microreaction techniques for studying chemical (primarily catalytic) reactions are discussed (Steingaszner). These methods will have limited application in laboratories using gas chromatography for general analysis. Next there is a particularly well done description of the current status of pyrolytic methods (McKinney). The chapter on pre-column reactions for structure determination places heavy emphasis on the authors' work in the natural product area (Beroza and Inscoe).

The three chapters on the coupling of gas chromatography with spectroscopic methods provide brief but comprehensive explanations of the fundamentals of each instrument. The chapter on mass spectroscopy (Watson) is somewhat lengthy, but there has been considerable activity in this area and the innumerable options and problems are well documented. The chapters on infrared and Raman (Freeman) and nuclear magnetic resonance (Hall) point out that these techniques are not readily tied directly to a chromatograph. The authors outline several attractive alternatives which allow these techniques to be applied.

The final three chapters provide some hope for the gas chromatographer who does not have access to the high powered spectroscopic instrumentation. Thin layer chromatography (Kaiser), which has been relatively ignored as an ancillary technique for gas chromatography, provides a powerful qualitative tool. It is especially useful for detecting component degradation during gas chromatography. Chemical identification (Merritt) and specific detectors (Malone and McFadden), two other techniques sometimes lost in the literature emphasis on spectroscopy, are also fully discussed.

This book provides a wealth of information to analytical chemists and gas chromatographers, in general. One would like to see more information on the less common ancillary methods but those presented should certainly be of great use and hopefully will stimulate more ideas and applications.

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ORGANIC PEROXIDES, Vol. 1, Edited by Daniel Swern, (Wiley-Interscience, John Wiley & Sons, Inc., New York, ix + 654 p., 1970, $31.50).

"Organic Peroxides" will be a three-volume series having as a major objective ". . . to describe in depth as many important areas of the chemistry, properties, reactivity and uses of organic peroxides as can be conveniently and efficiently covered. . ." (Editor's Preface). Organic peroxides are defined as those materials which contain both carbon and an —O—O— linkage. Volume 1 of the series consists of 11 chapters: I. Organic Peroxides and Peroxy Compounds—General Description, by O. L. Magelli and C. S. Sheppard (104 p.); II. Thermochemistry of Organic Peroxides, Hydroperoxides, Polyoxides and Their Radicals, by S. W. Benson and R. Shaw (36 p.); III. Rearrangement and Cyclization Reactions of Organic Peroxy Radicals, by A. Fish (58 p.); IV. Peroxide Reaction Mechanisms—Polar, by R. Curci and J. O. Edwards (66 p.); Peroxyesters, L. A. Singer (48 p.); VI. Organic Peroxy Acids—Preparation, Properties and Structure, by D. Swern (162 p.); VII. Methods of Preparation and Analysis of Organic Peroxy Acids, by D. Swern (42 p.); VIII. Base-catalyzed Autoxidation; G. Sosnovsky and E. H. Zaret (44 p.); IX. Metal Ion-catalyzed Reactions of Symmetric Peroxides; by G. Sosnovsky and D. J. Rawlinson (24 p.); X. Metal Ion-catalyzed Reactions of Peroxyesters, by G. Sosnovsky and D. J. Rawlinson (24 p.); XI. Organic Peroxides in Vinyl Polymerization, by K. F. O'Driscoll (24 p.).

The authors are in general critical in addition to providing current summaries of their areas of interest. The chapters are extensively referenced with a few citations to literature appearing as late as 1969.

The two chapters on organic peroxy acids comprise nearly one third of the volume. Chapter VI (421 references) contains an enormous amount of information on the preparation, properties and structure of these materials but extracting it can sometimes be a trying task. The arrangement of headings and subheadings in the first part of the chapter is confusing, with the last section (Structure of Peroxy Acids) consisting of a mass of text and Tables without formal subdivision. Chapter VII consists of actual literature procedures for the preparation of various peroxy

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acids, and describes in detail methods of analysis of these materials.

The book is a valuable and timely contribution to the field of peroxide chemistry, although the diversity of the subjects covered and the high price of the volume will restrict its usefulness in personal libraries.

Workers active in one or more of the areas treated will find the relevant chapters to be essential reading.

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TOPICS IN STEREOCHEMISTRY, Vol. 4, Edited by E. L. Eliel and N. L. Allinger (John Wiley & Sons, Inc., New York, 1969, 243 p., $18.50).

