



John R. Low, Jr.

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1909-1988

By J. E. Burke and L. F. Coffin

John Routh Low, Jr. was born in Washington, Pennsylvania, near Pittsburgh, on February 19, 1909. In 1937 he married. His wife, Dolphia, and he had three children: John R. Low III, Susan Low Laing, and Richard A. Low. He died in Belair, Maryland, on August 28, 1988, and his wife and children all survive him.

Jack's early exposure to the metallurgical atmosphere of the Pittsburgh neighborhood had an effect: he worked in the field of metallurgy all his life. He entered the Department of Metallurgy and Mining Engineering at Purdue University in 1927, and received his B.S. from there in 1931. Upon graduation he worked as a metallurgist and mill foreman, for Keystone Steel and Wire Company for two years and for Republic Steel Corporation until 1938, when he entered Carnegie Institute of Technology in Pittsburgh as a Carnegie Illinois Steel Company fellow. He received his doctor of science degree in metallurgy in 1943. Upon graduation, he joined the metallurgy faculty of Pennsylvania State University as an assistant professor, and was a professor and head of the Metallurgy Division from 1945 to 1948. Through the war years of 1944 and 1945, he also worked on government projects in the laboratories of the Carnegie-Illinois Steel Company in Pittsburgh, and there first became involved with the fascinating, and tremendously important, problem

of brittle fracture of ship plate. During that period, many of the all-welded Liberty Ships sustained severe fractures upon entering colder waters. Sometimes the fractures were serious enough to cause the ship to break in half.

In the period immediately after the war, many people changed jobs, as did Jack. In 1948 he joined the metallurgy group at the Knolls Atomic Power Laboratory of the General Electric Company as head of the research group. There he continued to work on brittle fracture in steel but also investigated the then important problems associated with property changes induced in metals by neutron bombardment and other radiation effects encountered in nuclear reactors. In 1953 he transferred to become a research associate in the Metallurgy Department of the General Electric Company Research Laboratory (now the GE Corporate Research and Development Center). While he continued his interest in brittle fracture, his interests broadened to include study of many dislocation processes in metals.

In 1967 he joined the faculty of Carnegie Mellon University where he continued research and teaching. In 1977 he became professor emeritus, and subsequently lived with his wife in Richmond, Virginia, and Belair, Maryland.

Jack Low played an exceedingly important leadership role in both the science and application of metal deformation and fracture through the years 1940 to 1977, a period when physical and mechanical metallurgy underwent a tremendous forward advance. He has played a major role in that advance, both through his own research and through careful and diligent training of those students fortunate enough to have worked with him. His students particularly remember his low-key, but extremely penetrating review and critique of their work and ideas. He was a recognized authority on the relationship between microstructure and fracture processes in structural alloys, and his publications on such topics as temper embrittlement, the role of inclusions and dispersoids, and cleavage processes in the fracture of high-strength steels and aluminum alloys are universally cited. He was an early

investigator of the role of dislocations in deformation and fracture, from which came the concept of dislocation velocity-stress relationship. This led to a clearer insight into the complex behaviors of strain aging and the yield point. His views, which have always been supported by careful and precise experimental evidence, have formed the backbone of our current knowledge of fracture in metals.

A major contribution by Jack Low was through the group that was to become the American Society for Testing and Materials (ASTM) Special Committee E24 on the Fracture Testing of Metals. In response to a request from the Secretary of Defense in 1959, ASTM formed a special technical committee to address the problems being encountered with brittle fracture of high-strength materials used in various missile and rocket motor cases. Jack chaired that committee. Their first two reports emphasized the importance of using the then just-developing analytical technique of fracture mechanics, and it was Jack who clearly presented the advantage of fracture mechanics technology in his preface to the first report issued by the committee. Fracture mechanics is now, of course, a very well-established subdivision of the materials science and technology field.

Jack Low was not only a good scientist, he was a delightful person and had many good friends in the various places he lived. He and his wife Dolphia gave many wonderful and well-remembered parties in Schenectady, where he spent the major part of his career. He was also an ardent golfer, with what was considered to be a beautiful swing, although its beauty was not always reflected in his score. He greatly enjoyed sailing and hated winter. He is missed by his many colleagues and friends.