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In Memoriam

Professor Ralph L. Webb (1934–2011)



Ralph L. Webb died, after a protracted illness, on April 3, 2011. He was a world-renowned expert on enhanced heat transfer, professor emeritus at the Pennsylvania State University, and editor of the *Journal of Enhanced Heat Transfer*. Ralph Lee Webb was born in Parker, KS, on February 22, 1934. Son of Kenneth and Grace Webb, his early childhood and schooling was spent in this farming community, southwest of Kansas City. Subsequently, he went on to pursue studies in mechanical engineering, receiving his BS from Kansas State University in 1957. Immediately thereafter, he served for two years in the US Air Force at Nellis Air Force Base, Las Vegas, NV. He then joined Knolls Atomic Power Laboratory in Schenectady, NY, studying part time at Rensselaer Polytechnic Institute for his MS, which he received in 1962. His next position was with the Trane Company of La Crosse, WI, as manager of heat transfer research. He supervised 19 major projects in heat and mass transfer between 1963 and 1977.

Early in his career with Trane, while working full time, he found the time to complete a Ph.D. in mechanical engineering at the University of Minnesota (1969), studying with Professors E.R.G. Eckert and Richard J. Goldstein. His thesis led to his first archival paper, published in the *International Journal of Heat and Mass Transfer* in 1971. Pioneering patents were issued in 1970 and 1972 describing modification of finned surfaces to augment nucleate boiling heat transfer, which were then commercialized by the company.

In 1977, he joined the thermal science faculty at the Pennsylvania State University, University Park, PA, as associate professor of mechanical engineering. He was promoted to professor in 1981. His only sabbatical was spent at the National Engineering Labora-

tory, East Kilbride, Scotland (1990–1991). He retired from Penn State in 2004 as professor emeritus of mechanical engineering.

During his 27-year academic career, he was a highly regarded teacher and researcher. His courses for undergraduate and graduate students included the subjects of heat exchanger design, enhanced heat transfer, and applied heat and mass transfer. He conducted extensive research in boiling, condensation, fouling, air-cooled heat exchangers, single-phase forced convection of gases and liquids, and wetting coatings to promote thin liquid films. Professor Webb mentored 49 masters and 17 doctoral students to graduation. He also hosted several post doctoral researchers. He was committed to not only the progress of a student's thesis, but also to the student's professional growth and general well-being. His engagement with his students continued into their professional careers, and he would often remark that his students and their families were his "extended families." This warmth and personal connection was indeed extended to the larger heat transfer community and numerous professional colleagues worldwide.

His practical technical expertise was confirmed by the extensive consulting engagements he had with 75 different organizations in the USA, Asia, and Europe. Besides providing engineering and enhanced heat transfer expertise, he developed numerous computer programs for design of different types of heat exchangers, such as cooling towers, shell-and-tube exchangers, refrigerant evaporators, and automotive radiators, among others, for practical industrial usage. Furthermore, he consulted with several law firms and was involved as an expert witness in several patent infringement and heat exchanger litigation lawsuits.

Professor Webb was keenly interested in disseminating information on enhanced heat transfer. He and Professor Arthur Bergles collaborated on early versions of a Bibliography on Augmentation of Convective Heat and Mass Transfer. They presented 7 short courses on "Augmentation of Heat Transfer" at ASME national meetings from 1975 to 1986, as well as the first European short course on the subject, "Design Methodology for Enhanced Heat Transfer," in Ulm, West Germany, in 1989. Professor Webb taught several other short courses on various aspects of heat exchanger technology.

Perhaps the most prominent contribution to research and practice in high-performance heat and mass transfer was the publication of his book *Principles of Enhanced Heat Transfer* (Wiley, 1994; and 2nd edition, with N.-H. Kim, Taylor & Francis, 2005). This is still the only comprehensive text on the subject. His own work, documented in over 250 journal articles and conference proceedings, provided a solid foundation for the book. He continued to be active in research after retirement, in spite of his illness, as evidenced by the publication of his last paper in the May 2011 issue of the *IJHMT*.

He founded the *Journal of Enhanced Heat Transfer* in 1993. In his editorial in the first issue, he succinctly stated that “The key objective of the *Journal of Enhanced Heat Transfer* is to provide a single, international forum for papers on enhanced heat transfer.” His desire was to see this journal eventually “viewed and accepted as ‘the place’ to publish papers on enhanced heat transfer.” The scope of the journal was subsequently broadened to include “Theory and Application in High Performance Heat and Mass Transfer.” That the journal is currently in its 18th year of publication speaks volumes for his advocacy and efforts in promoting scholarship on the subject.

Beginning in 1970, Professor Webb organized numerous symposium sessions at ASME conferences and other meetings. He lectured at seminars throughout the world. He served on committees of AIChE, ASHRAE, ASME, and SAE. He chaired the ASME Heat Transfer Division and was a technical editor of the *Journal of Heat Transfer*.

Professor Webb’s work did not go unrecognized. He was elected Fellow of ASHRAE, ASME, and SAE. He received the ASME Heat Transfer Memorial Award, the UK Institute of Refrigeration Hall-Thermostat Gold Medal, and the AIChE Donald Q. Kern Award.

Professor Webb is survived by his wife, Sylvia R. Apple, of State College, PA, two daughters, Janet Lee and her husband, Seungbi, of San Diego, CA, and Laura Tymas and her husband, Baron, of Durham, NC, and their children, Elias and Jesse. He also is survived by two stepchildren, Scott Atkinson, of Springfield, MO, and Amy Cowperthwait, of Wilmington, DE.

It is clear that Professor Webb’s extensive professional activities required most of his time. However, he was deeply into the restoration of antique clocks and building of new “Grandfather” clocks – to the extent that he was considered a Clockmaker.

We, his long-standing colleagues and former students, as well as many friends in the field of enhanced heat transfer, are saddened by Professor Webb’s passing, as documented in the many tributes for the memorial service held three weeks after his death. We cherish his memory, and will follow his lead in promoting high performance heat transfer.

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