DOCUMENTS OF THE GENERAL FACULTY

REPORT OF THE MEMORIAL RESOLUTION COMMITTEE FOR
WILLIAM R. MUEHLBERGER

The special committee of the General Faculty to prepare a memorial resolution for William R. Muehlberger, professor emeritus, geological sciences, has filed with the secretary of the General Faculty the following report.

Sue Alexander Greninger, Secretary
General Faculty and Faculty Council

IN MEMORIAM
WILLIAM R. MUEHLBERGER

William Rudolf (Bill) Muehlberger was born in New York on September 26, 1923, before his family moved to Hollywood, California, in 1929. He died of natural causes in Austin, Texas, on September 26, 2011. During his eighty-seven years, he attained large physical and professional stature and had a great impact on those who were fortunate to know him. His professional activities centered on his specialty: structural geology and tectonics rooted in fieldwork. He taught thousands of undergraduate students and many hundreds of graduate students and supervised the theses of sixty-one master’s and the dissertations of twenty-six Ph.D. students who went on to outstanding careers in research, teaching, government, and industry. His protégés worked on problems in tectonics, structural geology, and petrology in Texas, New Mexico, Colorado, the basement rocks of North America, Vermont, the Canadian Rockies, the Gulf of Mexico, Mexico, Guatemala, Honduras, Turkey, and on the moon.

Bill Muehlberger’s interest in geology was inspired by Boy Scout field trips into the San Gabriel Mountains and by a high school course in physical science taught by a Caltech graduate who had received a degree in geology. Muehlberger went on to receive all his professional degrees in geological sciences at Caltech; his undergraduate education began in fall 1941, just before World War II. He volunteered for the U.S. Marine Corps (1942-46) and was sent to the University of California at Berkeley for training in civil engineering to become a combat engineer (while there, he reigned as intramural heavyweight wrestling champion). After his discharge from military service, he returned to Caltech. In 1947, he was a field assistant mapping pegmatites in northern New Mexico, which began his lifelong interest in creating maps. Bill achieved distinction in both academic and athletic arenas; he was recognized as outstanding senior with the Hinrichs Memorial Award in the Caltech class of 1948. Notably, he was actually awarded his B.S. degree in 1949, as he was given an incomplete in a course so that he could remain eligible to play fullback on the football team along with his younger brother, Eugene. However, his season was cut short by injury, an event that enabled him to obtain an M.S. degree at the end of 1949.

Bill began doctoral studies on the Garlock fault zone in the northern Mojave Desert, but he was recalled to duty in the Marine Corps for the Korean War from 1950 to 1952. This time, he was based at Camp Pendleton where he worked on groundwater problems since he was the only marine who was trained both as a civil engineer and as a geologist. After returning to Caltech, Bill discovered that the field area for his original dissertation project had been turned into a restricted military base for testing rockets. He had to start anew and finished his dissertation in 1954 on the Pelona schist and strata of the Soledad basin of southern California, a study supervised by Richard H. Jahns, who had introduced him to fieldwork in 1947. Bill was proud that his diploma declared his major to have been structural geology and his minor vertebrate paleontology.
Professor Muehlberger was recruited to the UT Austin faculty by Professor Samuel Ellison whom he had met at an American Association of Petroleum Geologists (AAPG) meeting in Los Angeles. Bill and Sally Muehlberger left California so that he could become an assistant professor in fall 1954. This began his fifty-seven-year affiliation with The University of Texas at Austin. He was promoted to professor in 1962 and served as chair of the department from 1966 to 1970. During his tenure, the plate tectonics revolution occurred, and he oversaw an expansion into geophysics that led to the change in name from Department of Geology to Department of Geological Sciences. Bill became professor emeritus in 1992, but continued to be an active presence in the department until very near his passing, as evident from the fact that he gave two formal, hour-and-a-half lectures to students on viewing the Earth from space and on his tectonic map of North America in late October 2010.

From 1962 to 1966, Bill was the director of the Crustal Studies Laboratory at The University of Texas at Austin. This lab was primarily funded by the need to detect underground nuclear explosions. The goal was to compile all that was known about the buried basement rocks of North America. The studies were needed to help improve knowledge of variations in the crust so that seismologists could better separate local “geological noise” from an explosive seismic signal. This work resulted in the publication of the “Basement Rock Map of the United States” by the U.S. Geological Survey (USGS) in 1968. The map, along with three supporting papers (listed below), were the definitive studies concerning the buried basement terranes in the interior of the North American continent for about two decades.

