• *AOCS Commentary*

Penn State Symposium to Survey Present Status of Lipid Research

LIPID RESEARCH has undergone many marked changes in the past few years. Only a decade or so ago the lipid field was in a relatively primitive state and lacked a precise quantitative basis. Chemists were probing complex problems with inadequate tools and many basic facts were still to be appreciated. Few were attracted to this difficult, complex and uncertain field.

The present situation is very different. The great interest in lipid research can be traced directly to the vastly improved state of lipid chemistry. Lipid chemistry, like other branches of chemistry, includes reactions and chemical theory, the study of physical properties and analytical procedures as the basis for all lipid research. The status of lipid chemistry controls progress in metabolic and other biological research. This relationship between lipid chemistry and general lipid research has not always been fully appreciated, with the result that much effort has been wasted in studying biological problems with inadequate procedures and inadequate knowledge of chemical properties. Some have believed that a relatively superficial knowledge of a procedure or technique would be adequate for its application only to find later that a more complete knowledge of lipid chemistry was necessary for proper use of a technique and interpretation of results. Much of the real progress in many areas of lipid research has depended upon the lipid chemist who has first developed and then applied appropriate procedures for the study of biological material.

The situation is now different because our knowledge of lipid chemistry is much more extensive and certain. A much firmer basis, with generally recognized and accurate procedures and reliable chemical data, makes possible the entry of those who are not primarily lipid chemists into many areas of research. The person who does not specialize in lipid chemistry can learn quickly from lipid chemists what approaches and procedures are necessary for particular studies and the procedural details, and then apply these with considerable success.

Progress in lipid chemistry has been most directly related to development of chromatographic techniques with which purity can be judged reliably, characterizations can be facilitated, and quantitative determinations can be made. The most important of these procedures are gas-liquid, general column and thin layer chromatography. Both gas-liquid and thin layer chromatography were introduced for lipids and have since been used by chemists for many other substances. Gas-liquid chromatography has revolutionized general analytical chemistry and the qualitative analysis of complex mixtures of many types. With these important tools lipid chemists have made much progress and a reliable literature of chemical and physical properties, chemical synthesis and analytical procedures is being built up. Lipid chemistry is now established as an important and basic field of research. In recognition of this important fact an award in lipid chemistry has been established and will be presented for the first time at the Penn State Symposium.

Most of us find it essentially impossible to follow the rapid development and progress in lipid chemistry and general lipid research and to evaluate these developments. The Penn State Symposium has been organized in a way designed to aid those in lipid research in the difficult task of becoming aware of and evaluating recent developments in the field. The contributions will be valuable to both the lipid chemist and general lipid research investigator and to the experienced investigator as well as the novice. The Symposium has been organized on an open attendance basis for it is apparent that the opportunities for the less well established investigators or persons not specializing in lipid research to learn by attending symposia are rather limited. The more frequent type of meeting of well established specialists has an important place in scientific communications, but it serves a different purpose. The purpose of the present Symposium is to acquaint a large number of persons with some of the most recent developments and concepts in lipid research. The Symposium features much new (previously unpublished) information. Symposia largely of a review nature are of limited value during times of rapid progress such as these.

Some basic aspects of lipid chemistry will be discussed without regard to applications to biological problems. These areas include chemical synthesis, infrared spectroscopy and discussions of the important tools for qualitative and quantitative analysis, gas-liquid and thin layer chromatography. Quantitative aspects will be stressed throughout the Symposium as the title, "Quantitative Methodology in Lipid Research," indicates. The underlying role of lipid chemistry in lipid research will be very apparent and it must be appreciated that methods developed for and knowledge obtained in one area of research can frequently be applied in other areas. It is apparent that procedures developed for animal lipid separations can be applied to plant lipids of similar structure (e.g. animal cerebrosides and sulfatides are similar to plant galactosylglycerides and sulfolipids, respectively) and that with some modification procedures for naturally occurring lipids can be applied to strictly synthetic lipids, e.g. detergents. Much of the program will stress the application of the best procedures and most recent chemical knowledge to the study of biological problems.