This book consists of in depth reviews of selected topics in stereochemistry. These reviews are written an an advanced level and assume a good background in the field of stereochemistry. The book consists of four chapters: The Stereochemistry of Cyclohexyl and Vinylic Radicals; Geometry and Conformational Properties of Some Five- and Six-membered Heterocyclic Compounds Containing Oxygen and Sulfur; The Stereochemical Analogy Model-A Mathematical Theory of Dynamic Stereochemistry; and Chirality Due to the Presence of Hydrogen Isotopes at Monocyclic Positions. Probably the most pertinent chapter is the last one concerning Chirality as it deals with many biochemical aspects of stereochemistry involving deuterium and tritium. Sections of interest to lipid chemists in this chapter are concerned with the biosynthesis of squalene and the stereospecific enzymatic dehydrogenation of stearic acid. The volume seems to have a complete author index, citing authors whenever they appear in the text. The subject index appears to be comprehensive. This book should find its place in reference collections of libraries. In view of its advanced content and relatively high price, it would appear to be of limited usefulness as a general reference for a personal bookshelf.

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PROCESS IN THIN LAYER CHROMATOGRAPHY AND RELATED METHODS, Edited by A. Niederwieser and G. Pataki (Ann Arbor-Humphrey Science Publishers, Ann Arbor, Michigan, 224 p. 1970, $18.75).

This is the first volume of three which reflect the latest developments and techniques in TLC and related analytical methods. The editors hope that this book will aid the analytical chemist in keeping abreast of the newer developments in TLC. There are several handbooks on TLC which describe general techniques and approaches for the technician, and still others dealing with specific subjects like steroids and amino acids. This book is a continuation of specific subjects by authors who are experts in their fields.

The first volume consists of seven chapters of which the first, by L. S. Bark, deals with theoretical aspects of the R_m-function and its use in structural analysis; the second, by F. Snyder deals with techniques used in thin layer radiochromatography. The other five chapters

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describe specialized subjects, such as the separation of lipids by argentation TLC (by L. J. Morris and B. W. Nichols), TLC of DANS-amines (by N. Sieler and M. Wiechmann), TLC of iodoamino acids (by R. Zappi), the use of TLC in structural elucidation of glycoproteins (by E. Moczar and M. Moczar) and the separation of oligonucleotides (by K. H. Scheit). The volume is well organized and produced with an extensive table of contents and subject index, and a section on TLC nomenclature which defines terms used in context.

L. S. Bark reviews the role of chromatography and portrays its use in structural analysis. Theoretically it is shown that it is possible to utilize chromatographic behavior of a molecule in a particular system and determine its structure. Many other workers have investigated the chromatographic behavior of steroids both on paper and on thin-layers and it is from this work that many of the significant advances have come. However, from a statistical consideration, any single determination should be regarded only as indications of possible structure and must be used in conjunction with other analytical evidence.

The author reviews chromatographic separations of steroids, acids and esters, phenols and amines. He points out that the major problem in the field is a lack of systemization of results although much good work has been done, much of it has been reported without precise conditions used. All of these aspects are of interest to readers of this Journal, but the problems associated with the production of meaningful R_f, values have been described by only a few workers.

The radiochromatography techniques discussed are examined in terms of the principles involved, equipment required, results obtained and their advantages and disadvantages. The author slants his review to users of low-energy beta isotopes. He discusses types of radiometric procedures used with TLC including the beta camera detection. This new device is the most promising development in radiometric techniques in many years.

Argentation TLC of lipids was used primarily in studies of fatty acid methyl esters. The use of impregnated silver-nitrate adsorbents for TLC was baptized "argentation" and first described in 1962 for the separation of fatty acids and intact lipids according to number and type. The authors try to sketch the more important types of lipid separations which are now possible by this procedure and stress applications to new areas of lipid research. The separation of fatty acids, di- and triglycerides and phospho- and glycolipids are discussed.

An enormous interest in amines has been generated recently because of their biological activity in humans. The authors of this chapter describe dansylation conditions for the subsequent chromatographic analysis of amines and phenols.

Dansyl Chloride (1-dimethylamino-naphthalene-5-sulfonyl chloride) is a fluorescent reagent that would react quantitatively with amino groups and their derivatives could easily be separated by TLC, thus combining a sensitive detection method with an excellent separation technique. This section of the book has important Tables listing 112 Dans-derivatives and their R_f values in different solvent systems.

Chapter 5 is a review on the identification and distribution of circulating (biological fluids) iodoamino acids by TLC. This work is presented in five valuable Tables. References, chromatographic materials used, solvent systems, tested compounds and other characteristics are described.

Glycoproteins are conjugated proteins containing as prosthetic groups one or more heterosaccharides with a relatively low number of sugar residues and bound covalently to a polypeptide chain. Moczar and Moczar's contribution has made this part of the book very important because each glycoprotein presents a different problem and the optimum conditions for carbohydrate analysis, i.e., hydrolysis, must be ascertained by preliminary experiments. The presence of amino acids in the chain also creates many difficulties. The authors handled this well with selected experimental data. The methodology concerned the separation of monosaccharides, their derivatives, oligosaccharides and the determination of molar ratio of monosaccharides as well as the characterization of the type of linkage between the polypeptide and sugar chains.

