

New Books

L.A. Witting, Book Review Editor



Atherosclerosis Reviews, Vol. 1, Edited by Rodolfo Paoletti and A.M. Gotto Jr. (Raven Press, New York, NY, 1976, 278 p., \$20).

This book is the first volume of a new series on the topic of atherosclerosis. It contains a forward and seven sections. Section 1 by Jackson deals with a hypothesis, relating membrane structure, cholesterol and atherosclerosis, in which cholesterol action with phospholipids in plasma membranes affects membrane fluidity. According to this concept cell membrane changes related to a reduction in membrane fluidity induce the atherosclerotic process by reducing ATP-ase activity and decreasing cellular cyclic AMP levels bringing about proliferation. This interesting hypothesis needs to be tested in a number of systems since other factors besides ATP-ase and membrane fluidity contribute to reductions in cyclic AMP.

In Section 2, S. Eisenberg discusses lipoprotein metabolism and hyperlipidemia. This is a recapitulation of an earlier review by the author with R. Levy in *Advances in Lipid Research Vol. 13*. This presentation, however, is more concise and indeed is more suitable for a general readership. Section 3 by J. St. Clair concerns arterial wall metabolism related to atherosclerosis. Although the major emphasis is on lipid metabolism, the production of energy and the metabolism of connective tissue components were also examined briefly. Section 4 by Smith and Smith involves age-related morphological, lipid plasma constituent and connective tissue changes in the artery related to age; the authors then discuss early lesion development in the context of these changes. Section 5 deals effectively with the regression of atherosclerosis with modifications in arterial lipids, connective tissue elements, and morphology. The regression experiments in animals are compared to such regression in human lesions. Section 6 is probably of more personal than professional interest by lipid chemists; that is, the specific inductions and sequelae of bypass surgery on saphenous vein bypass surgery used for patients with blocked coronary arteries. The status of atherosclerosis research in the Soviet Union is briefly discussed in the last section of the book. Novel areas are relationships of neurohormonal factors and atherosclerosis and immunological aspects. On balance, the book is clearly written and current. Most sections would be of considerable interest to lipid chemists and biochemists.

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Atherosclerosis Reviews, Vol. 2, Edited by Rodolfo Paoletti and A. M. Gotto Jr. (Raven Press, New York, NY, 1977, 269 p., \$20).

This is the second volume in a continuing series on the topic of atherosclerosis. It contains a forward, which is an extension of that found in Vol. 1, and 14 relatively short sections. Section 1 by H.P. Dustan is a critical review of hypertension. Particularly stressed is the importance of lowering blood pressure in reducing severity and incidence of stroke. The equivocal results in reducing myocardial infarction by reducing blood pressure are also discussed. Also presented were the specific effects of arterial pressure on increased smooth muscle cell collagen and elastin metabo-

lism and accelerated endothelial injury with concomitant increased endothelial permeability. Dustan also illustrates that man, because of his upright posture, has the greatest atherosclerosis in the abdominal aorta and ileofemoral arteries, the sites for highest arterial pressures. Dustan discounts increased serum renin concentrations per se as a basis for increased atherosclerosis.

In the next section Henry McGill discusses the problems of the pathogenesis of atherosclerosis. He indicates that one of the main problems is the lack of accessibility to early human lesions for repeated observation and/or biopsy. Therefore, all an investigator can do in humans or animals is to carry on reconstructions from data derived from many individuals or experimental animals presumably at different stages of the process. Due to this limitation, McGill explains that progress in piecing out the sequence of events has been slow and there have been proliferations of hypothesis from the lipogenic concept to the monoclonal and polyclonal proliferations of smooth muscle cells. This presentation is well balanced.

