

him for his good will, dedication, sense of responsibility, ability to get things done, and warm friendship. He showed us admirable courage, strength, and grace in the face of his medical situation. We miss him and his great enthusiasm about all things, especially his family.

Robert B. Hallock

University of Massachusetts Amherst

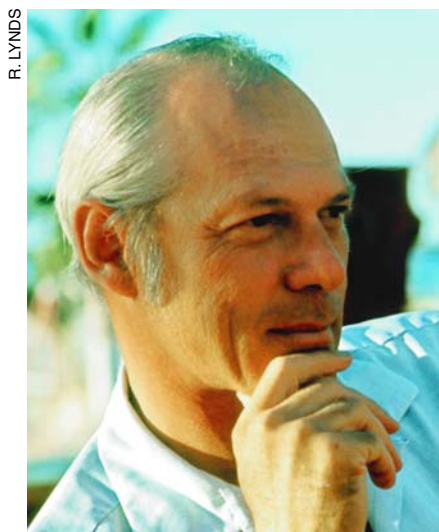
Austin Keith Pierce

The builder of the world's largest solar telescope, Austin Keith Pierce, was a leader in astronomy for decades. Groomed by the heavy hand of industrialist Robert R. McMath, he helped pull astronomy into the era of big science supported by government funding. Keith was born in Tacoma, Washington, on 2 October 1918, and died of cancer on 11 March 2005 in Tucson, Arizona.

Before World War II, a student who wanted to become an astronomer was discouraged unless he or she had an inherited income. As a career, astronomy offered no money or future. Even the largest observatories operated on shoestring budgets. For example, Mount Wilson Observatory, the product of the entrepreneurship of George E. Hale, only had light bulbs under 40 W. But massive government war efforts like the Manhattan Project changed all that. Keith, as a graduate student first under Ernest Lawrence at the Radiation Laboratory in Berkeley, California, never worried about 40-W bulbs. In Berkeley's can-do atmosphere, and later at the Oak Ridge, Tennessee, isotope separation plants, Keith learned physics technology through techniques such as high-vacuum practices and glass blowing, in optics, and via electronics and detectors.

As a youth, he had absorbed the rudiments of telescope building from his father, who taught mathematics at the University of Nebraska. *Amateur Telescope Making*, edited by Albert G. Ingalls (Scientific American, 1928), was their bible. Keith received an AB degree in physics at the University of California, Berkeley, in 1940. His PhD thesis, under Charles Shane, who held positions in both the astronomy department and the Rad Lab, was on the intensity of the solar magnesium *b* lines. For that, Keith used a Fabry-Perot interferometer with the department's 10-inch coelostat. He built his instruments in the Rad Lab shops, which were adjacent to the campus.

Keith then went to the University of Michigan and the McMath-Hulbert Observatory. After the war, govern-



Austin Keith Pierce

ment support for science was available. Astronomers boldly proposed to the fledgling NSF that some sort of a national observatory be formed and a 24-inch telescope for stellar photometry be placed near Yuma, Arizona. Into that near-vacuum stepped McMath. He steered astronomy—often through Keith—toward a national observatory to serve both solar and stellar astronomers' interests based only on the quality of their proposals.

McMath envisaged a new solar telescope and soon sent Keith to Europe to see firsthand the good and the bad of solar telescopes. Keith was particularly impressed by innovations at the Pic du Midi Observatory, in Toulouse, France, under Jean Rösch. The Europe trip and many other events led him to a concept that included an aperture of 1.5 m, an all-reflective light train to fully use Earth's atmospheric transmission windows from 0.3 to 20 microns, and active temperature control of the telescope and its internal environment to ensure good image quality.

McMath brought in the architectural firm of Skidmore, Owings, and Merrill to design the building. After Kitt Peak, Arizona, was selected as the site, the firm proposed to cantilever the telescope from the north summit so the tracking mirror would be 500 m above ground. Ira S. Bowen, Mount Wilson's director, suggested the radical idea that it be placed atop the nearby Baboquivari Mountains—the highest point is 2356 m—with an elevator bored through granite for ready access to the valley floor! As with many large physics labs, the final design was not limited to fixed instrumentation but could accommodate nearly any experimental equipment later developed.

The telescope saw first light in 1962. One of its principal instruments was a 13.5-m double-pass vertical spectrometer, which now contains two of the world's largest gratings. Using it, Keith carried out four seminal solar-spectrum investigations in the 1960s and 1970s that took full advantage of the telescope. Those fundamental works described the characteristics of 11 500 spectral lines seen in emission at the solar limb; the true central intensities of 40 important spectral lines, corrected for spectrograph-scattered light; definitive wavelengths of 14 624 solar absorption lines from 292 to 908 nm, referenced to thorium laboratory standards; and a quantitative specification of solar limb darkening.

Keith enjoyed reading the adventures of travelers like Richard Burton and Ernest Shackleton. His own sense of adventure was expressed in backwoods drives with his family: When they encountered a fork in a road, they always took the smaller, more intriguing one. He liked hiking but always wore a necktie. Once when asked why, he responded, "You never know who you might meet."

Besides building the monumental telescope, rededicated on its 30th anniversary as the McMath-Pierce Solar Telescope, Keith provided outstanding scientific leadership to the solar division staff of Kitt Peak National Observatory for its first 13 years. The imprint of his scientific work remains strong today, especially in the IR spectrum.

William Livingston

John Harvey

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Herman Postma

Herman Postma, longtime director of Oak Ridge National Laboratory (ORNL), died of a cerebral hemorrhage on 6 November 2004 while on vacation in Hawaii.

Postma was born in New Hanover County in North Carolina on 29 March 1933. His parents had emigrated from the Netherlands, and were still struggling financially, but Postma proved to be an outstanding student and won a full scholarship to Duke University. In 1955, he graduated at the top of his class with a BS in physics.

He entered graduate school at Harvard University under adviser Richard Wilson, who recalled, "Herman was one of the few of my students who did not have to have everything explained three times before it was