

ARTHUR CASAGRANDE

1902-1981

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ARTHUR CASAGRANDE, one of the great civil engineers and teachers of this century, died peacefully in his sleep on September 6, 1981, at age seventy-nine. He had known for several years that the end was inevitable, yet with characteristic strength of will he actively participated in consulting and research activities until a few months before his death. He was the Gordon McKay Professor of Soil Mechanics and Foundation Engineering Emeritus at Harvard University.

Arthur Casagrande was born August 28, 1902, in Haidenschaft, Austria. He received his civil engineering degree in 1924 from the Technische Hochschule in Vienna, where he served as an assistant to Professor Schaffernak in the Hydraulics Laboratory. His father died in the same year, leaving the major burden of supporting the family on his shoulders. As the Austrian Empire had been dismembered after World War I and very little construction was in progress, Arthur Casagrande's strong desire to work on major civil engineering projects led him to emigrate to the United States, where he arrived on April 26, 1926. Shortly thereafter he met Karl Terzaghi, the founder of soil mechanics, who offered him the opportunity to work as his private assistant at the Massachusetts Institute of Technology (MIT) for the summer of 1926.

From 1926 to 1932 he was Research Assistant with the U.S. Bureau of Public Roads, assigned to MIT, where he assisted Terzaghi in numerous research projects directed toward improving

apparatuses and techniques for soil testing. Arthur Casagrande developed the liquid limit apparatus, the hydrometer test, the horizontal capillarity test, the consolidation apparatus, and the direct shear apparatus. He also conducted field investigations on frost action in a cooperative project between the Bureau of Public Roads and the New Hampshire State Highway Department. His criteria for the frost susceptibility of soils, which resulted from this project, have been adopted by highway designers throughout the world.

In 1932 Arthur Casagrande began his long association with the Graduate School of Engineering at Harvard, where he developed a program of instruction that became the training ground for the majority of workers in soil mechanics and brought recognition to Harvard as the world's outstanding center of teaching and research in that field. He developed the triaxial test, now universally used as the basic technique for investigating strength and volume-change characteristics of earth materials, and entered into a lifelong study of the phenomenon of liquefaction, or loss in strength, of saturated cohesionless soils as a result of shock or earthquakes. He was an outstanding teacher, always thoroughly prepared, not dramatic, but completely at home in every detail. His students felt his personal interest, his genuine concern for their future, and the graciousness of his personality.

In 1936 he organized at Harvard the first International Conference on Soil Mechanics and Foundation Engineering. The success of this conference established the place of soil mechanics in engineering practice throughout the world.

During World War II, at the request of the U.S. Army Corps of Engineers, Professor Casagrande trained approximately 400 officers in the soil mechanics aspects of airfield construction. After the war the enrollment in his program of courses expanded to 80 or 90 students per year. In all, some 1,400 students studied soil mechanics at Harvard under Dr. Casagrande, and the roster of their names includes many of the outstanding professors, researchers, and practicing geotechnical engineers of the world. Few people have influenced the development of a branch of engineering as much as Arthur Casagrande by his own teaching and that of his former students.

Through long association with the Corps of Engineers, he strongly influenced the practice of soil mechanics and particularly the design and construction of earth dams. His association included studies of the failure of Fort Peck Dam, the stability of the banks of the Panama Canal and the possibilities for a sea-level canal, and consultation on the major dams constructed by the Corps including all those on the upper Missouri River. In addition, as a consultant on many of the highest and most difficult dams throughout the world, his experience and research had a dominant influence on the trend of development in this field. He engaged in such unusual problems as the foundations for the Liberty Mutual and John Hancock buildings in Boston, the construction of Logan Airport of soft dredged clay in Boston Harbor, the railroad fill across Great Salt Lake, and the foundations for the Synchrotron at the Brookhaven National Laboratories.

His last consulting assignments included the investigation of the failure of Teton Dam, design and construction of Itaipu Dam in Brazil (the largest concentrated hydrodevelopment in the world), and Tarbela Dam across the Indus River in Pakistan (the largest of all embankment dams).

Professor Casagrande was the recipient of many awards and prizes, including the first Karl Terzaghi Award of the American Society of Civil Engineers in 1963, the Moles Non-Member Award in 1976, the Edmund Friedman Professional Recognition Award of the American Society of Civil Engineers in 1968, and a number of medals and prizes for papers before engineering societies. He received honorary doctorates from the Technical University of Vienna, the University of Liege, and the University of Mexico, and was awarded the Distinguished Civilian Service Award of the U.S. Army.

He was the first Rankine Lecturer of the British National Society of Soil Mechanics and Foundation Engineering and the First Nabor Carrillo Lecturer of the Mexican Society of Soil Mechanics.

He was elected to the National Academy of Engineering in 1966, served as President of the International Society of Soil Mechanics and Foundation Engineering from 1961 to 1965, and was an Honorary Member of the American and Boston Societies of Civil Engi-

neers, the Soil Mechanics Society of Venezuela, the National Academy of Exact Physical and Natural Sciences of Argentina, and the Mexican Soil Mechanics Society. He contributed more than 100 technical papers on soil mechanics and its applications.

He is survived by his wife, Erna (Maas) of Belmont, Massachusetts; his brother, Leo, of Winchester, Massachusetts; his sister, Alix Robinson; his daughters, Vivien and Sandra; and a grandson, James MacKanna, Jr.