Memorial to Shailer S. Philbrick 1908–1994

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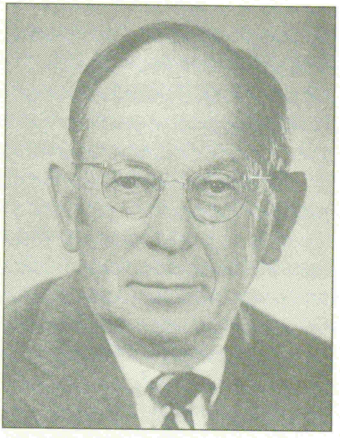

Shailer S. Philbrick was a giant in the field of engineering geology. During his long and distinguished career with the U.S. Army Corps of Engineers, he played a key role in the site selection, design, and construction of the system of dams that now protects Pittsburgh and the Upper Ohio Valley from its devastating floods. He set high standards and generously shared his knowledge with colleagues through his teaching and writing. All subsequent engineering geologists in the region have followed his approach and utilized his classification procedure.

Shailer S. Philbrick was born in Columbia, Missouri, on May 11, 1908, and died after a short illness on August 19, 1994, at Tompkins County Community Hospital in Ithaca, New York.

Shailer Philbrick began his professional career in 1934 after completing educational work at De Pauw (A.B., geology) and Johns Hopkins (Ph.D., geology) universities. His doctoral dissertation, "Contact Metamorphism of the Onawa Pluton, Piscataquis County, Maine," involved an area unmapped in sufficient detail for the study. It required that he make a topographic map of about 120 square miles in the dense woods of central Maine, unbroken by roads and difficult to search. The map, on a scale of 1:48,000 with a 50-foot contour interval, prepared by Philbrick in 1931 and Hobart Stocking in 1932, was based on very limited horizontal control by the U.S. Geological Survey and vertical control by the U.S. Coast and Geodetic Survey. Philbrick did all the geologic mapping that resulted in an example of contact metamorphism with a three-zoned aureole completely surrounding the pluton. This aroused such interest that it was still being published in several textbooks as late as 1983, 60 years after the completion of his dissertation. It is included as an example of contact metamorphism in Turner's classic textbook, *Metamorphic Petrology.*

After brief service with the U.S. Geological Survey and Soil Conservation Service, he joined the Corps of Engineers in 1935, remaining there until 1966. Philbrick's active career in engineering geology extended over 50 years. His first job with the Corps of Engineers was at Bluestone Dam, located on the New River near Hinton, West Virginia. It was there that he first had to simplify technical terminology so that project engineers could understand his geologic explanations.

After completion of Bluestone Dam, Philbrick was transferred to the Pittsburgh district in 1936 and remained there until 1966. He immediately became involved with the site selection, planning, investigation, and construction of ten major flood-control dams that were built in the Upper Ohio Basin to protect Pittsburgh and downstream cities. These dam sites included glaciated terrain and cyclic deposited sedimentary rock strata. The dams varied from concrete gravity structures to earth embankments, and some were a combination of the two. Youghiogheny Dam, a 184-foot-high structure started in 1939, was constructed of processed

earth and rock from the 300-foot deep spillway cut. This cut, unique in its time, involved detailed stability evaluations and drainage of the interbedded shales and sandstones. The applications of geology to the site location and design of the 177-foot-high Kinzua Dam on the Allegheny River resulted in substantial cost savings. This combination earth-fill–concrete gravity dam, completed in 1968, included the first permanent concrete cutoff wall to bedrock built using the ICOS method beneath a dam in the United States.

During World War II, the Pittsburgh district was involved with military construction and after the war, the building of Veteran's Administration hospitals within the district. A unique project was the undermined Veteran's Administration Hospital near the University of Pittsburgh's Medical Center. Mining of the 5–6-foot-thick Pittsburgh coal at a depth of approximately 100 feet in the middle to late 19th century posed a subsidence risk to the planned 20-story building. Following extensive exploration and evaluation of alternatives, the site was stabilized using cement grout to fill the mine voids. The building foundations were supported on shale using drilled, belled piers that penetrated weathered rock.