In the sudden death subsection, McGill gives an accurate reflection of the state of the art. Basil Rifkind, in the next section, produces a definitive, accurate, and well-balanced discussion of clinical trials of coronary artery disease prevention which involve reduction in serum lipid concentrations. Rifkind pointed out the perils of such prospective studies. He also provides an indication of current and proposed studies on disease prevention. Bierman and Ross discuss aging and atherosclerosis in the next section and raise important questions about the apparent relationship between these two phenomena. They also discuss, in detail, aging as it relates to arterial fatty streaks, fibrous plaques, and complicated lesions. Atherosclerosis is also reviewed in relationship to aging on the basis of the injury hypothesis, clonal senescence, and lysosomal lipofuscin. Other age-associated risk factors such as obesity, hypertension, diabetes, and hyperglycemia, hyperlipidemia, and cigaret smoking are also examined. This is an excellent section. Sirtori from Paoletti's group discusses the therapeutic aid from hypolipidemic and anti-atherosclerotic drugs. The hypolipidemic drugs have been classified as to their general site of action. The nonabsorbable drugs exert their action in the intestinal lumen, whereas absorbable agents affect lipid and lipoprotein metabolism. The report of clofibrate effects on coronary heart disease (CHD) is somewhat more comprehensive in terms of the trials described, but the author's personal views result in more bias in presentation than that found in the earlier section by Rifkind.

The authors stated that nicotinic acid, in the Coronary Drug Project, had no effect on CHD morbidity or mortality. The study in fact did show decreased morbidity with nicotinic acid treatment. Other anti-atherosclerotic drugs were described as specifically reducing lipoprotein deposition in the arterial free and as affecting lipoprotein-apoprotein and lipid ratio composition.

This drug approach is still in its infancy in the treatment of atherosclerosis by modifying arterial wall interactions with lipoproteins or by treating the sequelae of excess interaction.

The clinical management of stroke and other cerebrovascular diseases and their diagnosis is discussed in the next two sections. These sections may be of more personal rather than professional interest to lipid chemists. The beginning of the first section, clinical management of cere-

bral vascular disease by Fieschi et al., abounds in clinical jargon. For the uninitiated a medical dictionary may be a prerequisite. The next short section on computerized axial tomography by G. Seolli-Lavizzeri and R. Wüthrich is clear and concise.

Of greater interest to the nutritionally oriented chemist is an all-too-short section by David Kritchevsky on the influence of dietary fiber and serum cholesterol concentrations and the atherosclerotic process.

The next section devoted to the early diagnosis of atherosclerosis by Greenleaf from Kottke's group is another in which all of us may have a personal stake but no professional involvement.

The editors of this series of monographs seem to be setting a pattern of having at the end of each volume a section devoted to atherosclerosis research in a specific country. In volume 1, Russian research was reviewed, and, in keeping with this concept, the last four sections of Volume 2 are devoted to atherosclerosis research in Japan with Goto, Nakamura, Kimura, Ooneda, Yoshida, and Chimamoto participating. Of interest in these sections are the epidemiological studies carried out in conjunction with Ancel Keys and discussions of the use of drugs to modify local factors involved in the atherosclerotic process, e.g., the use of pyridine carbamate for femoral artery atheroma therapy.

On balance, this is a book that would hold the interest of the lipid chemist, biochemist, but it provides somewhat less specific lipid metabolism information than that found in Vol. 1.

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Advances in Infrared and Raman Spectroscopy, Vol. 3, Edited by R.J.H. Clark and R.E. Hester (Hayden and Son, Ltd., London, 1977, 285 p. \$35).

The book constitutes a well-organized, high level presentation of several important topics in infrared and Raman spectroscopy. Together with the first two volumes, the work presents a very broad and detailed overview of new developments in vibrational spectroscopy. The third volume consists of six chapters written by six well-known experts in their respective subspecialties. Despite the multiple authorship, the work is quite uniform in style, level of coverage, and thoroughness of the bibliography (up to several hundred references per chapter). The bibliography covers the pertinent literature well into the year of 1976. The chapters are: 1. Recent Techniques in Raman Spectroscopy; 2. Advances in Far-Infrared Interferometric Spectroscopy; 3. Force Constant Calculations - The State of the Art; 4. Raman Polarization Techniques in the Study of Macromolecules; 5. Vibrational Spectra of Non-Aqueous Solutions; 6. Raman Measurements on Flames.

This is a book for the spectroscopist who is already familiar with the general principles and techniques of infrared and Raman spectroscopy and has some background in the covered subspecialties. The different chapters describe recent advances without spending much time elucidating the underlying basic principles, instrument designs, or theoretical background. In some chapters equations are presented without derivation and without an explanation of the symbols.

