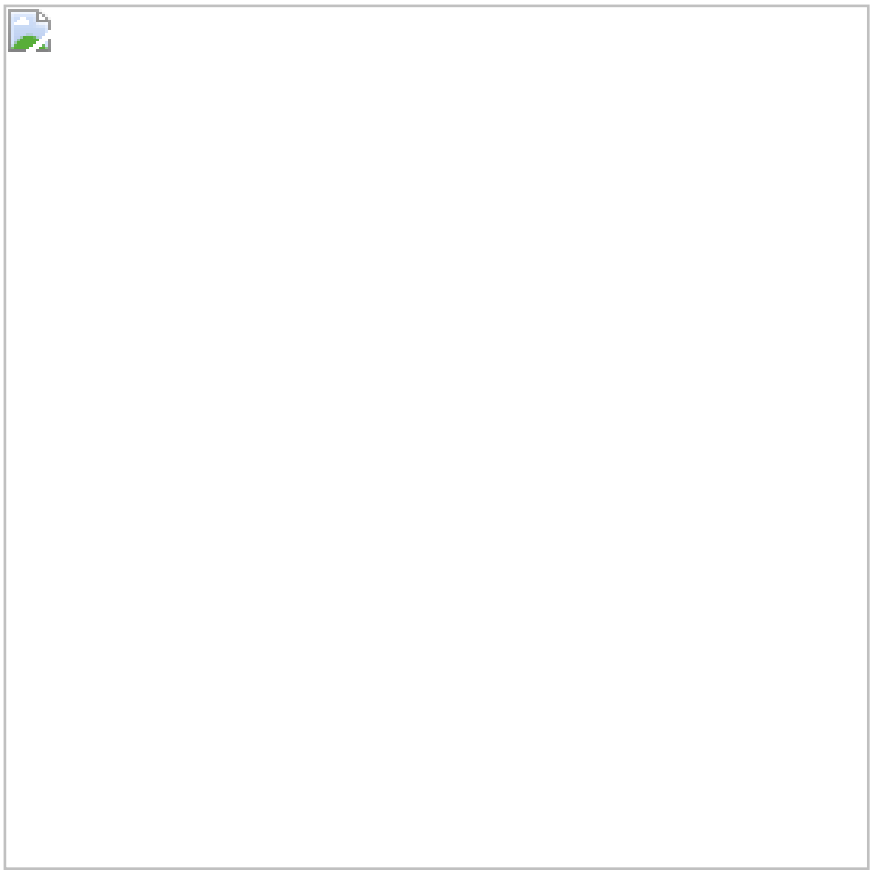

Austin Long

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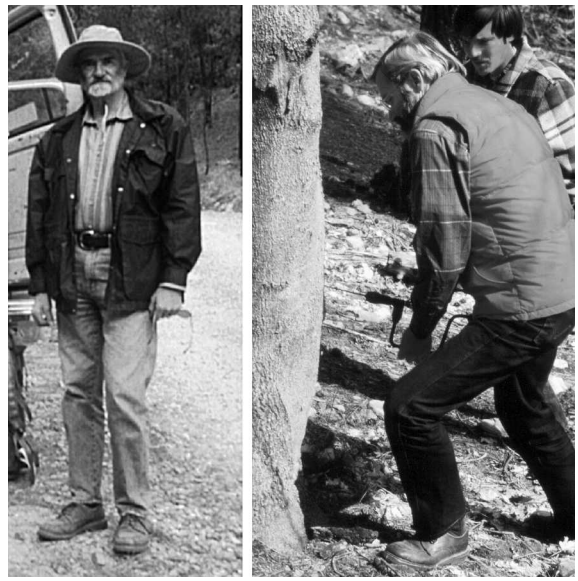
In Memoriam

AUSTIN LONG

1936–2010



Austin Long involved in tree-ring field work in the Santa Catalina Mts, southern Arizona.
Left—ponderosa pine isotope study, 1997;
Right—tapping maple tree for sap sugar isotope study, 1986 (Photo Credits—S. W. Leavitt)

With the passing of Austin Long on May 24th, 2010, our profession lost a productive and innovative researcher. Early in his career, Austin recognized the potential of isotope geochemistry as a tool for resolving problems in the earth sciences. Isotopes remained the unifying theme of his life's work. Synergy, also, was clearly important to Austin; he applied his expertise in isotopes in many fields, and with many collaborators. Last but not least among Austin's guiding principles were generosity and a strong sense of ethics.

Austin was a native of Wichita Falls, Texas. He began his university studies in his hometown, at Midwestern State University, graduating with a B.S. degree in 1957, and he earned a Masters degree in the Masters program at the Lamont Observatory of Columbia University (New York). Austin proceeded to doctoral studies under Paul Damon at the University of Arizona, and defended his dissertation 1966.