The last contribution was a review of the separation of oligonucleotides by TLC. Although the chromatographic separations of these large molecules have been reported, the literature is very thin. The review is intended to encourage more work for developing better use of TLC in the laboratory.

The book is an aid for the analyst engaged in thin layer whether it be from the practical or academic standpoint. Some of the information found in the book should be a stimulus for more work in some weak areas of research. The cost of the book appears high in comparison with others.

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SURFACTANT SCIENCE SERIES, Vol. 4, Cationic Surfactants, Edited by Eric Jungermann (Marcel Dekker, Inc., New York, 652 p., 1970, $37.50).

This book consists of 15 chapters and is well indexed by author and subject. The contents of the book are organized in four parts, each representing a different discipline. Part I covers the organic chemistry of cationic surfactants, including syntheses, applications and physical properties. Ample reference to the technical and patent literature is made, with special reference to the considerable number of technical bulletins emanating from the various manufacturers of these materials. Part II covers the physical chemistry of pure cationic surfactants, including discussions of important theoretical aspects of colloid chemistry. A critical discussion of the various qualitative and quantitative analytical procedures comprises Part III. Part IV is concerned with the germicidal and toxicological properties of cationic surfactants.

As a result of the growth in commercial applications of cationic surfactants since the early 1930's and the concurrent basic research activities in this field, the need has developed for a comprehensive up-to-date coverage of cationic surfactants. The need has been amply filled by this book.

The authors represent a cross section of investigators in many different areas who have contributed to our knowledge. They include representatives from universities and industry who are specialists in various disciplines of chemistry, bacteriology and toxicology.

The United States Tariff Commission reports show that the production of cationic agents in the United States reached 154 million pounds in 1967. This represents an 85% increase over the reported volume of 83 million pounds three years earlier and is indicative of the tremendous growth of this class of surface-active agents. Relative to the other categories of surface-active agents, namely the anionic and nonionic surfactants, the cationics represent less than 5% of the total surfactant market production.

Applications of cationic surface-active agents discussed include their use as antistatic agents, textile softeners, corrosion inhibitors, foam depressants, flotation chemicals, asphalt and petroleum additives. Their antibacterial properties play a role as sanitizing and antiseptic agents, as components in cosmetic formulations, and as germicides and fungicides. It is truly no surprise therefore that this class of surfactants has been raised from specialty chemicals to bulk industrial products.

Considerable variations in nomenclature of cationic surfactants exist in the literature. Some attempts were made to establish uniformity; however, a certain degree of individuality can be noted in the various chapters. Trademarks have been used where necessary and their structures are identified in the text.

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Of particular interest to this reviewer is the material in the last three chapters. Chapter 13 is a review of qualitative and quantitative analytical techniques. The presence of large numbers of homologs in the hydrophobic chain, as well as the contamination with inorganic impurities often pose difficult problems with commercial material. This chapter offers a comprehensive bibliography of all published methods.

Utilization of cationic surfactants as antibacterial agents represented their first important practical applications. These are covered in considerable detail in Chapter 14. The book concludes (Chapter 15) with a review of the toxicological properties of cationic surfactants. A considerable amount of data on acute, subacute and chronic toxicity, and on various irritation studies is summarized for all major classes of cationic surfactants.

This volume is an extremely valuable addition to the written knowledge of industrial chemists and engineers in practically every field of business. After all surfactants of either the nonionic, anionic or cationic types are necessary to the high standard of living we enjoy today.

Everyone reading this review should have a copy of this most valuable and well written and edited book for his own; or at least readily accessible to him.

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Gas Chromatography, L. Szepesy, English translation edited by E. D. Morgan (The Chemical Rubber Co., 384 p., 1970, $23.50).

In the preface the author states his purpose as follows, "The present book aims at presenting a general outline of the theoretical and practical aspects of gas chromatography, including the possibilities of its application and the trend of developments. By presenting a detailed survey of the relevant literature we wish to assist the reader in his eventual further search and to facilitate the acquisition of the necessary data. Theoretical questions will be dealt with only to the extent necessary for the explanation of chromatographic separation as a physical process and for the understanding of the fundamental correlations which are indispensable for the solution of practical problems."

The author has achieved his purpose admirably in producing a fundamental text. The first chapter contains a general survey of the field of chromatography and a very useful listing of literature sources, such as books, symposia, reviews, bibliographies and serial publications up to 1968. Each of the chapters contains many references with a total of over 1100 in the book.

