Publications

Book Reviews

Lipid-Protein Interaction, Vols. 1 and 2, edited by P.C. Jost and O.H. Griffith (John Wiley & Sons, 605 Third Ave., New York, NY 10158, 1982, Vol. 1, 339 pp., $75; Vol. 2, 307 pp., $70).

Volume 1 focuses on the lipid-protein interactions in several water soluble complexes and Volume 2 deals with the interactions in membranes. The six chapters of Volume 1 are: 1) Lipid-Protein Interactions in a Bacteriochlorophyll-Containing Protein, by B.W. Matthews, 2) Serum Albumin: Structure and Characterization of Its Ligand Binding Sites, by J.R. Brown and P. Shockley, 3) Pancreatic Phospholipase A_2: A Model for Membrane-Bound Enzymes?, by J.J. Volwerk and G.H. de Haas, 4) Phospholipid Transfer Proteins, by K.W.A. Wirtz, 5) Lipovitellin and the Yolk Lipoprotein Complex, by L.J. Banaszak, J.M. Ross and R.F. Wrenn and 6) Lipid-Protein Interactions in Plasma Lipoproteins, Model: High Density Lipoproteins, by A.M. Scanu, C. Edelstein and B.W. Shen.

Chapter 1 gives the high resolution X-ray diffraction studies on bacteriochlorophyll protein and describes the three-dimensional structure of this chlorophyll-binding protein in which the interaction of phytyl chains with the protein backbone is visualized. By discussing the conformation and packing of phytyl chains and the interaction of the chains with the protein, some generalizations of lipid-protein interactions are derived. In Chapter 2, the unusual repetition of segments in the amino acid sequence of albumin is analyzed, and the three-dimensional structure of albumin is given by the three-domain model consisting of six paired subdomains. The detailed structures of the fatty acid and drug binding sites of serum albumins are proposed. Chapter 3 gives a thorough review of pancreatic phospholipase A_2, an extensively investigated lipolytic enzyme. The mechanisms of action of various lipolytic enzymes and basic characteristics of pancreatic phospholipase A_2, including its three-dimensional structure, are described. Then, the dependence of enzyme activity on organized lipid-water interfaces and the function and properties of the active site of the phospholipase A_2 are covered. Chapter 4 describes the assays, purification, properties, specificity and function of phospholipid transfer proteins. Since the discovery of phospholipid transfer proteins in 1968, considerable progress has been made. This article is a timely review of this rapidly progressing field. In Chapter 5, biological functions and biogenesis of yolk lipoprotein are briefly described, followed by a discussion of the physical and chemical properties of lipovitellin and its low resolution structure. Chapter 6 first gives an overview of plasma lipoproteins and then a detailed coverage of high density lipoproteins (HDL). Currently available information on apo A-I, A-II, and other apoproteins in HDL is summarized, and the interaction of these apoproteins with lipids in model systems, as well as various structural models of HDL, are reviewed.

The seven chapters of Volume 2 are: 1) Structural Organization of Myelin: Role of Lipid-Protein Interactions Determined in Model Systems, by J.M. Boggs, M.A. Moscarello and D. Papahadjopoulos, 2) Spin Labeling and Lipid-Protein Interactions in Membranes, by D. Marsh and A. Watts, 3) Nuclear Magnetic Resonance and Lipid-Protein Interactions, by J. Seelig, A. Seelig and L. Tamm, 4) Photochemical Cross-Linking in Studies of Lipid-Protein Interactions, by R.J. Robson, R. Radhakrishnan, A.H. Ross, Y. Takagaki and H.G. Khorana, 5) Interactions Between Proteins and Amphiphiles, by J.A. Reynolds, 6) Equilibrium Constants and Number of Binding Sites for Lipid-Protein Interactions in Membranes, by O.H. Griffith, J.R. Brotherus and P.C. Jost and 7) Thermotropic Phase Transitions of Pure Lipids in Model Membranes and Their Modification by Membrane Proteins by J.R. Silvius.

