

**ARTHUR CASAGRANDE****1902-1981**

After a long illness, Arthur Casagrande passed away on September 6, 1981.

Born in Haidenschaft, Old Austria, in 1902, he received his Civil Engineering degree in 1924, and Doctor of Engineering degree in 1933, both from the Technical University in Vienna, Austria. From 1924 to 1926, he was Assistant in Hydraulics at the Vienna Technical University; and from 1926 to 1932, he was Research Assistant with the U.S. Bureau of Public Roads, assigned to the Massachusetts Institute of Technology (MIT) where he assisted the late Professor Karl Terzaghi in his numerous research projects directed toward improving apparatus and techniques for soil testing. In those years, Arthur developed the liquid limit apparatus, the hydrometer test, the horizontal capillarity test, the consolidation apparatus, and the direct shear test equipment. Among his various research projects, he also conducted field investigations on frost action during a cooperative project of the U.S. Bureau of Public Roads and the New Hampshire State Highway Department. His criteria for frost susceptibility of soils, resulting from this project, were adopted by highway designers all over the world.

In 1929, when Terzaghi accepted a professorship at the Technical University in Vienna, Austria, he engaged Casagrande to install a soil mechanics laboratory for him. On leave of absence from the U.S. Bu-

reau of Public Roads, Casagrande first visited several soil mechanics institutes in Germany and Sweden to collect useful information for the proposed laboratory in Vienna.

Casagrande returned in 1930 to MIT, where he built his first triaxial apparatus. During the period 1930 to 1932, he concentrated on research concerning shear strength and on consolidation tests on undisturbed clay. This resulted in his fundamental discovery that excess porewater stresses develop during shearing. In addition, he established a procedure for identifying the preconsolidation pressure of clays, and of evaluating time curves by means of semi-logarithmic plots.

In 1932, Casagrande accepted a lectureship at Harvard University, where he taught a two-semester course in soil mechanics and a course in foundation engineering. In the following year, he added a course in soil testing. In 1933, he received his Doctor of Science degree from the Technical University in Vienna. In 1934, Harvard made him an Assistant Professor. In 1935, he started a course on seepage and groundwater movement. In that year, he also handled his first assignment for the Corps of Engineers: Investigating the safety against liquefaction of the fine sand in the foundation of the Franklin Falls Dam in New Hampshire, and to advise on the control of seepage through the foundation of this dam.

In 1936, Casagrande conceived and organized the First International Conference on Soil Mechanics and Foundation Engineering, held at Harvard University, with Karl Terzaghi as President. In 1938, he was invited by the Corps of Engineers to become a member of the consulting board to investigate the failure at Fort Peck Dam. In 1939, the U.S. Army Engineer Waterways Experiment Station (WES) made a grant to Harvard and MIT for a comprehensive cooperative project in triaxial research, the results of which are contained in numerous progress reports that were published by WES in 1944.

In 1940, Harvard promoted Casagrande to Associate Professor. During the years 1942-1944, he trained about 400 officers of the U.S. Army Corps of Engineers, on the soil mechanics aspects of airfield construction. These officers were assigned to aviation engineer battalions in many parts of the world. It was in connection with these training courses that he developed his soil classification system, which was later adopted by the Corps and by the Bureau of Reclamation, with some modifications, as the Unified Classification System.

In 1946, he became Gordon McKay Professor of Soil Mechanics and Foundation Engineering; and in 1973, he retired from Harvard and became professor emeritus. In 1970, he joined with his brother Leo and

nephew Dirk, to form a geotechnical consulting group under the name of Casagrande Consultants. In addition to his consulting activities, he remained active as an educator, lecturer and author. During his long career, he wrote or co-authored more than 100 professional papers.

Casagrande was an excellent teacher, devoted to his students, both in and out of the classroom. He followed with enthusiasm and pride the successful careers of many of his former students.

During his nearly five decades of consulting practice, he acted as consultant to numerous federal, state, municipal and private organizations on the foundations of a great variety of structures, on groundwater problems, and particularly on the design and construction of earth and rockfill dams and dikes. These projects took him to all parts of the world. Included among his many projects were: design of foundation for the Prudential Tower in Boston; a comprehensive study of the stability of the slopes of the Panama Canal and of possible sea level conversion of the canal; and design and construction of many of the world's largest hydro-power dams, including the Oahe Dam in South Dakota, the Manicouagan 3 Dam in Canada, the Tarbela Dam in Pakistan, and the Itaipu Dam in Brazil. He was occasionally called upon to investigate the cause of foundation problems or failures, as e.g. the failure of the Teton Dam in Idaho.

Casagrande was a Fellow or Honorary member of many professional societies, including: National Academy of Engineering; American Academy of Arts and Sciences; Geological Society of America; American Society of Civil Engineering; Boston Society of Civil Engineering; Mexican Soil Mechanics Society; Venezuelan Soil Mechanics Society; Japanese Soil Mechanics Society; and National Academy of Exact, Physical and Natural Sciences of Argentina. He was a Member of: International Society for Soil Mechanics and Foundation Engineering; U.S. Committee on Large Dams; American Geophysical Union, Highway Research Board; American Society for Engineering Education; Society of Harvard Engineers and Scientists; and Sigma Xi. In addition, he served as President of the Boston Society of Civil Engineers and of the International Society for Soil Mechanics and Foundation Engineering.

Casagrande received honorary doctor's degrees from his alma mater in Vienna, Austria, from the National University of Mexico, and from the University of Liège, Belgium.

He was the recipient of many awards and prizes, including the First Rankine Lecture (Institution of Civil Engineers, London), Terzaghi Award and Terzaghi Lecture (American Society of Civil Engineers), Decoration for Distinguished Civilian Service (awarded by the Secretary

of the Army), Award of Merit presented by the American Institute of Consulting Engineers, the Moles Award, and the Order of the Rio Branco of Brazil. In 1978, the U.S. Army Engineer Waterways Experiment Station in Vicksburg, Mississippi, dedicated to him a new geotechnical research facility.

Words are not adequate to express the deep sense of loss experienced not only by Arthur Casagrande's family, but also by his countless friends and associates all over the world. We shall all miss his seemingly tireless devotion to solving difficult problems and his devotion to passing his knowledge on to others. But perhaps most of all, we will miss a man who genuinely cared about others, and a man who, even under the worst conditions, was able to maintain a wonderful sense of humor.

*Prepared by Leo Casagrande and Dirk R. Casagrande*