

Memorial to Ruth Doggett Terzaghi 1903-1992

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Ruth Terzaghi, who died March 3, 1992, was born in Chicago on October 14, 1903, the daughter of Lewis and Grace Doggett. The family consisted of one brother and two sisters. Ruth attended public and private schools in Chicago and graduated in geology and earth sciences from the University of Chicago in 1924. In 1925, she received an M.S. in geology from the same institution after presenting a thesis on the origin of abnormally steep dips in the Niagaran reefs of the Chicago region.

She taught geology at Goucher College from 1925 to 1926 and at Wellesley College from 1926 to 1928, after which she studied at Radcliffe College and received her Ph.D. in geology from Harvard University in 1930.

In 1928 she became acquainted with Karl Terzaghi, then a professor in civil engineering at the Massachusetts Institute of Technology and recognized as the founder of soil mechanics, the application of scientific principles to the engineering behavior of earth materials. Ruth recognized the possible application of Terzaghi's new approach to the problem of her master's thesis and sought his advice. The association led to their marriage in the summer of 1930, after Ruth had received her doctorate, and some months after Karl had undertaken new duties at the Technische Hochschule in Vienna.

The marriage of Ruth and Karl began a lifelong partnership in the application of geology to foundation engineering and of soil mechanics to geology. Between 1930 and 1938 Ruth traveled with Karl to investigate geological conditions for projects including a 600 ft arch dam in Sula Canyon in Daghistan, Soviet Russia; a main irrigation canal through loess and broken limestone in central Asia; a rockfill dam in Bou Hanifia, Algeria; a concrete dam on clay sediments to great depth on the Svir River near Leningrad; and numerous foundations and landslides in Europe.

In 1938 the Terzaghis left Vienna and in 1939 returned to the United States, where Karl became a member of the soil mechanics group in the Graduate School of Engineering at Harvard, and where Ruth was engaged as lecturer in engineering geology from 1957 to 1961 and as research fellow from 1963 to 1970.

Upon the Terzaghis' return to Harvard, Ruth's professional activities proceeded simultaneously in three directions: she continued to cooperate with Karl in several of his projects; she pursued her own interests in research and practice; and she served as a valued editor and critic of Karl's extensive writings.

The massive concrete in a large shipway on which Karl had been a consultant began to show signs of deterioration a few years after placement, and Ruth accepted the assignment to investigate the causes. She approached the task from the point of view that the deterioration of concrete was analogous to the weathering of rock. Her findings were reported in two technical papers, one in the *Proceedings of the American Concrete Institute* and another in the *Journal of the Boston Society of Civil Engineers*; the latter paper received the Clemens Herschel Prize of



that society in 1950. Her research led to an assignment by the Association of American Railroads to study the causes of the serious deterioration of a variety of concrete railroad structures; the study and consultations with railroad engineers took her to many parts of the country. Subsidence at a chemical plant led her to investigate means for selecting and stabilizing materials to be introduced into brine-filled cavities in salt deposits in order to support the roofs of the cavities and prevent collapses that would endanger overlying properties. She also assisted Karl in the investigation of dams, including Hogback Dam in Connecticut and Necaxa Dam in Mexico.

Over the years Ruth continued research in her earlier interests. Having concluded, following her initial discussion with Karl in 1928, that soil mechanics was applicable to the study of sedimentation, she returned to the question of the steep dips in limestone reefs; in 1940 she presented her findings, based on principles of soil mechanics, in the *Journal of Sedimentary Petrology*. In Maine, the family's favorite vacation spot, Ruth found the time to prepare a paper on the rapakivi of Head Harbor Island.

Ruth's final and perhaps best known contribution, an outgrowth of her years of association with engineering projects and her lectures at Harvard on engineering geology, was the paper "Sources of Error in Joint Surveys," which appeared in *Géotechnique* in 1965, and which was undoubtedly one of the major considerations in her election to honorary membership in the Association of Engineering Geologists.

Ruth was elected to Fellowship in the Geological Society of America in 1948. She was a member of the American Concrete Institute and the Boston Society of Civil Engineers, of which she served as chairman of the Structural Section in 1954-1955.

Ruth Terzaghi is survived by two children, Eric Terzaghi, a molecular biologist in New Zealand, Margaret Terzaghi-Howe, engaged in cancer research at the Oak Ridge National Laboratory, and six grandchildren.

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