

# MEMORIAL RESOLUTION

## A. LOUIS LONDON

(1913-2008)

Alexander Louis London was born in Nairobi, Kenya, 31 October, 1913, of English and Lithuanian parents. He died in San Rafael, California, 18 March, 2008.

In 1921 the family immigrated to the United States and settled in Alameda, California. There he attended the public schools and enrolled at the University of California, Berkeley in 1931. He majored in Mechanical Engineering, graduating in 1935.

The following year he enrolled as a graduate student in Mechanical Engineering at Berkeley, and was appointed a Teaching Assistant in Mechanical Engineering. At that time he became a student of L.M.K. Boelter, who was by then one of the national leaders in engineering heat transfer. London wrote a thesis on cooling tower analysis and received an MS degree in 1936.

London then took a job with the Standard Oil Company of California at their General Engineering office in San Francisco. There London began to make a name for himself in heat transfer analysis.

After a year at Standard Oil he took a job at the University of Santa Clara as an Instructor in Mechanical Engineering for the year 1937-38.

In 1938 he was appointed an Instructor of Mechanical Engineering at Stanford. Two years later he was promoted to Assistant Professor.

London was initially a bit of an "enfant terrible" to undergraduate students. The heat-power faculty at Stanford at that time was still living in the past, teaching an empirical and descriptive version of the subject. Lou London introduced a rigorous and analytical approach and a much more modern version of thermodynamics. And there is no question that he was a very demanding teacher. Many of the best students "bought into" London's methods, but other students were turned off. For those who accepted his methodology for thermodynamic analysis, his courses were the keystones of their later success. Many of London's best students went on into the burgeoning aircraft industry in Los Angeles during the war, where several later became important leaders. Two of his undergraduate students in that period, W.M. Kays and S.J. Kline, eventually became members of the Stanford faculty.

In 1943, with the War well under way, he was given an officer's commission as an engineering specialist in the U.S. Navy, and was assigned duty in the Bureau of Ships in Washington, D.C. where he served for 3 years. There he had a second opportunity to display his talents in engineering analysis, and at the same time he became well acquainted with many important technical people in both the Navy and in industry. More importantly, he became well acquainted with real world problems in the design of propulsion systems. He remained in the Naval Reserve after the War, and retired with the rank of Commander in 1978.

In September, 1946, he returned to Stanford as an Associate Professor of Mechanical Engineering.

Sometime before he returned he evidently had some contact with Fred Terman, who persuaded him to apply for a pair of research contracts sponsored by the Bureau of Ships and administered by the Office of Naval Research, and which were in reality a continuation of work he had been doing in Washington. Terman was, of course, doing the same thing on a much larger scale in Electrical Engineering. Government research contracts were new things at the time, and it was many years before most of the engineering schools in this country realized that this was the route to the future. Stanford was closely following MIT and a few other universities, and this head-start was an important step in the rise of Stanford's prestige as an engineering school of distinction.

London's research contracts were both connected to the Navy's interest in gas turbines as a ship propulsion system. While still in the Navy London had initiated a program at the Navy Experiment Station in Annapolis on a study of compact, high performance heat exchangers for gas turbine regenerators. His Stanford program was essentially a continuation of that program. The Navy, ultimately funded this particular program, for about a dozen years. It resulted in a book that is to this day an important source book in the field of compact heat exchangers.

During the 1950's London gradually gave up teaching undergraduates and concentrated on graduate student courses. New, younger faculty members took over the undergraduate program. This was a period when the Department of Mechanical Engineering began to develop its Master's Degree program, and then its PhD program.

In the 60's and 70's London continued his strong interest in gas turbines and was very active in the Gas Turbine Division of the American Society of Mechanical Engineers, serving at one time as its chairman. He also became a very active consultant to industry, most especially to General Motors. Over the years he graduated a few PhD's, but this was not his major interest. He was more interested in the two-year degree of Engineer, and sponsored the research of a considerable number of students working towards that degree.

London published a considerable number of technical papers, mostly in the Transactions of the American Society of Mechanical Engineers, and he co-authored two textbooks. However, he was not a prolific book writer. London had an aversion to the idea of professors making money by the publication of textbooks, especially those assigned to their own students. His book, Compact Heat Exchangers, was co-authored with W. M. Kays, but the initial edition of that book was published by the ASME with no royalties involved. It was only later, and because of a considerable demand, that it was published by a commercial publisher, McGraw-Hill.

London's name will always be associated with a non-dimensional parameter that arises in the analysis of heat exchangers. He named it the NTU (Number of Transfer Units). Many felt that this was a rather awkward name, and various attempts have been made to name it the London Number (as in "Reynolds Number, etc.) But London would have none of it.

The Thermosciences Division of the Department of Mechanical Engineering has in recent years become well known and respected not only in this country but also worldwide. The fact that ultimately four members of the Division were elected to the National Academy of Engineering is in itself an indication of what was accomplished. Any attempt to trace its history from virtually nothing to its present status must go back to September, 1938, when Lou London arrived on this campus. Everything started with him. (It could also be said that in a sense it all started with L.M. K. Boelter at the University of California.) As the years went by numerous members of the Division faculty made major contributions to this area of study, many of which went way beyond where Lou was. But there is no question that it all started with Lou.

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In 1938 London married Charlotte Letts. They had three children, Charles, born 1940, Allan, born 1944, and Deborah, 1950. Charlotte died in 1999.

London was awarded the R. Tom Sawyer Award by the Gas Turbine Division of the American Society of Mechanical Engineers in 1977, The James Harry Potter Gold Metal in 1980, and the Max Jacob Memorial Award in 1984. He was inducted into the Silicon Valley Hall of Fame in 1990. He was elected to the National Academy of Engineering in 1978. He retired from Stanford in 1978.

From 2000 until his death, Lou London lived with his son, Allan, and his wife, Kelly, and their son, Alexander, in San Rafael, California. During his last years he lived an active life, attending Senior Access in Kentfield three days a week and never missing the News Hour with Jim Lehrer or the Nightly Business report on KQED. His home and life was always teeming with children and visitors.

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