



IN MEMORIAM

Silas Milton Henderson
Emeritus Professor of Biological and Agricultural Engineering
UC Davis
1909 - 2008

Silas Milton Henderson, professor of biological and agricultural engineering emeritus, University of California, Davis, passed away peaceably on March 13, 2008.

Born in Clearfield, Iowa on October 5, 1909, Milt (as he was known to most of the people around him) was raised on a typical southwestern Iowa farm growing crops to feed their dairy cows, hogs, and chickens; the products from which provided the family income. His parents wanted him and his younger brother each to have a good education. He attended a country school for the first seven grades, usually walking the two miles between school and home, and attended the Clearfield schools for eighth grade and high school, graduating in 1928.

Milt entered Simpson College in Indianola, Iowa, graduating in 1932 with a B.A. degree with a major in physics and a minor in mathematics. His first job was teaching commercial courses, mathematics, and baseball, as well as, organizing an orchestra in a consolidated high school in Strahan, Iowa. At the end of the school year the school board fired all the teachers, hoping to hire new teachers at much-reduced wages, during the time of the Great Depression. It was at this same time that Milt and Frances Emmons were married, and the couple moved to the Detroit, Michigan area where Milt worked for the Ford Motor Company as a metallurgical analyst until mid-1937.

Milt had always wanted to be an engineer, so in 1937 he returned to Iowa State College in Ames to study agricultural engineering. He supported his family through part-time employment with the USDA, working on grain storage. His B.S. degree was completed in 1939, and he continued studying for an M.S. degree, which was completed in 1942. His major professor was J. B. Davidson, the same person who in 1915 had started the Agricultural Engineering Department at UC Davis. In 1943, Milt was employed as an assistant professor of farm structures research at Iowa State working on glued-wood construction and on fencing design. During his time in Ames Milt was elected to seven scholarly societies.

Because he had hoped to work on farm machinery, Milt took an associate professor position at the University of Georgia in Athens in 1946. However, in 1947 Milt accepted an offer from Professor Roy Bainer to come to UC Davis as an associate professor and to join with Professor Russell L. Perry to write a comprehensive textbook on agricultural process engineering. The book project was sponsored by the Ferguson Foundation, with publication to be by Wiley and Sons. Not long after work had started on the book Professor Perry went on an assignment to Indonesia, followed by assignments to UCLA and UC Riverside. Consequently, most of the writing of the book was done by Milt. In 1955 the hard-bound, first edition of Agricultural Process Engineering, was published. This popular textbook has since been published in three more editions, and it is through this book that Milt became known to agricultural engineering students world-wide.

When Milt came to UC Davis both he and Professor Perry taught courses on agricultural processing, heat transfer and refrigeration for both agricultural engineering majors and majors in the applied agricultural science fields. When Professor Perry left Davis all these courses fell to Milt, who found that he truly enjoyed teaching, and he continued teaching until his retirement in 1977. His interest in teaching found further expression in his continuing efforts at curriculum development for the training of agricultural engineers. Milt gave both research and promotional efforts to the incorporation of biological science in the curriculum. He was also one of the pioneers in broadening the purview of agricultural engineering to include the field of food engineering. This interest in teaching was further expressed in Milt's serving as departmental advisor for both undergraduate and graduate students. He served as associate dean for graduate studies in the College of Engineering in 1964 and 1965. Milt and Frances frequently entertained graduate students and visiting scholars working with Milt at dinners in a family atmosphere in their home, and the expertise of Frances in preparing these dinners became well known.

At UC Davis, the research on the drying and storage of grain that Milt had started in Iowa continued, but now the grain was rice instead of corn. His research showed his penchant for always reasoning from basic physical and biological principles, thus the extension of his expertise to the drying of hops, as well as, to the cooling of eggs was straightforward for him. This characteristic resulted in his grouping with several like-minded UC Davis researchers to work on phytotron facilities to investigate the process of solar energy transfers to photosynthesis in green plants. Milt became known internationally for his work on the grinding process of grains and other materials used for animal feed. All the research that he carried out was based on sound, and many times complex theory, but he knew the importance of having his research findings in a form that was useful to practitioners in the field. Consequently, Milt cooperated extensively with extension specialists in preparing materials related to his research. In order to further strengthen his ability to interact with the public on engineering problems he became a registered, professional mechanical engineer in the State of California – one of the few agricultural engineers in the 1950's to become so registered.

