



Leon Lapidus

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1924-1977

By Neal R. Amundson

Leon Lapidus, Chairman of the Department of Chemical Engineering, Princeton University, died suddenly in his office on Thursday, May 5, 1977. He was fifty-two years old. His death came as a great surprise and shock to his many friends and colleagues, both in the chemical and computer industry, as well as in the academic world, where he was widely known for his research, extensive writings over a wide area, and as an excellent teacher and superb mentor of a series of excellent students. He had joined Princeton University first in 1951 as a Research Associate and became Head of the Chemical Engineering Department in 1968, succeeding the late Richard H. Wilhelm.

Leon Lapidus was born in Syracuse, New York, on September 26, 1924, and received the bachelor's and master's degrees from Syracuse University, the latter in 1947. He attended the University of Minnesota and received his doctorate in chemical engineering in 1950, being one of the rarities of modern times, a three-year Ph.D. degree recipient. Leon was a graduate student who worked consistently and constantly, but whose outward appearance was not one of compulsion. He coauthored three papers before he received the doctorate. He was a postdoctoral fellow at the Massachusetts Institute of Technology for one year, following which he went to the Forrestal Laboratory at Princeton, where he worked under Professor Richard H. Wilhelm on the chemical kinetics of the water-gas shift reaction, a reaction which at the present time is again receiv

ing a great deal of attention. He became an Assistant Professor in 1953 and a full Professor in 1962 and was elected to the National Academy of Engineering in 1976. He was recognized in 1970 by Princeton University, when it appointed him Class of 1943 University Professor of Chemical Engineering.

Dr. Lapidus early in his career became interested in the more theoretical aspects of chemical engineering and was one of the early workers who used the modern digital computer in his research. His main thrust in research, after an early foray into transient phenomena, liquid-liquid fluidized systems, and theoretical analysis of various unit operations, was in the field of control and optimization applied to chemical reactions coupled with heat and mass transport in chemical reactors. He was one of the first to apply Lyapunov functionals to distributed parameter systems, particularly tubular and stirred pot reactors, and his interest and work in nonlinear control initiated much of the work of others. He worked on process identification, adaptive control, time-optimal control, filtering, and, in general, applied all of the techniques now commonly used before they were so.

In the recent past, probably because of his close association with IBM for a number of years, he became interested in efficient and accurate methods of computation for a variety of problems in chemical engineering. He developed means for handling stiff systems and applied these to a wide variety of chemical reactor problems. In fact, from 1965 to 1977 he published over 100 papers and at the time of his death had ten major works in press, two of these being books, one of which was published the day after his death. Prior to his death he had developed some new numerical techniques about which he was very excited. He had presented these in January 1977 at a seminar at the University of Minnesota and appeared to be in robust good health. These techniques were remarkably simple and accurate, and hopefully they will appear posthumously. In 1962 he authored "Digital Computation for Chemical Engineers," followed by "Optimal Control of Chemical Processes" in 1967, "Numerical Solution of Ordinary Differential Equations" in 1971, and "Mathematical Methods in Chemical Engineering-Volume III: Process Modeling, Estimation, and

Identification" in 1974. He coedited a memorial volume for Richard H. Wilhelm on *Chemical Reactor Theory* in 1977 and had just finished "Numerical Solution of Partial Differential Equations."

Dr. Lapidus had been honored by the American Institute of Chemical Engineers with the William H. Walker Award for research and with its Professional Progress Award. He had been Chemical Engineering Lecturer for the American Society of Engineering Education and had been a Member of the American Chemical Society and the American Institute of Chemical Engineers. He was widely sought after as a consultant and did so for Shell, Exxon, IBM, Cities Service, Humble, and others. He had always been in great demand as a seminar lecturer and as a symposium leader.

Leon Lapidus was married to Elizabeth Kalmes, of Rolling Stone, Minnesota, and had a son, Jon Jay, and a daughter, Mary Kalmes. He is survived by his sister Mrs. Florence Goldman of New York City. In addition to his many professional activities, he was an active and excellent lawn tennis player and at his death was President of the New Jersey Tennis Association.