Memorial to John W. Harshbarger 1914–1991

EUGENE S. SIMPSON, ERROL L. MONTGOMERY

Tucson, Arizona

Professor John W. Harshbarger, founder of the University of Arizona Department of Hydrology and Water Resources, died Thursday, October 10, 1991, at the age of 77.

John Harshbarger was regarded as one of Arizona's and the nation's leading experts in the field of water resources. He provided guidance and leadership in the development of water supplies nationally and internationally, including work throughout the United States, Mexico, South America, and the Middle East, during a career that spanned nearly five decades. During his tenure at the University of Arizona, Harshbarger, with assistance from the U.S. Geological Survey, organized the first academic program in the United States that combines teaching and research in all aspects of hydrology. In 1971 the hydrology program became an independent and self-governing



department. Under Harshbarger's direction, the Hydrology Department achieved a national and international reputation for excellence. This department, which grants Bachelor of Science, Master of Science, and Doctoral degrees in hydrology, remains the only one of its kind in the United States.

John Harshbarger was born in Lewistown, Pennsylvania, on May 13, 1914. In 1942 he earned a Bachelor of Science degree in mining engineering from the Texas College of Mines; in 1948 he earned a Master of Science and in 1949 a Ph.D. in geology from the University of Arizona. In 1957 Harshbarger was awarded a professional degree in geological engineering from the University of Arizona.

He began his professional career in 1942, working as a mining engineer for Inspiration Consolidated Copper Company, Inspiration, Arizona. From 1943 through 1946 he was a geologist for Union Mines Development Company, Grand Junction, Colorado. He was a graduate assistant and teaching assistant at the University of Arizona Department of Geology under a Shell Fellowship Grant from 1947 through 1949, and an assistant professor from 1949 through 1950. He joined the U.S. Geological Survey, Groundwater Branch, in 1950 and became district geologist of the Groundwater Branch, State of Arizona, in 1955.

In 1959, Harshbarger left the U.S. Geological Survey to become a professor of geology at the University of Arizona. He served as geology department head from 1961 through 1966, and as hydrology department head from 1966 through 1967. He continued as a part-time professor until 1980, when he retired from the university and was given the status of Professor Emeritus. John and his wife established the first graduate fellowship award for the Department of Hydrology and Water Resources, the John and Margaret Harshbarger Fellowship, which aids outstanding doctoral candidates. In 1982, Harshbarger received the honor of Distinguished Citizen Award by the University of Arizona in recognition of outstanding service.

As Harshbarger's experience, academic qualifications, and professional activities became better known, he came under pressure to provide technical services in hydrogeology to the nonacademic community. In 1967 he began to devote a major part of his professional time to

consulting activities as founder and head of the firm of Harshbarger and Associates, and later in association with Errol L. Montgomery & Associates. During his career he was coauthor of two books, and he wrote 39 scientific published articles and more than 200 technical reports on geology and groundwater hydrology.

John Harshbarger had an outstanding professional impact on geology and hydrogeology. He will be remembered as one of a small group of eminent Arizona earth scientists, and as an important contributor and outstanding member of the worldwide earth science fraternity.

He is survived by his wife, Margaret; two daughters, Donna Rea of Ann Arbor, Michigan, and Mary Jane Makaio of San Diego, California; a son, R. Howard Harshbarger of Tucson; and numerous grandchildren.

Memorial gifts in John Harshbarger's memory may be made to the University of Arizona Foundation for the John and Margaret Harshbarger Fellowship. Contributors should address memorial gifts to: University of Arizona, Scholarship Development Office, Attention: Chad Hunley, 1111 N. Cherry, Tucson, Arizona 85721.

