Mahdi S. Hantush 1921–1984

PAGE 361

Mahdi Salih Hantush, Professor of Hydrology at the University of Kuwait, died on January 14, 1984 from complications following heart surgery.

A hydrologist, scientist, and great teacher, Mantush specialized in the application of mathematics to the solution of transient groundwater flow problems. His particular expertise in the development of well-flow equations led the late R. W. Stallman of the U.S. Geological Survey to refer to him as "The Master of Radial Flow." Hantush's numerous scientific publications contributed greatly to the present theories of flow in leaky aquifers, unconfined aquifers, and anisotropic aquifers. He derived the mathematical equations of flow to fully and/or partially penetrating wells in such aquifer systems, and devised methods for the analysis of pumping-test data to determine their hydraulic properties. He was not only a researcher, but also a practicing hydrologist, deriving the equations he needed to solve practical problems.

Hantush's treatise, "Hydraulics of Wells," published in 1964 in volume 1 of the Advances in Hydroscience series edited by V. T. Chow, became a "must" reference for every student, teacher, or practitioner of groundwater hydrology. This classic work to the science of groundwater hydrology was recognized by the Geological Society of America through the presentation to Hantush of the O. E. Meinzer Award in 1968. Although well hydraulics and well-field design were his forte, Hantush's publications addressed a variety of other complex hydrogeologic problems ranging from flow in sands of nonuniform thickness to the growth and decay of groundwater mounds in response to percolation. His work has been widely quoted in the groundwater literature, and in these days of computer modeling his equations are often used as benchmarks to validate numerical models. He was a Fellow of the American Association for the Advancement of Science and the American Society of Civil Engineers, and a member of the American Geophysical Union, Sigma Xi, and several Middle Eastern scientific and engineering societies.

Born in Hit, Iraq in 1921, Hantush received a degree in Civil Engineering from the American University of Beirut, Lebanon, in 1942. After several years as a superintendent with the Irrigation Department in Baghdad, Iraq, Hantush came to the United States to pursue graduate studies. He received an M.S. degree in irrigation engineering from the University of California at Berkeley, in 1947, and a Ph.D. degree in civil engineering, with a major in groundwater hydrology, from the University of Utah at Salt Lake City, in 1949. His Ph.D. dissertation, "Plane Potential Flow of Groundwater with Linear Leakage," prepared under the advisorship of the late C. E. Jacob, started his life-long pursuit of developing a better understanding of flow in leaky aquifer systems.

After completing his graduate studies, Hantush joined the faculty of the University of Baghdad, where he served first as Professor of Irrigation and Hydraulic Engineering and then as Dean of the College of Engineering until 1958. During 1953–1955, he returned to the United States for a year at the University of Utah and for a year at the New Mexico Institute of Mining and Technology (NMIMT) in Socorro. These two years gave him time to complete and publish some of his early work on the theory of flow in leaky aquifers and the opportunity to apply this theory in the preliminary evaluation of the Roswell groundwater reservoir in New Mexico. This period also was the beginning of a long association with NMIMT that, on and off, lasted for over 15 years. Hantush joined NMIMT in 1958 as a senior hydrologist and professor of hydrology and established one of the nation's first graduate degree programs in groundwater hydrology. He pursued his teaching and research interests with equal vigor and attracted students from all over the world. His advanced courses in groundwater hydrology often encompassed his latest research interests. He never carried notes to his classes, where he developed, with noted ease and clarity, mathematical solutions to difficult flow problems. His lectures were complex but always interesting, and his office was always open to anyone who needed help or advice. It was during these years that he developed the "modified" theory of leaky aquifers which considered the important role of confining-bed storage as a source of water.

In late 1961 he returned again to Iraq. However, his association with the hydrology program at NMIMT continued. He returned to Socorro often until 1966 when he developed heart trouble. Thereafter, his visits to Socorro, which continued until 1970, were less frequent and shorter, and often associated with medical exams.

In 1968, while again in the United States for a short visit, he was appointed Minister of Petroleum by the President of Iraq. However, being a technical man with a greater interest in science than in administration, he decided not to accept this position. At about the same time he was invited by the government of Kuwait to provide advice on groundwater development. He and his family moved and settled in Kuwait, where he served as a consultant to the Water and Gas Schemes Administration and taught courses in applied mathematics and groundwater hydrology at the University of Kuwait. He held these positions until his death.

Undoubtedly, Hantush's scientific contributions gained him a place in the history of groundwater hydrology, and he will be remembered by many for his work. However, by those who were fortunate to know him personally, he will be remembered as the humble, compassionate person he was, as a man who gave of himself freely, and who gained the respect and friendship of his colleagues and students.

Hantush is survived by his wife Iqbal and five grown children.

The New Mexico Institute of Mining and Technology has created the Mahdi S. Hantush Fund, to which donations may be made in his memory. The revenue from this fund will be used to support fellowships, recognizing outstanding contributions to hydrology by graduate student researchers, and/or activities aimed at the advancement of hydrology. Contributions to the fund may be sent to NMIMT, Alumni Development Office, P.O. Box K, Campus Station, Socorro, NM 87801.

This tribute was written by M. U. Ahmad, Ohio University, Athens, Ohio; G. W. Gross, New Mexico Institute of Mining and Technology, Socorro, N. M.; M. A. Marino, University of California, Davis, Calif.; S. S. Papadopulos, S. S. Papadopulos and Associates, Inc., Rockville, Md.; and Z. A. Saleem, Ebasco Services, Inc., Greensboro, N. C.

Cover. A pneumatically operated Mackereth corer surfacing at Lake Titicaca, Bolivia. The corer is operated remotely from a small inflatable dingy using bottles of compressed air, and is capable of recovering 6-m-length cores of soft sediment from water depths in excess off 100 m. Because of its lightweight PVC and aluminium construction it has been possible to operate the equipment in remote lakes in the East African Rift Valley and in the Andes mountains. In such climatically sensitive regions, lake sediments preserve a valuable record of paleoenvironmental changes. The photograph was taken during a 1983 expedition arranged through the French overseas research organizations, O.R.S.T.O.M., using equipment from the University of Rhode Island. (Photo courtesy of C. E. Barton, Bureau of Mineral Resources, Canberra, ACT, Australia.)

News

Terrestrial Mass Extinctions

PAGE 361

That galactic triggering or forcing of terrestrial biologic crises could arise as a result of collisions (or close encounters) of the solar system with intermediate-sized to large-sized interstellar clouds of gas and dust is a theory postulated by R. Rampino and B. Stothers of NASA's Goddard Institute for Space Studies. The idea is that episodes of major mass extinctions and impact cratering on the earth