Chapter 1 examines the possible structural and functional role of proteins in myelin. Two types of proteins considered are the basic protein which is an extrinsic type and the proteolipid protein which is the hydrophobic intrinsic type. The chemical and physical properties of these proteins and their interactions with various lipids in model systems are reviewed, and the organizing effect of proteins on myelin lipids is analyzed. Chapter 2 describes the spin label studies of integral proteins at the lipid-protein interface. Although the structure of the lipid binding domain of the membrane integral proteins is not known in sufficient detail, the electron spin resonance experiments provide basic information on the dynamics of lipids at the interface, which are well reviewed in this chapter. The appendix contains the methods of synthesis of fatty acid and phospholipid spin labeles. Chapter 3 reviews primarily the use of deuterium and phosphorus nuclear magnetic resonance in the study of lipid-protein interactions. After a brief description of the methodology, the results obtained with various reconstituted membranes are discussed. Chapter 4 gives the application and potential of photolabelling techniques in identifying the lipid binding sites of proteins. The requirements, characteristics and physical properties of photosensitive cross-linking reagents are described, and the results obtained with model systems containing membrane proteins, and with phospholipid exchange proteins, are discussed. In Chapter 5, the properties of amphiphilic compounds and the equilibrium equations for amphiphile-protein interactions are briefly surveyed. Then, the interactions between amphiphiles with apolipoproteins A-I, A-II, and B, and with intrinsic membrane proteins are discussed. Some basic considerations of the thermodynamic treatments for these interactions are given. In Chapter 6, multiple equilibria-binding equations for lipid-protein interactions in membranes are formulated by treating the interactions as an exchange reaction between lipids at protein surface and lipids in bilayer. The application of the equations to membrane proteins in lipid bilayers is illustrated using computer-generated binding curves and experimental data. Chapter 7 gives an extensive compilation of the available data describing the thermotropic behavior of pure phospholipid and sphingolipid systems, as well as the phase behavior of various binary lipid mixtures and of the reconstituted mixtures of proteins and pure phospholipids. These data will greatly aid the researchers in designing the experiment for the study of the thermotropic behavior of lipids in biological membranes.

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These two volumes represent a most impressive collection of information concerning the lipid-protein interaction. The chapters are well written and provide detailed review of the recent research. The readers will appreciate the importance of well defined model systems in obtaining fundamental information vital to the understanding of complex lipoprotein and membrane systems. Although these two volumes will be of great value to graduate students and researchers working in related fields, the high prices will probably discourage individual purchasers. All libraries in biological sciences, however, are recommended to acquire a copy.

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Ether Lipids: Biochemical and Biomedical Aspects, edited by H.K. Mangold and F. Paltauf (Academic Press Inc., 111 Fifth Ave., New York, NY 10003, 1983, 439 pp., $58).
In the eleven years since Snyder's book "Ether Lipids" (Academic Press, 1972) there has been much new work in this area. Isolation, analysis and chemical synthesis are covered in five chapters, special or novel classes of ether lipids are discussed in five chapters, and biosynthesis and catabolism require four chapters. The remaining seven chapters consider autoxidation, ether lipids in the diet, clinical diagnosis and medical research, therapeutic effects, synthetic alkyl analogs of LPC, platelet activating factor and liposomes. The editors have also authored nine of the chapters and the majority of the chapters (14 of 21) are from Germany or Austria. Some of this work may seem a bit esoteric, such as the chapter on dialkyldiglycerol ethers in certain bacteria and the chapter on divinyl ether fatty acids in potatoes. On the basis of Wood's work (Tumor Lipids, AOCS, 1973), a lengthy discussion of ethers in tumor lipids was expected but not found. The platelet activating factor receives good coverage by Beneviste and Vargaftig through 1981. This is a very interesting and fast moving area of research. The greatest strengths of this book are in the chemistry, synthesis and analysis areas, followed by biosynthesis and catabolism. Triether lipids as a nondigestable and, therefore, noncaloric dietary fat are one of the interesting miscellaneous topics considered. This is a solid substantial book of general interest to lipid chemists.

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Advances in Chromatography, Vol. 21, edited by J.C. Giddings, E. Grushka, J. Cazes and P.R. Brown (Marcel Dekker Inc., 270 Madison Ave., New York, NY 10016, 1983, 360 pp., $49.75 US and Canada, 20% higher elsewhere).
This volume contains eight chapters: HPLC/MS by E.D. Games; HPL Affinity Chromatography, by P.O. Larsson, et. al.; Dynamic Anion-Exchange Chromatography, by R.H.A. Sonel and H. Hulshoff; Capillary Columns in Liquid Chromatography, by D. Ishii and T. Takeuchi; Droplet-Counter Current Chromatography, by K. Hostettmann; Chromatographic Determination of Copolymer Composition, by S. Mori; HPLC of K Vitamins and Their Antagonists, by M. Shearer; and Problems of Quantitation in Trace Analysis by GC, by J. Novak. Most Americans would probably recognize dynamic anion-exchange chromatography more readily by the title reversed-phase ion-pair chromatography. It is surprising to see how HPLC and its variants have come to dominate the recent volumes in this series. In the present volume, GC is used for headspace-gas analysis and is briefly described for polymer analysis after pyrolysis or chemical decomposition.

