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Book reviews

The Interpretation of Analytical Chemical Data by the Use of Cluster Analysis, by D. LucMassart and Leonard Kaufman (Wiley-Interscience, John Wiley & Sons Inc., 605 Third Ave., New York, NY 10158, 1983, 237 pp., $45).

Although the title covers only analytical chemical data, the authors have presented a much wider range of applications of clustering methods. Such applications range from liquid chromatography to cosmochemistry and archaeometry. The clustering techniques themselves are novel and could be defined as "the classification into groups of objects . . . (or data) . . ., characterized by their qualitative and/or quantitative properties."

A presentation of the mathematical concepts involved in clustering techniques occupies a major part of the book, from Chapter 1 to Chapter 5, and the applications are mostly contained in Chapter 6. Unlike previous books on cluster analysis, this book contains only one chapter (Chapter 7) on computer programs and packages, which is quite brief. Perhaps the most useful chapter in the book for an analytical or a food chemist is Chapter 8, which contains a worked example showing in some detail how clustering works for a particular set of data, and which methods and programs have to be used to optimize the data analysis process and extract the relevant interpretation from a large collection of data on related objects.

The book therefore is aimed at the reader who has a strong interest in the processing of analytical data and who may require instruction in the use of covariance and correlation matrices, dimension reduction methods, eigenvalues and eigenvectors, agglomerative procedures, divisive methods, partitions, graph-theoretical techniques, density methods and variance minimization.

As an introductory textbook to clustering techniques, it will be useful to the analytical and food chemists investigating multicomponent systems and is addressed to a wider audience than suggested by the title. Experimenters in the fields of earth and life sciences, biomedical applications of computers and archaeometry may also find some of the examples given in the book to be relevant and interesting.

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Heparin (and Related Polysaccharides), Polymer Monographs, Vol. 7, by Wayne D. Comper (Gordon and Breach Science Publishers, One Park Ave., New York, NY 10016, 1981, 266 pp., $55.95).

Polymer Monographs have traditionally treated industrial synthetic polymers and have excluded macromolecules of purely academic interest. This monograph breaks that tradition by including biopolymers. The author endeavors to bring emphasis on "the structural and functional aspects of heparin and related polysaccharides" while trying also "to place the many diverse aspects of heparin in proper context, clear up apparent contradictions, reduce confusion and improve the chance of giving new insights into heparin." He has quite successfully brought together the results of about a decade of effort in this small book. However, he points out, the book may be outdated quickly because of the explosive output of work which has taken place in the last five years.

Among its other distinctive properties, heparin is the highest negatively charged molecule in tissues. A great deal of high quality effort has attempted to reveal the structure because of its important anticoagulant activity (it is absolutely necessary during open heart surgery). Molecular weights have often been reported to be in the range of 6,000-30,000, but problems exist in the determinations because of the strong polyelectrolyte nature. According to the author, evidence now suggests that heparin is synthesized in the mast cells as a complex of very high molecular weight, most probably consisting of a protein core with pendant heparin chains covalently attached. It would appear that the molecular weights may depend on the method of extraction and the specific source. Other features of the unique structure of this highly sulfated anionic polysaccharide are detailed.

In the general introduction, the nomenclature of glycosaminoglycans and proteoglycans is outlined, along with a brief history of heparin and heparin sulfate. From there, the author discusses the structure and biosynthesis, ion interactions in model systems, tissue distribution and extracellular interactions. In interesting concluding remarks, the author summarizes his views of the structure-function

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principle for these molecules.

Molecular structures and weights for monosaccharide units, specific refractive index increments and published values of partial specific volumes at 25 C of commercial heparin preparations are given in appendixes along with a list of abbreviations and signs. Subjects are indexed adequately.

The book should interest medical practitioners and biochemists as well as some polymer chemists.

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Handbook of Carcinogens and Hazardous Substances: Chemical and Trace Analysis, edited by M.C. Bowman (Marcel Dekker, 270 Madison Avenue, New York, NY 10016, 1982, 750 pp., $99.50, 20% higher outside U.S. and Canada).

