

Memorial to Rodger E. “Tim” Denison 1932–2016

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Tim Denison passed away on 8 July 2016 after a rich life of 83 years. Tim was born 11 November 1932, in Fort Worth, Texas, to A. Rodger and Maude Espy Denison, but raised in Tulsa, Oklahoma. Dr. A. Rodger Denison was a successful petroleum geologist who served as president of the American Association of Petroleum Geologists from 1943 to 1944. Tim graduated from the Wentworth Military Academy in Missouri. Despite growing up in an oil town, Tim’s real interest was in studying history. Dissuaded from majoring in history by his parents, who feared for his future employment prospects, Tim decided to study geology (which he regarded as a historical science given its focus on studying the evolution of things through time) and went on to obtain a B.Sc. in geology from the University of Oklahoma. During the Korean War, he was drafted into the U.S. Army and completed Ranger training, then served two years as a platoon leader. Tim never talked much about his experiences in Korea, but his remarkable character traits of loyalty, commitment, and forthrightness were tested and strengthened there. Tim’s platoon extolled his superb qualities as a platoon leader, bestowing on him a plaque honoring his strong, fair leadership and stating they would follow him anywhere. It was in Korea where Tim developed his love of classical music.



Following his service, Tim returned to OU for his M.Sc. It was there he met Caroline Holmes on a blind date; they married three months later on 26 December 1957 and enjoyed 58 years together. Tim became a GSA member in 1958 and remained a member his entire life. He became a GSA Fellow in 1972.

After graduating from OU, Tim worked for the Oklahoma Geological Survey on the basement rocks of southern Oklahoma. In the early 1960s, William R. Muehlberger at the University of Texas at Austin began an AAPG- and Air Force–supported project on the basement rocks of North America. Understanding the character of the basement would assist geophysicists in their study of Soviet underground nuclear testing. In what Bill repeatedly described as “a great stroke of luck” he discovered Tim was working on a similar project in Oklahoma and recruited him

to come to UT to study for his Ph.D. Along with fellow student Edward Lidiak, they pieced together the hidden basement provinces of the continent from samples in many dozens of deep petroleum exploration wells and the isolated basement rock outcrops scattered across parts of Oklahoma, Texas, Kansas, Missouri, Arkansas, and Nebraska, along with more extensive and well-mapped exposures in New Mexico, Colorado, and Wyoming. By the time he finished his Ph.D. in 1966, Tim and Caroline's daughters Kelly and Cambria had been born. His association with UT continued his entire life, and he remained active in the Geology Department (now called Jackson School of Geosciences) until his death. He was one of the youngest people ever named to the UT Geology Advisory Council, and he missed only three of the advisory committee meetings in his more than four decades of service.

In 1964, Tim took a job as a researcher with Mobil Oil and the family moved to Dallas, where Tim joined Mobil Research and Development. In Dallas, Tim selected and prepared igneous and metamorphic rocks for radiometric dating and interpreted the results for samples encountered in Mobil's worldwide operations. Except for 14 years as a consultant, Tim worked for Mobil (now ExxonMobil) until he retired and became a research scientist in the Department of Geosciences at the University of Texas at Dallas.

During Tim's career at the Mobil Research and Development Lab, he merged his knowledge in geochemistry with that in sedimentology to become well known as one of the pioneers of the discipline known as strontium isotope stratigraphy. Tim and his colleagues at Mobil recognized that the shells of carbonate-secreting marine organisms captured the Sr isotopic composition of the seawater in which they lived, and that the Sr isotopic composition of seawater through time could be reconstructed by careful selection of the most pristine and biostratigraphically constrained samples. In the 1960s, colleagues at Mobil, led by physicist George Kenny, built the first multisample, thermal ionization multicollector mass spectrometer (24 sample turret, 4 fixed cups for ^{85}Rb , ^{86}Sr , ^{87}Sr , and ^{88}Sr), a design that was 20 years ahead of mass spectrometer technology of the time. Tim and his colleagues at Mobil (especially Bill Burke and Ernest Hetherington) used the innovative instrument to measure well-preserved fossils and limestones of various ages and used this to reconstruct the Sr isotopic evolution of the oceans during the Phanerozoic. First efforts were to help understand the age of unfossiliferous deposits for Mobil, but eventually the team was allowed to publish a synthesis of their results. His 1982 paper (Burke et al., 1982) presenting the so-called "Burke or Mobil curve" for Phanerozoic seawater is a classic, with more than 1500 citations. Tim was also instrumental in deciphering how trace elements could be used to help identify least-altered marine precipitates in terms of their $^{87}\text{Sr}/^{86}\text{Sr}$ compositions (Denison et al., 1994).