To make his knowledge on grain drying available to other agricultural engineers Milt gathered together theory and equations about the drying process, as well as, data on both the drying characteristics and the equilibrium moisture contents (at various levels of relative humidity) for various agricultural materials. This group of information became known to many agricultural engineers as Henderson's Equation. It allowed quantitative prediction of how an agricultural material would dry under any set of circumstances.

The inventive side of Milt was frequently expressed in the form of his development of various research instruments and tools. Working with Joe P. Gentry, he developed, and in 1966 patented, a machine to remove the pits from un-dried prunes.

In the late 1940's Milt visited many agricultural engineering departments in the United States to ascertain what sort of material should be included in the textbook he was writing. In the early 1970's he made similar visits to assess the degree of incorporation of biology courses in agricultural engineering curricula. As a visiting lecturer or as a consultant Milt traveled to Ireland in 1964, Virginia Tech University in 1965, Bangkok, Thailand in 1967, and Costa Rica in 1969.

In everything that he did Milt was unusually neat, orderly, thorough, and methodical. He was never one to take short-cuts, yet he was compassionate enough to not complain when co-workers were less virtuous in these respects than he.

Milt was a member of the American Society for Engineering Education, and the American Society of Heating, Refrigeration and Air Conditioning Engineers. He was a Fellow of the American Association for the Advancement of Science and the British Society for Research in Agricultural Engineering. He was a Life Fellow of the American Society of Agricultural Engineers (ASAE, now ASABE) compiling 67 years of membership. In ASAE he chaired, and/ or served as a member of nine key committees, each representing one of his many areas of expertise. From 1960 to 1963 he served as a Vice President of the ASAE.

From ASAE he received two "Exceptional Merit Journal Paper Awards" and two "Blue Ribbon Awards" for Educational- Aid Bulletins that he had written. In 1977, he was the recipient of ASAE's Massey- Ferguson Gold Medal Award for dedication to the spirit of learning and teaching in the field of agricultural engineering.

In 1978, Iowa State University presented Milt with a Professional Achievement Citation in Engineering. Then in the same year Simpson College presented him with an Honorary Doctor of Science Degree.

Upon retirement in 1977, Milt took up the hobbies of clock- making and of bee- keeping to accompany his regular stream of work- shop projects. In 2006, Milt, his elder son, Jerald, and his grandson, Brad, were recognized by the campus newspaper as constituting a third- generation team of UC Davis teachers. Jerald served as a Professor in the Mechanical and Aeronautical Engineering Department, while Brad taught in the campus' University Writing Program. Milt's younger son, Kenneth, operated a well- known insurance agency in Davis for many years. In his last few years, Milt lived in St. John's Retirement Village in near- by Woodland where he received numerous visitors and maintained an active interest in the farming operations in his home area in Iowa. Milt seemed always to be in good health and totally alert with a wry sense of humor. During his retirement he wrote thoughtful, sincere notes of congratulations, sympathy and thanks to various members of his department, as well as, to others. These notes were cherished by each recipient.

Milt was active in the Presbyterian Church most of his life, and one of the activities he pursued was singing in the choir. In his earlier days he was heavily involved with the development of a Boy Scout troop sponsored by the Davis Community Church. During his younger days he showed interest in athletics and music. He once won the rope climb at the county fair, could jump over a rolled newspaper held at each end with his hands, and could do one- handed pushups. He could play the harmonica by putting it in his mouth and not having to control it with his hands. He once played the cornet in a band led by John Phillip Sousa.

Silas Milton Henderson was preceded in death by his wife of 63 years, Frances. He is survived by his two sons, and their families, including four grandchildren and six great- grandchildren.