NEW BOOKS

THE STRUCTURE OF LIPIDS, by D. Chapman (Wiley, New York, 1965, 335 p, $10.50.)

This book considers the application of modern spectroscopic methodology to lipid chemistry, especially the determination of the structure of lipids. A short introductory covers the definition and gives examples of the most generally known lipids. This is followed by a chapter dealing with the separation techniques commonly employed in working with lipids. The information dealing with separation methods is more adequately dealt with in other literature and is more useful here as an entry into the literature for those desiring more detailed information.

The remainder of the book deals with the application of various spectroscopic methods to lipid structure determination. They have the same general format: theoretical considerations are discussed, followed by instruments and techniques and then by application to lipids.

The chapter on ultraviolet spectroscopy is brief but comprehensive and is not a major chapter in the book, probably since it is of limited use in the determination of lipid structure. The spectrum on Infrared and Raman spectroscopy gathers together much heretofore scattered information. The lata given and discussion of the interpretation of the spectra of fatty acids and esters of both mono- and disbasic as well as that given concerning the interpretation of the spectra of mono-, di-, and triglycerides and the influence of polymorphism on their spectra is of great value. It is a pleasure to see such data gathered together and discussed with clarity. Infrared spectroscopy as applied to the phospholipids has not been widely employed. However, the author has gathered together those available, and some degree of correlation is evident. A limited amount of information concerning the applications of infrared methods to lipoproteins offers exciting glimpses into the realm of complex lipid structure. This chapter suffers from generally poor reproduction of the infrared spectra which detracts from an otherwise well written and organized section.

The chapter on mass spectroscopy is not noteworthy; it is largely a discussion and presentation of material which can be found in more authoratative reviews. It does, however, treat the reader to a few typical applications of mass spectroscopy to lipids.

Nuclear magnetic resonance spectroscopy (NMR) is now one of the most powerful tools in organic chemistry. This section deals first with the applications of broad line NMR. Interesting results obtained in the study of the various crystalline modifications of mono-, di-, and tryglycerides are presented as are applications toward the measurement of liquid/solid ratios in fats. High resolution NMR is considered in greater detail. Tabulations of major correlations are included and extend the usefulness of this chapter. NMR spectra of typical lipids showing the effects of unsaturation, isomerism and substitutent groups are given. Spectra of mono-, di- and triglycerides are presented and discussed. More careful editing of this chapter and arrangement of tabulated material for easier comprehension would have increased the usefulness of this chapter. Electron spin resonance spectroscopy is discussed in a short chapter. This will be of interest to chemists involved with free radical work, as in studies on x-ray and γ-irradiation of lipids.

The final chapter in the book is probably one of the more comprehensive discussions of x-ray crystallography as applied to lipids which has recently appeared. X-ray diffraction studies of the crystalline structure of fatty acids, mono-, di- and triglycerides are discussed. A small space is given to the applications of this technique to the study of lipoproteins.

The index is short but appears to be adequate. The book is well bound and attractive. It is printed in readable style and is pleasant to read. This book should be in the personal library of every person who is interested in lipid structure, either as a practicing lipid chemist or as a student.

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NUCLEAR MAGNETIC RESONANCE IN A FLOWING LIQUID, A. I. Zernovoi and G. D. Latyshev (Plenum Press, New York, 1965, 166 p, $22.50).

This book is a translation of a recently published Russian monograph (Moscow 1965) written by two of the leading scientists in the development of NMR in flow systems (FNMR). The book outlines the progress in FNMR made in the period prior to 1964. In connection with the book an almost complete list of publications dealing with FNMR is given.

The book is divided in two main parts. The first part (80 p) is an introduction to the theoretical formulation of resonance phenomena in cases where the probe itself is a part of a flow system. In order to follow the treatment some knowledge of the formulation of corresponding problems in ordinary (static) NMR spectroscopy is needed.

The authors have in an admirable way ignored the trend in modern lit-

erature to omit most steps in derivation of formulae. By this approach they have made it possible to read this part without pen and paper exercises.

The second section (80 p) describes the present practical applications of FNMR. It is this part of the book that readers of the *Journal of American Oil Chemists' Society* will find most interesting.

One of the applications mentioned is the continuous measurement of relaxation time T_1 in a flowing liquid. The strong dependence of T_1 on concentration of paramagnetic particles makes it a highly sensitive detection of minor amounts of metals and metal ions in the liquid. In problems of catalytic action of impurities and investigation of corrosion the method is likely to find some application.

Accurate measurements of flow rates can be performed by means of FNMR. The measuring device is located entirely on the outside of the flow and provides a convenient method for making measurements on corrosive or poisonous liquids. In cases where high or low pressure flows are involved the method can also be used with profit. Quoted in the text are measurements in the range 50 cm^3/h to 5 m^3/h.

Connected with the two previously mentioned methods is the spin labeling technique, where a strong magnetic field is applied to pulses to the flowing liquid. During the pulses magnetization builds up in the small part of the flow located in the field. Later it is possible to detect the distribution of magnetization along the stream and obtain valuable information about diffusion processes and turbulence in branched flow systems. The advantage of the method is that it is unnecessary to introduce traceable impurities or to use isotopic labeling.

For people working in high resolution spectroscopy FNMR is a present of little importance. Heterogeneity created by the flow conditions broadens the lines so that half line widths are of the order of a few Hz.

It is worth calling attention to the fact that while static NMR spectroscopy in general is associated with expensive equipment FNMR can be conducted in a much cheaper way, using less homogeneous magnets and homemade detection systems. For this purpose the authors have given a description of the construction of each type of apparatus followed by a discussion of the optimum adjustment of parameters for accurate measurements.

For chemists working either in research or plant development this book will be of interest as it represents the first survey of FNMR available. Little has yet been done in the technological application of FNMR. With this new book as basis the method will undoubtedly develop to a commonly applied control device.

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ASTM Session on Gas Chromatography

Committee E-19 on Gas Chromatography of the American Society for Testing & Materials announces the Fifth Annual Meeting on the Practice of Gas Chromatography to be held Oct. 10–12, 1966, at the Dennis Hotel, Atlantic City, N. J. For information pertaining to registration, write to M. G. Bloch, Socony Mobil Oil Co., Paulsboro, N. J. 08066.

Cottonseed Clinic, 1967

The 1967 Cottonseed Processing Clinic will be held February 13–14, according to G. H. Dunklin, president of the Mississippi Valley Oilseed Processors Association, and C. H. Fisher, director of USDA's Southern Utilization Research and Development Division.

Further information may be obtained from B. H. Wojcik, Assistant Director for Industrial Development, Southern Utilization Research and Development Division, P. O. Box 19687, New Orleans, La. 70119.