SELECTED BIBLIOGRAPHY OF J. W. HARSHBARGER

- 1946 Supplemental and summary report on the Western Carrizo Uplift and Chuska Mountains area of the northern Navajo Indian Reservation, northeastern Arizona: Union Mines Development Corporation Report RMO-441, 82 p. (open filed by AEC in 1960).
- 1951 (with Repenning, C. A., and Jackson, R. L.) Jurassic stratigraphy of the Navajo country, in Guidebook, second field conference: New Mexico Geological Society, p. 95-99.
- 1953 (with Repenning, C. A., and Callahan, J. T.) The Navajo country: Arizona-Utah-New Mexico, in The physical and economic foundation of natural resources (Part IV, Sub-surface facilities of water management and patterns of supply—Type area studies), U.S. House of Representatives, Interior and Insular Affairs Committee, p. 105-129.
- 1954 (with Repenning, C. A.) Water resources of the Chuska Mountains area, Navajo Indian Reservation, Arizona and New Mexico: U.S. Geological Survey Circular 308, 16 p.
- 1956 (with Brown, R. H., and Thomas, H. E.) Analysis of basic data concerning ground water in the Yuma area, Arizona: U.S. Geological Survey Open-File Report, 117 p.
- 1957 (with Repenning, C. A., and Irwin, J. M.) Stratigraphy of the uppermost Triassic and the Jurassic rocks of the Navajo country: U.S. Geological Survey Professional Paper 291, 74 p.
- —— (and others) Annual report on ground water in Arizona—Spring 1956 to spring 1957: Arizona State Land Department Water-Resources Report no. 2, 42 p.
- 1958 Use of ground water in Arizona in Climate and man in the southwest: University of Arizona Press, Program in Geochronology Contribution no. 6.
- —— (with Akers, J. P.) Ground water in Black Mesa Basin and adjacent areas, Arizona: New Mexico Geological Society Ninth Field Conference. (J. W. Harshbarger also coedited the guidebook.)
- 1959 (and others) Capturing additional water in the Tucson area: Arizona State Land Department Watershed Management Symposium, third annual volume, p. 25-46.
- 1960 Geohydrology of arid lands, Arizona—A case study: University of Arizona Press, Arid Lands Colloquium.
- 1961 Techniques of ground-water development in the Navajo country, Arizona, New Mexico, and Utah: International Association of Scientific Hydrology Publication no. 57, p. 657-679.
- 1963 Capturing additional water for the increase of supplies, in Land and water use: American Association for the Advancement of Science, p. 211–223.

- 1964 (with Skibitzke, H. E., and Brown, R. H.) Water and its uses, in Aridity and man: American Association for the Advancement of Science, p. 145-173.
- 1966 (and others) Arizona water: U.S. Geological Survey Water-Supply Paper 1648.
- 1967 (with Evans, D. D.) Educational progress in water resources present and future: Water Resources Bulletin, v. 3, no. 1, p. 29-44.
- 1969 (with Cooley, M. E., Akers, J. P., and Hardt, W. F.) Regional hydrogeology of the Navajo and Hopi Indian Reservations, Arizona, New Mexico, and Utah: U.S. Geological Survey Professional Paper 521-A.
- 1970 Source, movement, and development of water in arid regions, in Mining and ecology in the arid environment process: Tucson, University of Arizona Press, p. 122–134.
- 1971 (with Peek, H. M., Guyton, W. F., Brasgears, M. L., Walton, W. C., and others) Hydrogeology and effects of pumping from Castle Hayne aquifer system, Beaufort County, North Carolina: North Carolina Department of Water and Air Resources Open-File Report.
- 1979 (with Farrell, C. R.) Ground-water studies for nuclear power plant siting, in Hatheway, A. W. and McClure, C. R., Jr., eds., Geology in the siting of nuclear power plants: Geological Society of America Reviews in Engineering Geology IV.
- —— (with Hargis, D. R.) Hydrology and mining in the Tucson area: Society of Mining Engineers of AIME.
- 1983 (with Montgomery, E. L.) Groundwater development from salar basins in the arid Andean highlands of northern Chile: Australian Water Resources Council, Department of Resources and Energy, International Conference on Groundwater and Man, Sydney, Australia, December.
- 1985 (with Montgomery, E. L.) Ground-water development for mineral industry in arid zones of the Andean Highlands, South America: Mining Engineering, January, p. 45–48.
- 1988 (with Montgomery, E. L., and Victor, W. R.) Hydrogeologic conditions of the regional karstic aquifer and associated breccia pipes near Grand Canyon, Arizona, USA: Karst hydrogeology and karst environment protection: Proceedings, International Association of Hydrogeologists 21st Congress, Gulin, China, v. XXI, Part I, p. 429-434.
- 1989 (with Montgomery, E. L.) Arizona hydrogeology and water supply: Arizona Geological Society Digest, v. 17, p. 827-840.
- 1990 (with Montgomery, E. L., and DeWitt, R. H.) Exploration and exploitation of mountain aquifers via large-yield water wells, *in* International Conference on Water Resources in Mountainous Regions, Lausanne, Switzerland: International Association of Hydrogeologists Memoir XXII, Pt. 2, p. 991–1000.