This volume is primarily a compendium of analytical chemical methodology and, to a lesser extent, the toxicology of carcinogens and other hazardous materials. Beginning with an overview of chemical carcinogens, chapters treat in detail alkylating agents, aromatic amines and azo compounds, estrogens, mycotoxins, N-nitrosamines and N-nitroso compounds, pesticides and related substances, polynuclear aromatic hydrocarbons, toxic metals and metalloids, as well as halogenated contaminants: dibenzo-*p*-dioxins and dibenzofurans. Each chapter has been written by an expert in the area. Each chapter treats chemical and physical properties, methodology, sample extraction, clean-up, sensitivity, quantitative analysis and identification, confirmatory techniques, artifacts and recovery. Several of the chapters are written in great detail in treatment of experimental methodology. This is refreshing, since the reader can determine a considerable amount of detail concerning experimental procedures used for the assay of these materials. Each chapter terminates with a comprehensive bibliography. Citations contain the titles of papers, so that the reader can determine the content of the paper which is of interest. The index appears complete, with details found listed under the name of individual compounds. Overall there is a good treatment of the applications of gas chromatography to this field. However, this reviewer was disappointed to note a general lack of discussion and reference to the use of mass spectrometry (GC-MS) in these areas, although this technique is the method of choice in the identification and verification of organic carcinogens and other hazardous substances. Although experienced analysts will be aware of the proper techniques for handling and disposal of chemical carcinogens and other hazardous materials, discussions of these techniques have been omitted. Lack of treatment of these topics has decreased the potential value of this handbook but it certainly will be useful in the laboratories of individuals involved in carrying out or designing assays for these materials. It should serve as a good entry into the field and lead one further by means of the individual citations furnished with each chapter. For those individuals not directly involved in the analyses of carcinogens and hazardous materials but who enjoy reading in the area of analytical chemistry, this book effectively

illustrates the application of sophisticated analytical techniques to the solution of difficult problems.

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Advances in Lipid Research, Vol. 19, edited by R. Paoletti and D. Kritchevsky (Academic Press, 111 Fifth Ave., New York, NY 10003, 1982, 256 pp., $36.50).

This year's volume of the series contains an interesting chapter by Boranska on biosynthesis and transport of phosphatidylserine in the cell. He considers the division of the CDP-diacylglyceride pathway and the exchange pathway between prokaryotes and eukaryotes to be not as clear-cut as once thought. Photosynthetic plants apparently provide an interesting area for further research. Mention is also made of the only partially characterized ATP-dependent pathway. This is followed by a chapter on the analyses of prostanoids by GC-MS by Fischer and Frolich. Emphasis is on metabolic products of the prostanoids rather than prostanoid synthesis. As is becoming ever more prevalent in GC-MS, there is also a major emphasis on the use of stable isotope labeled compounds with this technique. It is interesting to note that the scant mention of the GC part of GC-MS refers essentially to fused silica capillary GC. The remaining five chapters—"Interaction of Lipids and Lipoproteins with the Intracellular Matrix of Arterial Tissue: Its Possible Role in Atherogenesis" by Camejo; "Apoprotein C Metabolism in Man" by Nestel and Fidge; "Lecithin: Cholesterol Acyltransferase and Cholesterol Transport" by Marcel; "Development of Bile Acid Biogenesis and Its Significance in Cholesterol Homeostatis" by Subbiah and Hassan; and "Morphological Aspects of Dietary Fibers in the Intestine" by Cassidy, Lightfoot and Vahouny—are the usual atherosclerosis-oriented material which has dominated this series for years.

Perhaps the publishers should read Stallone's chapter on ischemic heart disease and lipids in blood and diet (*Ann. Rev. Nutrition*, Vol. 3, 1983) and have a long talk with the editors. When a topic is viewed as highly controversial after 30 years' work, billions in research funding and massive studies throughout the world, are the "advances" really advances? Stallone makes a very telling point by quoting the separately published descriptions of five well known experts evaluating the same research data and reaching five different conclusions.

I believe there are many lipid chemists and biochemists who would be happy if the name of the series were changed to something like "Advances in Lipid-Oriented Atherosclerosis Research." As it is, we are tantalized and led on by the one or occasionally two chapters per year which are often quite excellent and deal with some topic other than atherosclerosis. These comments should not be taken to imply in any way any criticism of the chapters in this volume or of the authors of these chapters. All such criticism is directed towards Paoletti and Kritchevsky who seem to have lost the vision that once made this an outstanding series. Looking at my bookshelf, I realized that through some oversight volume 18 in this series had been neither purchased nor missed. Enough said.

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Chromatography and Mass Spectrometry in Biochemical Sciences, 2, edited by A. Frigerio (Elsevier Publishing Co., PO Box 211, Amsterdam, The Netherlands, or 52 Vanderbilt Ave., New York, NY 10017, 1983, 506 pp., $106.50).