With the obvious amount of interest in capillary gas chromatography it is natural to consider the future prospects for capillary HPLC. It is estimated that operation of a HPLC unit is roughly four times more expensive than operation of a GC unit. The difference is related to the relative costs of pure solvents versus compressed gases. Reducing column ID from 4.6mm to 2mm and 1mm reduces solvent costs by 80% and 95%, respectively. Consideration of dead volume effects and required, small, submicroliter detector volume leads one to the conclusion that column technology is currently well ahead of instrument technology. While syringe pumps are on the comeback, it will be interesting to see how gradients will be generated at flow rates of less than one microliter per minute. Droplet counter-current chromatography equipment has been available for about five years. The technique has its main potential in preparative work probably of natural products. While there has apparently been some progress, the technique remains largely an obscure curiosity.

As noted previously, this series from time-to-time includes a chapter, such as that on Vitamin K, of particular interest to oil chemists. Coverage in such areas is too sporadic and infrequent to justify routine acquisition for this purpose. This series can be recommended to any lipid chemist who also performs analyses of almost any type. The level of coverage and currency is usually very high.

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Recent Developments in Mass Spectrometry in Biochemistry, Medicine and Environmental Research, 7, edited by A. Frigerio (Elsevier Publishing Co., PO Box 211, Amsterdam, The Netherlands, or 52 Vanderbilt Ave., New York, NY 10017, 1981, 360 pp., U.S. $72.25, Dfl. 170.)
This book represents the published papers resulting from a symposium with the above title held in Milan in June, 1980. A total of 32 chapters dealing with all aspects of mass spectrometry are in the volume. Of many interesting chapters, several dealing with the use of stable isotopes as well as use of mass spectrometry in determining the structure of drug metabolites are very instructive. Overall, the volume is well done, but although it has an author index (of papers), and a listing of papers in the table of contents, there is no subject index. This, at least in this reviewer's opinion, reduces the value of the book since only the chapter titles are suggestive of the contents. It is difficult to find detailed information concerning topics unless one searches each page within a chapter. Within this limitation, however, the book contains much information concerning state-of-the-art

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research in many subject areas within bio-and analytical chemistry which will be of interest to those in the bioanalytical or nutritional research diciplines.

Food Oils and Their Uses, 2nd Edition, by T.J. Weiss (Avi Publishing Co., 250 Post Rd. E, Westport, CT 06880, 1983, 310 pp., U.S. $38.50 elsewhere).
This second edition of the book **Food Oils** is an updated version of the first edition. The book is not one dealing with the chemistry of food fats and oils, it is rather one that deals with the practical aspects of food fats and oils and the products made from them. After a brief chapter dealing with the chemical and physical properties of fats and oils, topics dealing with commerical oil sources, basic processing of fats and oils and chemical adjuncts are covered. Specialized fats such as bakery, frying, household and margarine fats and discussed in separate chapters. Confectionary coatings, mayonnaise, salad dressings, peanut butter, and immitation dairy coatings are also reviewed. Each chapter contains references to the scientific literature and patent literature. The index appears adequate. This book is recommended for those who wish to learn about practical uses of food oils and their products without going into great depth.

Chemicals in the Environment: Distribution, Transport, Fate, Analysis, by W.B. Neely (Marcel Dekker Inc., 270 Madison Ave., New York, NY 10016, 1980, 245 pp., $39.75).
In a highly industrialized society such as ours, the presence of chemicals in the environment has been a topic of both great interest and public awareness. The problems caused by inadequate precautions in the disposal of potentially harmful chemicals have been well publicized. It is therefore important that the industries producing chemicals which may appear in the environment are aware of their possible impact on human health. Such awareness has resulted in the growth of a multidisciplinary science-environmental science. This book brings together topics from many diciplines which can be of use in accessing the position of chemicals in the enviroment. Topics covered are: mathematical basis of compartmental models; movement of chemicals across the air, water, and soil interface; ecological magnification, chemical and physical properties of the compartments; application of compartmental models to describe the movement and distribution of chemicals in environmental systems; mathematical modeling as an aid in decision making and informed planning. The book also contains several different appendices: solutions to differential equations, physical constants characterizing stream flows, environmental modeling parameters and constants and a glossary of terms used. The information presented in this book will be of assistance to those persons involved in planning chemical waste disposal, and others who need information concerning the way in which chemicals are distributed in the environment.