Two chapters on Fundamental Theory, and Theory of Gas Chromatography, give good coverage of the theoretical aspects and mathematical equations which express relationships of rate theories and column efficiencies. The chapter on Apparatus presents descriptions of the various parts of a gas chromatograph and suggests criteria for good operation. There is a large section covering the construction and theory of various types of detectors. A chapter on Choice of Columns and Stationary Phases gives very thorough coverage to absorbents, supports, liquid phases and column preparation. A mathematical treatment of the effect of column parameters is also included. Use of retention data and auxiliary methods for qualitative identification and the calculation of response factors to obtain quantitative values are described. A short chapter on Analytical Applications gives 224 references to different classes of gas and liquid samples.

The chapter on Special Techniques contains a large section on pyrolysis gas chromatography and a good introductory survey to reaction gas chromatography. The unique problems connected with Preparative Gas Chromatography and Process Gas Chromatography are described in other chapters. The final chapter presents Some Special Applications of Gas Chromatography such as: simulated distillation work, elemental analysis, and measurement of surface area.

This book is a good one for beginners in the field of gas chromatography or specialists in other fields who may wish to make use of gas chromatography. The book covers the fundamentals very well and, in addition, the references give the reader guidance in moving out into many specific and special applications. The English grammar is excellent and easy to read. There are many illustrations which promote understanding of the text.

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ABSTRACTS: BIOCHEMISTRY AND NUTRITION

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Acylation of lysolecithin in the intestinal mucosa of rats. P. V. Subbaiah, P. S. Sastry and J. Ganguly (Dept. of Biochem., Indian Inst. of Sci., Bangalore 12, India). *Biochem. J.* 118, 241–46 (1970). The presence of an active acyl-CoA-lysolecithin (1-acylglycerophosphorylcholine) acyltransferase was demonstrated in rat intestinal mucosa. ATP and CoA were necessary for the incorporation of free (1-^{14}C)-oleic acid into lecithin (phosphatidylcholine). The reaction was about 20 times as fast with (1-^{14}C)-oleoyl-CoA as with free oleic acid, CoA and ATP. With 1-acylglycerophosphorylcholine as the acceptor, both oleic acid and palmitic acid were incorporated into the β-position of lecithin; the incorporation of palmitic acid was 60% of that of oleic acid. Of the various analogues of lysolecithin tested as acyl acceptors from (1-^{14}C)oleoyl CoA, a lysolecithin with a long-chain fatty acid at the 1-position was most efficient. The enzyme was mostly present in the brush-border-free particulate fraction of the intestinal mucosa. Of the various tissues of rats tested for the activity, intestinal mucosa was found to be the most active, with testes, liver, kidneys and spleen following it in decreasing order.

Influence of duration of cholesterol feeding on esterification of fatty acids by cell-free preparation of pigeon aorta. Studies on the mechanism of cholesterol esterification. R. W. St. Clair, H. B. Lofland and T. B. Clarkson (Dept. of Pathol. and Lab. of Animal Med., Bowman Gray School of Med. of Wake Forest Univ., Winston-Salem, N.C. 27103). *Circulation Res.* 27, 213–25 (1970). Influence of duration of cholesterol feeding on esterification of fatty acids and hydrolysis of cholesteryl esters was studied in cell-free preparations of aorta from White Carneau pigeons. Esterification of fatty acids required ATP and CoA; greater than 80% of the esterifying activity was located in the particulate fraction obtained by centrifugation at 105,000 × g (after a preliminary centrifugation at 1000 × g). Fatty acids were incorporated most efficiently into phospholipid, primarily (82%) lecithin. Cholesterol was esterified by transfer of fatty acyl-CoA to cholesterol, a mechanism similar to that described for liver and adrenal cortex. Little if any cholesterol esterification occurred when lecithin labeled at the 2-position with oleic acid-1-^{14}C was used as substrate.

Biosynthesis of the peptidoglycan of bacterial cell walls. XX. Identification of phosphatidylglycerol and cardiolipin as cofactors for isoprenoid alcohol phosphokinase. Y. Higashi and J. L. Strominger (Dept. of Biochem. and Molecular Biol., Biological Labs., Harvard Univ., Cambridge, Mass. 02138). *J. Biol. Chem.* 245, 3691–96 (1970). The butanol-soluble, long chain isoprenoid alcohol, phosphokinase, from *Staphylococcus aureus* has been separated into a protein and phospholipid component by chromatography on a column of diethylaminoethylcellulose. The phospholipid is a mixture of phosphatidylglycerol and cardiolipid, either of which is effective alone in restoring the activity to the enzyme. Several

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