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# THE LIPIDS

*Their Chemistry and Biochemistry*

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HARRY J. DEUEL, Jr.

*Dean, Graduate School, and Professor of Biochemistry,  
University of Southern California, Los Angeles*

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***Volume III: BIOCHEMISTRY***

***Biosynthesis, Oxidation, Metabolism,  
and Nutritional Value***

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1957

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# THE LIPIDS

*Volume I*

**CHEMISTRY**



*Volume II*

**BIOCHEMISTRY**

*Digestion, Absorption,  
Transport and Storage*



*Volume III*

**BIOCHEMISTRY**

*Biosynthesis, Oxidation, Metabolism,  
and Nutritional Value*



*To my wife*  
GRACE C. DEUEL,  
*and to my many friends*  
*all over the world.*



**HARRY J. DEUEL, Jr.**

## HARRY JAMES DEUEL, Jr., Ph.D.

1897-1956

Harry James Deuel, Jr., was born in St. Paul, Minnesota, October 15, 1897, the son of Harry James Deuel and Myrtle Lillian (Mouser) Deuel. After graduating from a local high school he entered Carleton College, where he displayed particular interest in science, doing his major work in chemistry. Before receiving his degree he accepted a position as Junior Chemist in the United States Department of Agriculture, Washington, D. C., which he held for two years, during which time he also did advanced work in his field as a student at George Washington University. His aptitude for research work, and his industry, became evident in the course of these years when he was an assistant to C. F. Langworthy. Six papers were published under their joint authorship during this period. At this time he also collaborated with Arthur D. Holmes in research reported in five papers. All of these earlier publications were in the field of the digestibility of various specific foods and classes of nutrients. The paper on "Digestibility of Certain Miscellaneous Vegetable Fats" (A. D. Holmes and H. J. Deuel, Jr., *J. Biol. Chem.*, 41, 227-235, 1920) was the first of what was to be a long and distinguished series of publications dealing with lipids.

The developing scientist evidently felt the need for more advanced study, and this led to his entrance into the Yale University Graduate School as a student for the doctorate under Professor Lafayette B. Mendel. This work was successfully completed in 1923, when he received the Doctor of Philosophy degree in Physiological Chemistry from Yale University. His doctoral dissertation was entitled "The Chemistry and Physiology of the Pyrimidines, Thymine and Uracil with Reference to Nucleic Acid Metabolism." To accomplish this work it was necessary for him to synthesize these pyrimidines in quantities sufficient to permit their administration to dogs for the metabolism study. While in the Yale Laboratory he also collaborated with the writer in "A Comparison of the Paths of Absorption with Respect to the Action of Secretin upon the Pancreas." This was made the basis of a report to the XIth International Physiological Congress held in Edinburgh in 1923, which was attended by both authors. This was the first of many such international meetings which Dr. Deuel attended over the many remaining years of his career.

As a result of these travels he came to know in a very personal and intimate way many distinguished colleagues in other countries, and was often able to introduce to them various American colleagues who were making their first trip to Europe. In this activity his personal qualities of friendship, interest in other people, and ingratiating manner made him a peculiarly effective ambassador and representative of American scientists.

One year after receiving his Ph.D. degree, Dr. Deuel married Grace Antoinette Cutting, a graduate student in History and Mathematics, Teachers' College, Columbia University. Thus began a long and happy married life during which his wife proved to be a most valuable aide in ways difficult to describe in words. She was his congenial companion on his many trips abroad. Their home was a place where faculty and students alike felt truly at ease in an atmosphere of friendliness and mutual interest. As one friend expressed it: "Here was a man who could carry out his official obligations with dignity and yet have time to make the shyest new foreign student feel at home." In this as well as in many other phases of his activities, the help of Mrs. Deuel was incalculable.

The first position which Dr. Deuel accepted on the advice of Professor Mendel was that of Assistant in Physiology in the Cornell University Medical College, New York City, under the distinguished Graham Lusk. He held this position for five years (1923-1928), and then was appointed Professor of Physiology and Head of the Department at the University of Maryland Medical School. During the first year of this appointment he was offered, and accepted, the post of Professor of Biochemistry in the newly reorganized School of Medicine at the University of Southern California, the position which he held for the rest of his career. For twenty years (1929-1949) he served as Head of the Department of Biochemistry. During this time, in recognition of the importance of nutritional biochemistry and of nutrition as a science in itself, the title of his position was changed to Professor of Biochemistry and Nutrition.

In 1949 Dr. Deuel was appointed Dean of the Graduate School at the University of Southern California. In this capacity he visited various institutions throughout the United States to see how their graduate schools were organized, and then directed the planning and operation of the school in his own institution. Because of his great personal drive and industry, he was able to accomplish all of this without sacrificing research and scholarly work of his own, shown by the fact that, as Dean, he not only continued to direct younger colleagues and graduate students in various research projects, but published many scientific papers, as well as the first



two volumes of the series entitled *The Lipids, Their Chemistry and Biochemistry*. The present volume completes this series.