His first position was as a Senior Scientist in the Smithsonian's Radiation Biology Laboratory in Washington, DC from 1963 to 1968, with a concurrent affiliation as a researcher at the Geophysical Laboratory of the Carnegie Institution. In 1968, he accepted a position as Associate Professor at the University of Arizona in the Department of Geosciences, from which he eventually retired as an Emeritus Professor in 1998.

The breadth of his research contributions was remarkable. Austin's career spanned the development of three different analytical methods for radiocarbon. He and his students published on improvements to all three techniques, and on the application of radiocarbon dating to archaeology, groundwater hydrology, paleontology, paleoclimatology, atmospheric chemistry and solar physics. Austin served as Editor of the journal *Radiocarbon* between 1989 and 1999. In archaeology, he contributed to studies of Pleistocene

extinctions, the domestication of corn, the Clovis culture and Native American sites in Arizona. He was responsible for collecting an unparalleled data set for stable isotopes in Tucson rainwater, event by event, over 23 years. He was interested in the application of isotope techniques to biological systems, and made fundamental contributions to what are now flourishing fields of research in tree-ring and packrat-midden studies. His expertise in groundwater isotope studies was recognized nationally when he was invited to participate in the evaluation of prospective nuclear waste disposal sites in North Carolina, California and Nevada (Yucca Mountain). The development of a high-precision method for the measurement of stable chlorine isotopes in Austin's laboratory led to the application of the technique to natural systems in many other laboratories around the globe.

Earlier I mentioned Austin's generosity and ethical sense—qualities from which I learned and benefited as I began the second phase of my career. Austin's laboratories had a consistent reputation for producing good data and for fair treatment of clients. There was always room for visitors—in Austin's house, too—and the laboratories became an international crossroads where scientists from all over the world were welcome. Because the laboratories received State funding, Austin's policy was to give back to the community by self-funding beneficial research such as the Tucson Basin isotope study.

Austin is survived and greatly missed by his wife Karen, and by daughters Lara, Stephanie, Tonya, Kirsten and Kathy. He is also survived by a host of professional disciples who will continue to benefit from his teaching and research for decades to come.

—Contributed by Chris Eastoe

Austin loved to "tinker" in the best sense of tinkering. Whether it was maintaining his automobiles as a shade-tree mechanic or performing first aid on his mass-spectrometers, he seemed to relish rolling up his sleeves and getting "under the hood" to replace parts or make necessary adjustments. I think this was emblematic of Austin's inherent inquisitiveness that reached far beyond hardware to his efforts to expose and exploit the theory and basis of the hydrological, biological, and atmospheric systems he was studying, commonly addressing problems through analysis of stable isotopes, cosmogenic isotopes, or radioactive-decay isotopes. He encouraged students to approach their research problems similarly, first developing an understanding of the fundamentals of the problem, imagining then designing the experiments to resolve the question, and bringing new or modified instrumentation and analysis to bear on the problem as necessary.

Many times in Austin's career, resolution of research questions involved radiocarbon or stable-isotope analysis of wood and tree rings. Improving the accuracy of radiocarbon dating by perfecting chemical pretreatment to remove contaminants motivated Austin's radiocarbon analysis of bulk ancient wood and tree rings of modern wood. Austin's stable-isotope analysis of tree rings began systematically in the 1970s (with Terry Mazany and Juan Carlos Lerman) to develop a modern tree-ring $\delta^{13}C$ chronology from dated ponderosa pine tree rings from Flagstaff, and with $\delta^{13}C$ analysis of dated tree rings about 1,000 years old from archaeological sites. In both projects, Austin was interested in testing for climate and atmospheric $\delta^{13}C$ signals in tree-ring isotopes that could be used for reconstructions. I came along at the end of the 1970s and became Austin's PhD student working on tree rings. A recently completed dissertation by another of Austin's students at the time, Larry Arnold, had already found strong climate signals in the $\delta^{13}C$ of juniper leaves in Arizona (related to Austin's interest in extracting climate signals in plant matter isotope composition from packrat middens going back tens of thousands of years), which became the basis of my dissertation research on removing climate effects in the $\delta^{13}C$ of tree rings to isolate a record of atmospheric $\delta^{13}C$ before direct measurements were routinely done fairly late in the 20th century. This was just the beginning of many tree-ring projects in which Austin and I were involved over a 20-year period, in which he provided ready access to a mass-spectrometer after I left Arizona.

In several of these projects, I had the good fortune of going in the field with Austin to collect tree-rings samples with chain saws and increment borers. I don't know if Austin was ever a Boy Scout, but he always seemed to be prepared when we camped, and he re-introduced me to the delicious joys of cooking breakfast with butter (which I had previously abandoned because of the initial saturated-fat health scares). Another of Austin's traits from the research setting was also particularly valuable during these experiences, namely his patience and measured determination in resolving the day-to-day logistical problems we encountered.

I feel fortunate to have had interactions with Austin over these many different levels and in a variety of venues for several decades—he provided leadership by excellent example.

—Contributed by Steven W. Leavitt

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