Between 1968 and 1975 and intermittently afterward, Bill supervised graduate students who completed dissertations centered on mapping the geology of Central America, mostly Honduras, Guatemala, and parts of southern Mexico. The mapping established the first regional framework of the basement geology, Mesozoic and Cenozoic stratigraphy, as well as the nature of Laramide orogenesis and Cenozoic strike-slip and extensional tectonism. The initial program produced four geological quadrangle maps in Honduras and two in Guatemala. Eventually, Muehlberger’s students were credited with fourteen quadrangles that are still the basis for urban planning, mineral and oil exploration, and academic research. This work, supported by local universities and government agencies, was funded by the National Science Foundation (NSF), the United States Agency for International Development (USAID), and several petroleum companies and was assisted by volunteers in the Peace Corps.

In 1964, Bill became involved in geological field training of the Apollo astronauts. Apollo training started with field trips to see faults, folds, intrusions and lava flows, sand dunes, and impact craters in West Texas, New Mexico, Arizona, California, Oregon, Hawaii, and elsewhere to help the astronauts understand what they would be seeing when they orbited Earth or landed on the moon. For example, the Rio Grande Gorge in the Taos Plateau of northern New Mexico is an almost 1:1 scale model for the lunar Hadley Rille, where Apollo 15 landed. That training evolved to include teaching astronauts to use a compass and aerial photographs to map folds and faults in the Marathon region and volcanic rocks in Big Bend of West Texas. The objectives and logistics of the field excursions included simulations of the limited communications that would be available through Mission Control with men on the moon.

In 1970, Bill was selected to be chief of the Surface Geology Team for Apollo 16 through 20. Shortly after his selection, however, the last three planned missions were eliminated. From 1970 to 1973, he was on leave from UT Austin and employed by the USGS as the principal investigator for geology on the Apollo 16 and 17 landings. Bill led the scientific team that selected the “last landing sites” and set priorities for sampling traverses—fundamental endeavors. These missions had a rover and three scheduled seven-hour traverses. He was in Mission Control in Houston to provide real-time mission support. He performed post-mission data analysis and astronaut debriefings and contributed to the publication of scientific results from the returned samples (see citation below). Bill worked closely with the latest four persons to walk on the moon—Charles Duke and John Young on Apollo 16, and Gene Cernan and Jack Schmitt on Apollo 17.

Notably, the largest rock returned from the moon was nicknamed “Big Muley” in his honor. This twenty-six-pound, football-sized and -shaped whitish piece of anorthosite was collected as a contingency sample by astronaut Charlie Duke during the first Extra Vehicular Activities, or moonwalks, of Apollo 16. Muehlberger was at Mission Control watching the live video feed of the crew’s moonwalk with his twenty-nine-member team. The area proved to have few rocks, but the team spotted one jutting from the dust around the lip of Plum
Crater. The mission communicator told Charlie Duke that Bill wanted him to pick it up. The size of the rock was not evident in the video, and Duke was clearly surprised at the instruction. “Big Muley” was large and unwieldy, even in the one-sixth gravity of the moon. In his bulky space suit, Duke couldn’t just bend over and pick up the big rock. Instead, he had to sink to his knees, then slowly roll the rock up his leg, press it against his thigh, and then rise. The video of Duke struggling to collect the rock records him saying, “If I fall into Plum Crater picking up this rock, Muehlberger has had it.” The video of this famed event (http://www.hq.nasa.gov/alsj/a16/a16v.1240739.mov) was featured in the definitive 1989 Apollo documentary “For All Mankind.” In recognition of Muehlberger’s importance to the Apollo Program, NASA presented him with the Medal for Exceptional Scientific Achievement in 1973.