This volume represents the proceedings of an international conference on chromatography and mass spectrometry in biomedical sciences held in Bordighera, Italy, in June 1982. Forty-seven chapters representing presentations at the meeting comprise the monograph. The book contains a wealth of information regarding techniques for determining materials and metabolites in body fluids and tissues using various types of chromatography and mass spectroscopy. For this reason, the book is recommended to those working in the areas of isolation and identification of organic compounds of biomedical interest and their metabolites. However, the information is difficult to access since there is no subject index—only an author index listing chapter authors. With this limitation it is difficult to recommend the book at its high price for individual use, unless an investigator has a use for a topic which is specifically listed as a chapter.

E.G. Perkins

Handbook of International Food Regulatory Toxicology 1: Evaluations, edited by G. Vettorazzi (Spectrum Publications Inc., 175-20 Wexford Ter., Jamaica, NY 11432, 1980, 161 pp., $30).

This book is a result of work carried out by the WHO/FAO committees on food additives. The book is divided into two chapters: general principles in the toxicological evaluation of food additives, and general principles in the toxicological evaluation of pesticide residues in food. Each of these is divided into sections dealing with physical and chemical identification, toxicological testing, interpretation of data and evaluation of results. To readers of this journal, the information concerning pesticide residues would be most relevant.

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Chromatography: Fundamentals and Applications of Chromatographic and Electrophoretic Methods, Part A: Fundamentals and Techniques, edited by E. Heftman (Elsevier Scientific Publishing Co., PO Box 1663, Grand Central Station, New York, NY 10163, or PO Box 330, 1000 AH Amsterdam, The Netherlands, 1983, 338 pp., $83 U.S. and Canada, Dfl. 195 elsewhere).

The last treatise concerning chromatography appeared several years ago and the appearance of an updated version by Dr. Heftman is welcomed. The current volume covers only fundamentals and techniques; the second part is intended to cover applications. Part A is a comprehensive treatment of the theoretical and instrumental aspects of chromatography and electrophoresis written by outstanding scientists in their respective fields. The contents are: survey

of chromatography and electrophoresis, history of chromatography and electrophoresis, theory of chromatography, column chromatography, planar chromatography, gas chromatography, ion exchange chromatography, gel chromatography and electrophoresis. The material is presented at a graduate level, and requires dedication to master the theoretical discussions presented in many areas. It would be useful to encounter more lucid explanations of theory involving chromatographic phenomena. The illustrations, drawings, equations, etc., are well done and the index appears complete. This volume is to be recommended as a shelf reference for practicing professionals and chromatographers, and it should be available in reference libraries. Although it is useful to have on a personal reference shelf, the price of $83 for a 388-page book puts it out of reach for many of us.

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New publications

The Book of Tofu: Protein Source of the Future . . . Now! Vol. 1, by William Shurtleff and Akiko Aoyagi, Ten Speeds Press, PO Box 7123, Berkeley, CA 94707, 1983, 335 pp., $11.95 paperbound, $16.95 clothbound, plus handling costs.

Jojoba and Its Uses Through 1982: Proceedings of the Fifth International Conference, edited by Anna Elias-Cesnik, University of Arizona, College of Agriculture, Office of Arid Lands Studies and Division of Continuing Education, Conference Department, Tucson, AZ 85719, 1983, 295 pp., softcover, $20.

The Biological and Medical Aspects of Olive Oil, by G. Christakis, M.K. Fordyce and C.S. Kurtz, International Olive Oil Council. A review of the literature for the International Olive Oil Council by the faculty of the Nutrition Division, Department of Epidemiology and Public Health, University of Miami School of Medicine, Miami, FL. Softcover, 61 pp. For copies, write to the International Olive Oil Council, Juan Bravo, 10-2°, Madrid-6, Spain.

Physical Properties of Foods, edited by Micha Peleg and Edward B. Bagley, IFT Basic Symposium Series, Avi Publishing Co., 250 Post Rd. E, PO Box 831, Westport, CT 06881, 1983, 532 pp., hardbound, U.S. $45, $49.50 elsewhere.

Ambident Anions, by O.A. Rentov, I.P. Beletskaya and A.L. Kurts, Consultants Bureau, Division of Plenum Publishing Corp., 233 Spring St., New York, NY 10013, 1983, 338 pp., $59.50 U.S. and Canada, 20% higher elsewhere.