Postwar navigation in the Upper Ohio Basin required replacement and enlarging of the inadequate navigation facilities. Philbrick was involved with the investigation, design, and construction of nine navigation locks and dams on the Ohio and Monongahela rivers during this time. Rocks in these major valleys were faulted and required detailed stratigraphic analyses to determine adequate foundation levels. The work on all or most of these projects entailed major replacements of railroads, roads, bridges, towns, and cemeteries, including problems with active major coal mines, landslides, mined-out areas, and the need for concrete aggregates and rock for riprap. His staff was always small, ususally just three geologists. It was through this work that Philbrick developed his keen insight into geologic problems and used this extensive experience to enhance his teaching of geologic subjects which is evident in his numerous and significant publications.

In 1968, he began serving as consultant to the Advisory Committee on Reactor Safeguards, U.S. Nuclear Regulatory Commission. In relation to this, two major duties developed: first, review of the criteria for geologic and seismic acceptability of sites proposed in part by the USGS, which acted as a consultant to the NRC; and second, the review of the geologic and seismic reports prepared by the applicants for licenses or by their consultants. Sites were visited, cores were examined, aerial reconnaissance was done, consultants for the applicants were heard and interrogated, and opinions were written for the advisory committee. Studies involved well-known and newly discovered faults or non–tectonically related landslides in California.

In the East, faulting along the passive Atlantic margin, with its great depth of weathering and soil formation, required differing techniques than those used for West Coast faults. The New Madrid event of 1811–1812 and the Charleston event of 1886 influenced all the studies. Studies for the disposal of nuclear waste developed into a review of numerous reports on American and European investigations of several geologic situations, because the need for a site in safe, structurally adequate bedrock, free of disastrous earthquakes and not subject to ground-water transport of radioactive materials or exposure by subsequent erosion became evident.

Shailer Philbrick was a visiting lecturer at Northwestern University in 1960; he was a visiting professor in 1963–1964 and became professor in 1966 at Cornell University, where he remained until receiving professor emeritus status in 1972.

His publications greatly contributed to the understanding of rock slopes, landslide investigations, and coal-mine subsidence. Philbrick received the 1977 Claire P. Holdredge Award from the Association of Engineering Geologists (AEG) for his 1976 paper, "Kinzua Dam and the Glacial Foreland." He was selected as an honorary member of AEG in 1986. His acceptance remarks included the following characteristic statement: "Let us always bear in mind our duty to provide factual information and to call the shots as we see them, even if this runs counter to the

views and desires of our employers. An honest geologist is the first requirement now and in the future."

Philbrick generously contributed to many scientific and technical organizations. A founding member of the Pittsburgh Geological Society, he served as president in 1947–1948. From 1961 to 1966, he was a representative of the Geological Society of America on what is now the Joint Committee on Engineering Geology of ASCE-GSA-AEG. He served as chairman of GSA's Engineering Geology Division in 1955 and was the 1985 recipient of the Division's Distinguished Practice Award. A charter member of the American Institute of Professional Geologists, he served on several Highway Research Board committees between 1951 and 1972, including the committee that guided preparation of Special Report 29, "Landslides and Engineering Practice." In the summer of 1992, Philbrick was invited by the Pennsylvania Geological Survey in Harrisburg to make a presentation to 150 geologists and students at the site of the Corps of Engineers Kinzua Dam for a field conference they were convening in northwestern Pennsylvania. When contacted, he said that because he was "slowing down a bit" he was going to have to decline the offer. He requested that a colleague deliver the lecture and provided very detailed guidance as to what were the important aspects and "high points" of the dam design and construction. These are described in detail in his Holdredge Award–winning paper.

Shailer Philbrick also contributed to his community by serving as a trustee of the Village of Cayuga Heights, New York, and as a member of the Southern Cayuga Lake Intermunicipal Water Commission. He helped blaze the northernmost 118.7 miles of the Appalachian Trail in Maine in 1931–1933. He was a longtime member and elder of the First Presbyterian Church of Ithaca and formerly a member, Sunday school teacher, and elder at the Ben Avon, Pennsylvania, Presbyterian Church.

He is survived by his wife of 58 years, Elizabeth; two children, John W. Philbrick and Anne P. Isenberg, both of Poughkeepsie, New York; a brother and a sister; and four grandchildren. A daughter, Margaret P. Maurer, and a brother predeceased him.

His 1986 citation as honorary member of AEG concluded with these words: "Shailer S. Philbrick, through his distinguished practice, teaching and writing has set an outstanding example of professional excellence in engineering geology."

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