Chapter One is concerned with new developments in Raman techniques, concentrating on sample preparation, sample handling, and differential methods. Many, if not most, of the innovations are not commercially available; considerable skill in instrument building is required to apply the proposed techniques. The second chapter, concerning far infrared interferometric spectroscopy, is essentially descriptive and provides a good overview. Chapter Three, con-

cerned with force constant calculations, is thorough and detailed but definitely requires familiarity with the generally accepted mathematical methods in this field. The fourth chapter deals with Raman polarization in the study of macromolecules. It constitutes a thorough discussion and presentation of the topic. The examples, however, are confined to relatively simple polymers; it appears to be extremely difficult to apply these techniques to complex polymers with low symmetry. The last chapters, concerned primarily with work in ionic nonaqueous solvents and the Raman spectra of flames, respectively, constitute required reading for anybody involved in these research areas.

To conclude: this is a well-written, thorough book for practicing spectroscopists and serious students involved in new developments in infrared and Raman spectroscopy. As such, it is highly recommended.

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Contemporary Liquid Chromatography, by R.P.W. Scott (John Wiley & Sons, New York, NY, 1976, viii + 326 p., \$22.75).

This book is one of three recently published in this field, the others being by Parris and by Simpson. It is volume XI in the series "Techniques of Chemistry" edited by Weissberger and Perry, which is successor to "Techniques of Organic Chemistry." That series contained four volumes on chromatography: "Adsorption" (V, 1951), "Fundamentals" (X, 1957), "TLC" (XII), and "GC" (XIII). The author points out that most scientists are faced with a far greater proportion of highly polar and nonvolatile materials to separate, than volatile ones amenable to GC. He predicts that eventually over three-quarters of laboratory separations will be by some form of LC.

One-half of the book is divided about equally between chapters on theory and on apparatus. About a sixth is devoted to column operation. Four other chapters each about half that length form the remainder of the book. The opening chapter discusses nomenclature, classifies different kinds of separations, and establishes the principles. A chapter on "Chromatographic Procedures" gives practical details on selecting operating parameters, instrument operation, column packing, and ends with a brief section on qualitative and quantitative analyses. A chapter is devoted to LC-MS, plus a small portion on LC-UV, spectroscopic techniques being used for identification in a manner similar to GC-MS. The final chapter describes preparative LC.

I have heard that the compromise always present in chromatography between resolution, speed, and sample size is referred to as "Scott's triangle." The book, however, describes a tetrahedron, where the fourth choice is "scope," the ability to separate a mixture of wide polarity. Two areas of special interest are Dr. Scott's own research on incremental gradient elution, and two aspects of LC-MS by his group at Hoffmann-LaRoche and McLafferty's group.

Points of criticism include dismissing the entire subject (p. 179) of post column derivatization with a single sentence under "fluorometer detector." UV detectors are written solely for 254 nm single wavelength detectors and without mention of spectrophotometric units. However, the scanning mode for qualitative information is mentioned and also adapting laboratory spectrophotometers for HPLC, not easily accomplished with a cell suitable for HPLC. The surprising statement appears about a UV detector used in the DuPont LC that "has a wavelength range of 380-650 μ . . . and 254 μ . . .," while the diagram appears to be the 254 μ fixed wavelength unit. A 70 μ l detector cell is inferred state of the art for an RI detector (p. 147), where

it is stated for this unit, "if . . . gradient elution is employed, the baseline tends to drift," and "the noise level (in Figure 3.22) is clearly seen," while the baseline shown is completely smooth. The last paragraph of section 7-7, on parallels with TLC and efficiency in RP, are important but belong elsewhere as they are unrelated to the remainder of section IV-7.

The strength of this book is that it provides good background for intelligent use of HPLC. The writing is clear and, though there are a substantial number of what are probably typographical errors, few cause difficulty except for "principle" ones. Illustrations, printing, and the presentation of 92 equations are excellent, apart from one section where the equations are not numbered. The listing of 59 symbols used in the theory chapter is useful and necessary. Scientists responsible for HPLC will want to read Dr. Scott's views on Contemporary LC.

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Physico-Chemical Basis of Wetting and Spreading [Russian], B.D. Summ and Yu. V. Goryunov (Khimiya Publ., Moscow, 1976, 232 p., price Rub. 1.81).

The chapter headings are: Thermodynamics of Wetting, Wetting of Real Solids, Effect of Physico-chemical Factors on Wetting, Spreading, Control of Wetting with Surface Active Substances, Effect of Wetting on Processes in Industry and Nature.