Following his retirement from Mobil, Tim brought the Mobil mass spectrometer to UT Dallas, where he continued Sr isotope research on waters and rocks from the south-central United States, particularly the Permian, Cretaceous, and Recent of Texas and Oklahoma. Tim liked his routines; as an example, he took daily walks around the UTD campus with his friend and scientific collaborator Doug Kirkland before getting back to work. Tim would put on classical music when writing, spending the day with colleagues in his office with a short break for lunch. Then at about 4 p.m. it was time for a glass of beer or wine and more work until news at 6 p.m. and then dinner at 7 p.m.

Tim's love of field geology resulted in compilation of important regional data sets over many years without funding. As acknowledged in his 2003 publication on Comanchean Series strontium isotope chronostratigraphy (Denison et al., 2003), "This work received no financial support and was conceived as a justification to visit and collect at nearby exposures on pleasant days." On his frequent visits north (Norman) and south (Austin) of Dallas, Tim would regularly stop to collect bedrock, river and lake waters. Analyses of these samples demonstrated the use

of Sr isotopes as important riverine tracers (Sun et al., 2011). In 2009, the Geological Society of America South-Central Section held a special session in Tim's honor titled "A View of the Craton Southward into the Gulf of Mexico" at its meeting in Dallas. In 2014, the Oklahoma Geological Survey dedicated their monumental volume *Igneous and Tectonic History of the Southern Oklahoma Aulacogen* to Tim.

Tim published over 70 papers in the peer-reviewed geoscientific literature and was active in both GSA and AAPG, providing a rare and much-needed bridge between academia and industry. Tim's experience in both industry and academia enabled him to provide especially useful advice because he appreciated the importance of sound science and strong industry and because his advice was tempered by his wide-ranging practical experience. You always knew where you stood with Tim; he might not agree with your ideas but he was never duplicitous. Tim was committed to the importance of careful field observations and thin section descriptions. He believed that it was important for students to study petrographic thin sections, and he put his money where his mouth was. In the fall of 1971, Tim began sponsoring an award to the UT Austin geology student who best identified a variety of rock hand specimens and thin sections. The winner of this written competition held each spring, known as the Petrography Award, received a cash award of \$1,000 (a tidy sum back then) along with the envy of her or his peers. Although open to all, graduate students had an experience advantage over undergraduates. This situation was remedied in 1981 when a separate undergraduate award was created.

When Tim wasn't geologizing, he attended to his family and his many interests. He rebuilt Alfa Romeos, played tennis, and read widely, especially history. He loved classical music and collected Bullwinkle memorabilia. A treasured possession was a bubble bath container in the shape of Bullwinkle that he painted gold to resemble an Oscar statue. His family will remember him as a superb team member to have in a game of Trivial Pursuit; a weekend cook whose specialties were nachos, and grilled cheese made in the waffle iron; a connoisseur of both good and cheap beer; and an avid Simpsons fan. He could recall dozens of New Yorker cartoons. He was very fond of cats, of which the family had many over the years, and of escaping the Texas summer heat in Colorado.

Survivors include his wife, Caroline Holmes Denison; daughter and son-in-law Kelly and Tim Harrell; daughter and son-in-law Cambria and Brian Reinsborough; grandchildren Calder, Reeve and Kellen Reinsborough; sister and brother-in-law D'Ann and Jay Kavanaugh; sister-in-law Sue Holmes Dunn and her husband, David; niece Molly Frank and her husband, Michael; niece Cassie Crosby and her husband, Doug; niece Tammy Kavanaugh and her husband, John; niece Palmer Kavanaugh; and nephew Morgan Kavanaugh, plus many great-nieces and -nephews.

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