Oleochemicals: Raw Materials, Synthesis, and Processing, Products and Applications, edited by R. Marcuse (Scan-

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dinavian Forum for Lipid Research and Technology, c/o SIK, Box 5401, S-402 29, Göteborg, Sweden, 1982, 179 pp., U.S. $21, 150 Swedish krona).
This volume represents the printed contributions of a LIPIDFORUM symposium with the above title sponsored by the Scandanavian Forum for Lipid Research and Technology. Contributions in the raw materials area concerned vegetable materials, marine oils, animal fats, tall oils and saponins, processing, hydrozirconation and alkylation of fatty acid derivatives. The applications of metasthesis to unsaturated fatty acids and lipids are covered in the synthesis and processing section. The product and application section deals mainly with surfactants, tall oil, steel rolling emulsions and lubricants. A short section discussing measuring methods for oleochemicals as wetting agents and the monitoring of surface layers by fluorescence is also included. While focusing primarily on areas of interest to the Scandinavian countries, the topics covered are of interest to the industry worldwide, and should be of value to persons interested in all aspects of oleochemicals.

Chemistry of Natural Products, edited by Wang Yu, Science Press, Beijing, China (Gordon and Breach Science Publishers, One Park Ave., New York, NY 10016, 1982, 336 pp., $77).
This volume represents published presentations from the Sino-American symposium on chemistry of natural products. Papers deal primarily with natural product structure elucidation, synthesis and biosyntheic pathways. Presentations were made by scientists from both the U.S.A. and China. Although the symposium was held in 1980 and the material may be somewhat dated, much of it is of interest and still pertinent. It is especially interesting to read of the research being done by colleagues in China since in many cases the published work is not readily accessible. As indicated, the book is primarily devoted to the organic chemistry of natural products and should be of interest to those chemists working in this area, as well as to the general organic chemist as an indication of the wide applicability of organic chemistry in some of its most sophisticated forms.

Edible Oils and Fats: Developments since 1978, edited by S. Torrey (Noyes Data Corp., Mill Road at Grand Avenue, Park Ridge, NJ 07656, 1983, 402 pp., $44).
This book covers the developments in the patent literature from June 1978 to April 1982 and is intended to serve as a guide to the patent literature. It contains a very detailed combined table of contents and subject index. Contents are as follows: Extraction and fractionation processes, Purification processes, Modifying properties of fats and oils, Margarines and spreads, Cooking and salad oils, Confectioner's fat, Dairy products and dairy product substitutes, Salad dressings and pan release agents, Meat: its analogs and animal feeds, Emulsifiers for fat-containing food products and Additional fat-containing food products. In addition, there is a company index as it appears in the patent, an inventor index and an index of the U.S. patent numbers. This is a potentially very useful book at a reasonable price. It will be useful to those persons in research and development involved in devising, developing and modifying products and processes. Such a publication is also useful in that it allows a simple access to the recent patent literature in a rather large area such as the food fats and oils.

Food additives: Recent Developments, edited by J.C. Johnson (Noyes Data Corp., Mill Road at Grand Avenue, Park Ridge, NJ 07656, 1983, 412 pp., $45).
This volume is comprised of a description of information appearing in U.S. Patents from January 1979 to July 1982. These deal with food additives used for preserving or processing foods. The book uses a combined format subject index and table of contents which is quite detailed. Chapter headings which are further detailed by subjects treated are as follows: Stabilizers, Microbial stabilizers, Vegetable gums, Emulsifiers, Modified starch and cellulose, Protein additives, Protein substitutes, Acid and salts and other food additives. In addition, a separate company, inventor and U.S. Patent number index is included. This book is useful since it provides information not readily available in the scientific literature, and provides a simple access and overview of research and development in the food additives field. The information contained in the volume will be of interest to those persons involved in the development of new and improved food products.

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New Publications

Guide to the Chemical Industry: Technology, R&D, Marketing and Employment, by William S. Emerson, Wiley-Interscience, John Wiley & Sons Inc., 605 Third Ave., New York, NY 10158, 1983, $35, 330 pp.

Fibre in Human and Animal Nutrition, The Royal Society of New Zealand, Bulletin 20, edited by G. Wallace and L. Bell, The Royal Society of New Zealand, Private Bag, Wellington, New Zealand, 1983, New Zealand $35 plus $2.40 shipping (approximately U.S. $25), 249 pp. Proceedings of Dietary Fibre in Human and Animal Nutrition Symposium, Massey University, Palmerston North, New Zealand, May 1982.

Gas Chromatography Troubleshooting Guide, 32 pages, free from Supelco Inc., Supelco Park, Bellefonte, PA 16823.

Proceedings of the Third International Congress on the Biological Value of Olive Oil, published by the Subtropical Plants and Olive Trees Institute of Chania, Crete, Greece, and the International Olive Oil Council, Juan Bravo 10, 2°-3°, Madrid 6, Spain, 688 pp. Also recently published by the IOOC are: **Summary of the 3rd International Congress, The Biological and Medical Aspects of Olive Oil,** and **The International Olive Oil Agreement.** For information on how to obtain copies, write to the IOOC office in Madrid.

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