Studies of inherited metabolic diseases affecting the brain of man will be considered and a new lipid defect described. The changes in lipid composition of peripheral nerve during the process of experimental Wallerian degeneration produced by cutting the nerve will be described in detail. Studies of experimental Wallerian degeneration are of particular interest since this process is the best experimental model for studying changes similar to those taking place in the nervous system in some human diseases. Alterations of human erythrocyte lipids in disease states will be described and discussed. A consideration of the lipid composition of plants will prove of special interest. Plant structures are formed with lipid classes that differ from those of animals and the fatty acids of the lipid classes also differ considerably. Such differences provide a valuable means for studying the lipid structural requirements for formation of biological membranes and other structures.

It is clear from information now available that there are two very different types of biological membranes. The type characteristic of myelin of brain and nerve contains a large amount of sphingolipid (sphingomyelin, cerebrosides, sulfatides) and cholesterol. The sphingolipids contain very long chain (up to C_{27}) fatty acids of low degree of unsaturation, and cerebrosides and sulfatides contain 2-hydroxy fatty acids. The erythrocyte membrane is somewhat similar to myelin in that large amounts of sphingolipid (sphingomyelin) and cholesterol are present. Myelin and the eryth-

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"Quantitative Methodology in Lipid Research"
Pennsylvania State University
University Park, Pa.
Aug. 3–7, 1964

A personal invitation, application for attendance, reservation information and complete program has been mailed. For further details, contact the AOCS Headquarters, 35 E. Wacker Dr., Chicago, Ill. 60601.

Meetings

AOCS National Meetings

1964—Chicago, Pick-Congress Hotel, October 11–14
1965—Houston, Shamrock-Hilton Hotel, April 25–28
Cincinnati, Netherlands Hilton Hotel, October 11–13
1966—Los Angeles, Statler Hilton Hotel, April 24–27
Philadelphia, Bellevue-Stratford Hotel, October 4–6
1967—New Orleans, Roosevelt Hotel, May 7–10
Chicago
1968—Memphis
New York, Statler Hilton Hotel

Other Organizations

July 20–24, 1964—14th Advanced Paint Refresher Course, University of Missouri, School of Mines and Metallurgy, Rolla, Mo.

July 26–Aug. 1, 1964—6th International Congress of Biochemistry, New York, N.Y.

Aug. 11–13, 1964—Seminar on Bleaching Earths and Active Carbons, Regional Research Laboratory, Hyderabad, India, under auspices of the Council of Scientific & Industrial Research of India.

Aug. 17–18, 1964—44th Annual Convention, American Soybean Assoc., Annual Meeting National Soybean Processors Assoc. and Soybean Council of America, Inc., Muehlebach Hotel, Kansas City, Mo.

Sept. 7–12, 1964—IV International Congress of Surface Activity, Brussels, Belgium.

Oct. 12–18, 1964—First World Fat Congress, Hamburg, Germany.

Oct. 29–30, 1964—28th series of lectures on Coating Materials and Pigments, Royal Dutch Chemical Society, Berlin, Germany.

Nov. 1964—1st International Congress of Agricultural and Food Industries in Tropical and Sub-Tropical Regions, Abidjan, Ivory Coast, Africa.

Nov. 5–7, 1964—42nd Annual Meeting, Federation of Societies for Paint Technology, Conrad Hilton Hotel, Chicago, Ill.

Penn State Symposium . . . .

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rocyte membrane are examples of relatively stable structures. In marked contrast is the mitochondrial membrane. Mitchondria contain only traces of sphingolipid and cholesterol and the glycerol lipids that make up the structure contain highly unsaturated fatty acids. The differences in the structural features, stability, and properties of these membranes will be described and illustrated.

The less well-defined role of lipids in enzyme reactions will be dealt with in contributions on mitochondrial function and blood coagulation. Discussions of lipids that affect contraction of smooth muscle and those that serve as insect attractants will further emphasize the many functions of lipids in biological systems.

GEORGE ROUSER
Chairman, Organizing Committee