Some idea of Dr. Deuel's scope of scientific activity can be gained from the fact that a complete list of publications which carry his name either as senior author or collaborator totals 276 items. The titles show that he maintained a wide breadth of view and interest. His experience as a teacher of physiology to medical students (with Graham Lusk at Cornell, and at the University of Maryland) was no doubt responsible in part for his continuing interest in such topics as carbohydrate metabolism, diabetes, and energy metabolism. More than 25 of his papers deal with these themes. Such topics of course naturally led to investigations in the field of lipids and their metabolism. This resulted in his conviction that somewhere a book or two should be available summarizing existing knowledge concerning the lipids. He therefore decided to undertake the writing of it as a personal assignment. Two of his volumes have already appeared. The present one represents the completion of this personally assigned and personally accepted responsibility.

As an active contributing scholar in his generation Dr. Deuel was elected to numerous professional organizations, only a few of which can be mentioned here: the American Physiological Society, American Society of Biological Chemists, American Chemical Society, Biochemical Society (London), Harvey Society (New York), the British Nutrition Society, and The American Institute of Nutrition. This latter society elected him President just before his death. He also served the American Institute of Nutrition as a member of the editorial board of its official publication, the *Journal of Nutrition*, for the usual term of four years (1946-1950). He was a member of the Board of Directors of Annual Reviews from 1946 on, and was elected to the presidency of the Board in 1953. In 1949 Dr. Deuel received the Borden Award. Through the Institute of Food Technologists he received the Monsanto Presentation Award in 1954. In January, 1956, during his year abroad on a Fulbright Lectureship, he was given an Honorary Medal by the University of Brussels. During this same year he attended six scientific meetings in England and continental Europe, and delivered numerous lectures before universities (Oxford, Cambridge, Edinburgh, Aberdeen, Dundee, Glasgow) and other professional groups, including the British Society of Nutrition.

As might be expected of a person as prominent as he was, Dr. Deuel was often called upon to serve his country, state, and community in various capacities. He was head of a Committee on Oilseeds and Fats under the

Dept. of Agriculture, and of other government committees concerned with nutrition.

The news of his passing evoked numerous expressions of sorrow and affection from many groups, his university circle, colleagues, students, and friends. It is fitting that this biography close with some passages taken from these many letters to Mrs. Deuel. "The life of a truly great and good man cannot be formalized in words. To be sure, scientific achievements, concrete contributions to the world's knowledge, awards of merit, and participation in scientific progress by publications, lectures, and laboratory research can be recorded. But the qualities of the spirit which make a human being stand out among his fellows, kindness and staunch defense of justice, the warmth of friendship, and the lovable personality of a man like Harry Deuel cannot be put into words."

"His passing has been a great loss not only to the University, to science, and to the community, but, also, to mankind wherever he touched. He was one of those invaluable persons whose moral code was never compromised by the trends of the day. The greatest loss, one feels, is to the youth who could have known him, for here was man with old-fashioned virtues who had not only achieved eminence but, also, the love and respect of all who knew him. He was one of the University of Southern California's greatest ambassadors."

One of his international students called him "the man with the golden heart."

GEORGE R. COWGILL

Yale University  
New Haven, Connecticut

## INTRODUCTORY EDITORIAL NOTE

On April 17, 1956, Dr. Harry J. Deuel, Jr., passed away following the recurrence of a serious illness for which he had been operated upon in 1954. After the operation he maintained as his chief professional objective the completion and publication of this third volume of his work *The Lipids, Their Chemistry and Biochemistry*. Before his death he had done most of the necessary writing. It remained for some of his colleagues and friends to see this written material through the press.

The entire text of this third volume had been completed by Professor Deuel several months before his return to the United States from England, where he was lecturing under the auspices of the United States Educational Commission in the United Kingdom, and on the continent, during the winter of 1955-1956.

During his last months in England the material of the latter half of the volume was being typed and checked in Los Angeles. These latter chapters were reviewed by Dr. Deuel's friends and associates before being forwarded to the publisher. For the most part, however, this material has been left unchanged so the volume is consistent with the style and organization of the first two volumes and in accord with the author's intentions. Certain minor corrections of details have been made to bring the material up to date beyond the time when it was originally written.

The bibliographic research and the technical work of preparing the manuscript for the publisher was carried out by Mrs. Margaret Ritter who fulfilled the same responsibilities for Volumes I and II.

Chapters VIII, IX, X, XI, XII, and XIV were reviewed by Dr. Roslyn B. Alfin-Slater and Dr. Ernest Geiger; Chapter XIV was also read by Dr. Wendell Griffith. Chapter XIII was revised by Dr. Raymond Reiser from an article written by Dr. Deuel and Dr. Reiser and previously published in *Vitamins and Hormones*, 13, 29-70, 1955. Dr. James Mead also made several suggestions for the revision of this chapter. Gratitude is hereby expressed to the Academic Press for permission to use the material forming a large part of this chapter of the present volume.

We would also like to thank Mrs. Joanne Forney, Mrs. Helen Rice, and Mrs. Marie Visser for typing the final manuscript, Dr. Lilla Aftergood for

preparing the indices, Dr. John Forney, Dr. Howard Hill, Dr. Norman T. Mattox, Dr. Sydney Rittenberg, Mr. Arthur Wells, and Dr. L. Zechmeister for checking some of the scientific details and nomenclature, and Dr. George R. Cowgill for preparing the biography.

*Los Angeles, September, 1957*

STANLEY R. TOWNSEND  
—for the Editorial Committee

# THE LIPIDS

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## *Volume III: BIOCHEMISTRY*

*Biosynthesis, Oxidation, Metabolism,  
and Nutritional Value*

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