The authors' effort to be impartial has resulted in inclusion of contradictory opinions which may leave a reader, especially a novice, confused as to which is correct in the system with which he is dealing. This observation applies particularly to the problem of the validity of Young's equation of contact angles, but other statements, especially in Chapters 1 and 2, also are refuted elsewhere in the volume. The free energy of a system is a sum of several components. Whenever all other components except those proportional to the interfacial areas are neglected, justification for this treatment must be given. The authors do not follow this rule. For instance, the expression for the free energy of many processes involving solids is given as $\sigma_{s1}\omega_{s1}$ (σ_{s1} = interfacial tension of the solid-liquid interface of area ω_{s1}), although these processes are associated with mechanical deformation of the solids (see equation I.12 and p. 42). Some doubtful explanations are selected (e.g., that for the sliding of drops along inclined surfaces, p. 44) probably because the authors are more familiar with the older publications in Russian than later foreign literature. The list of references contains 351 items and roughly, one of three is to a Western book or paper.

Another source of confusion is the emphasis placed on the difference between polar and nonpolar molecules; it is nowhere pointed out that toluene (having a permanent dipole moment) is very similar to benzene (unpolar) in its wetting behavior. In the discussion on page 79 of the wetting ability of different liquids, polarity is not mentioned. A conscientious reader will have difficulty in reconciling this with material on pages 13-14, 84 etc.

There is relatively less emphasis on theoretical considerations in Chapters 3 through 6, and the author's impartiality becomes more palatable. It is in these chapters that the main value of the book is manifest, namely the profusion of experimental data on wetting and spreading, taken from Russian publications, some of which are almost unobtainable in the West.

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Protein Crosslinking: Vol. 86A - Biochemical and Molecular Aspects; Vol. 86B - Nutritional and Medical Consequences. Edited by Mendel Friedman. These are volumes 86A and 86B in the series "Advances in Experimental Biology and Medicine." Subject index in each volume. Library of Congress Catalog No. QP551.S939 (Plenum Press, New York, NY, 1976, \$59.50@).

In recent years oil chemists here found areas of common interest with protein chemists. These areas include new uses and modifications of oilseed proteins and possible lipid associated changes in tissue proteins associated with aging.

These two volumes are the outgrowth of the Symposium on Nutritional and Biochemical Consequences of Protein Crosslinking held at the 172nd American Chemical Society Meeting in San Francisco, CA, Aug. 29 to Sept. 3, 1976. They include not only 63 of the original 64 symposium papers but also 21 additional articles to cover subjects not in the symposium. Dr. Friedman is to be congratulated not only on the breadth of the original symposium but also for the efforts taken to complete the coverage. Of the 84 articles, 21 are completely or mainly reviews; in addition, most of the rest of the articles have extensive introductory reviews. The major areas covered include foods (meat, milk, grains), the integument and connective tissues (hair, hide, wool, feathers, collagen elastin) reactions or reactive groups (dehydroalanine and its reactions, disulfide bonds, Maillard, peroxidation, alkalization, radiation), unique proteins (insulin, lectins, antigens/antibodies) and the effects of crosslinking on nutrition and aging. Some subjects are popular, and lysinoalanine formation and consequences are very well covered. From a nutritional viewpoint the unwholesome aspect is well covered in terms of unwanted crosslinking from such treatments as heating or alkali treatment, or reactions such as disulfide, dehydroprotein, or carbonyl-amino bond formation. Yet there is only one paper about the relationship of protein crosslinking to improvement of functional properties of foods during processing.

There is one article on lipid-protein interaction, that of fish myofibrillar protein with lipids, although there are casual references in other articles to the effects of fat on crosslinking reactions. Protein-polymer interactions are the subject of one paper (Trehalose-P synthetase activation by various polyanions) and one paper on the kinetics of chymotrypsin bound to glass; nothing else on the immobilization or activity of bound enzymes.

Keep in mind that the two volumes are not specifically a text on or review of protein-crosslinking, but rather a symposium which reflects mostly current concerns. As such, everybody interested directly in protein-crosslinking will want to have a set available. For those interested in the chemistry of the various crosslinks or the methods used to study them, there is a wealth of information available, spread throughout the articles. Although the volumes are organized according to subject matter, cross referencing is generally absent (in one subject, crosslinking and aging, the two authors make no references at all to each other), and coverage of any one subject may be spread through both volumes. Because of this, these volumes are not as useful to the general reader as a shorter, intentional review article would be.

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