Following Apollo, Bill became co-investigator for the Earth Observations team of the Skylab and Apollo-Soyuz missions. He provided each class of astronauts with the training needed to understand the Earth beneath them and encouraged them to systematically photograph the less accessible areas. Crews of the three Skylab missions in 1973/74 and Apollo-Soyuz in 1975 captured thousands of photographs of mountains, valleys, volcanoes, ocean currents, and weather patterns, which were taken with hand-held cameras and which have been used in countless publications and classroom lectures. During 1974/75, Bill was an AAPG distinguished lecturer who presented “Our Dynamic Earth: The View from Skylab” to thirty-five universities and geological societies. In 1981, NASA appointed Bill as geological advisor for the Space Shuttle Earth Observations Project, which eventually also included the International Space Station. Since Apollo, Bill provided astronaut classes and flight crews with forty-five days of lectures and thirty-one multi-day geological field trips. Many of the astronauts returned to give public lectures about their observations of Earth that were enhanced by or rooted in Bill’s teachings. Between 1976 and 2000, Bill also gave seventy-eight lectures at universities about viewing the Earth from space. In recognition of his contributions to astronaut training and educational outreach, NASA also awarded him the agency’s Public Service Medal in 1999. Bill was involved in planning toward fieldwork on Mars and was recognized as a member of the group selected for the Team Innovation Award by the Johnson Space Center in 2010.

In 1982, Bill, aided by numerous colleagues and several graduate assistants, began compilation of the “Tectonic Map of North America” for AAPG. The map, published in 1992 (southern half) and 1996 (northern half), extends from the northern edge of South America to the North Pole. Six feet on a side and displayed in hallways in geoscience departments around the world, this map shows the major geological units that constitute North America. The mapped units are differentiated in terms of time and plate tectonics—batholiths and volcanic arcs, fold/thrust belts, metamorphic belts, rift basins, continental shelves, etc.—that were created by ancient and ongoing plate interactions. Muehlberger’s map, which hangs in the UT Austin geology auditorium, is so widely respected that entire college-level geology courses are built around its interpretation. In recognition of the quality of the compilation and the significance for research and teaching, the Structural Geology and Tectonics Division of the Geological Society of America (GSA) selected this publication for their 1998 Best Paper Award.

Bill held various endowed positions in the Department of Geological Sciences. These included the Fred M. Bullard Professorship (1980-82), the Charles E. Yager Professorship (1982-83), the John E. (‘Brick’) Elliott Professorship (1983-85), the William Stamps Farish Chair in Geology (1985-89), and the Peter T. Flawn Centennial Chair in Geology (1989-92). Upon retirement, he was appointed emeritus professor, maintained an office, and remained highly active in departmental activities.

Besides the awards mentioned above, Bill was also recognized with the George C. Matson Award for best paper published by the AAPG in 1965, with the Houston Oil and Minerals Corporation Faculty Excellence Award in 1978, with the Knebel Distinguished Teaching Award in 1993, as Honorary Member of the AAPG in 1995, as Honorary Member of the Austin Geological Society in 2000, with the Distinguished Educator Award from the AAPG in 2002, with the Jackson School Hall of Distinction in 2008, and with the Marcus Milling Legendary Geoscientist Medal from the American Geological Institute in 2010.

In August 2010, a research symposium was organized in Bill’s honor by former student/colleague Patricia W. Dickerson, which brought together more than one hundred and twenty former students, colleagues, and friends. For almost two full days, they thanked him and shared the fruits of their research in fields as diverse as North American tectonics, Central American and Caribbean geology, natural resources, lunar geology, and human
Bill met Sally J. Provine in 1948, and they married in 1949. For sixty years, they were partners who traveled the world, proudly raised Karen and Eric, and immensely enjoyed their time with their children’s spouses, Paul and Edie, and four grandchildren, Hahna and Olivia Muehlberger, and John and Kristen Erickson. Sally contributed to the University and department in many ways, including being one of the original ten docents for the LBJ Presidential Library. During Bill’s early years at The University of Texas at Austin, he was supported during the summer by the New Mexico Bureau of Geology (NMBG) to map the northern part of the state. Sally joined Bill and was a full collaborator in a 1961 guidebook to the High Plains of New Mexico. Their publication was revised and expanded forty years later to become the 2005 NMBG publication, *High Plains of Northeastern New Mexico: Guide to Geology and Culture*. Their guide was selected for the 2007 New Mexico Best Travel Book Award and has been a best-selling publication for the NMBG ever since. Between the two editions of that book, they co-authored another very popular 1982 NMBG guide, *Española—Chama—Taos: A Climb through Time*. In 1993, shortly after his retirement, Bill, Sally, and their family and friends established the William R. Muehlberger Field Geology Scholarship to support students. Sally passed away following complications from heart surgery on October 28, 2008.

**Significant Publications**


This memorial resolution was prepared by a special committee consisting of Professors Mark P. Cloos (chair), Patricia Dickerson, and Sharon Mosher.

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