Memorial to Arthur Newell Strahler 1918–2002

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Arthur Newell Strahler was born in Kolhapur, India, on February 20, 1918, the son of missionary parents, Milton and Harriet Strahler. He died on December 6, 2002.

Art's interest in geology was developed as an undergraduate under Karl Ver Steeg at the College of Wooster, Ohio, which led to graduate studies under the direction of Douglas Johnson at Columbia University. By late spring 1939, he was committed to geomorphology (Strahler, 1992a). For his Master's thesis, he studied the massive landslides of the Vermilion and Echo Cliffs of northern Arizona (Strahler, 1940). This was a traditional study with a description of the landslides and a statement of causes. Most interesting in light of his future work was his development of a model of the erosional evolution of the landslide blocks in the context of the Davision model of youth, maturity, and old age. While in the field, he assisted Donald Babenroth, another of Johnson's students, who was working out the geomorphology and structure of the East Kaibab Monocline. Babenroth was killed in a rock-climbing accident, and Strahler completed the study (Babenroth and Strahler, 1945) and continued work in this geomorphology-geology vein (Strahler, 1948). His Ph.D. dissertation was largely an attempt to validate Johnson's hypotheses regarding Appalachian drainage development (Strahler, 1945); unfortunately, he considered the "effort as largely a waste of time" (Strahler, 1992a). Art remained at Columbia University, becoming Professor of Geomorphology in 1958 and Departmental Chairman from 1959 to 1962. He left Columbia in 1968 to become a full-time academic author.

Until about 1946, Art's research consisted of qualitative-descriptive studies that linked landform development with structural and tectonic processes. However, it is to his credit that he recognized the significance of hydrologist Robert Horton's (1945) paper, which had a tremendous impact. "Here, I realized, was a gold mine of fluvial process concepts based upon a lifetime of field studies by a hydraulic engineer" (Strahler, 1992a). Art recognized that Horton's paper was "a remarkable interdisciplinary transfer of information from hydrology, a geophysical area of knowledge, to a geomorphology largely rooted in geological concepts" (Strahler, 1992a).

Thus began the transition of Art from a historical qualitative geologist to a quantitative geomorphologist with a focus on process. This change of approach enabled Art to single-handedly transform geomorphology. The importance of hydrology, hydraulics, and soil mechanics became obvious, and Art's students took courses that prepared them to work with and communicate with civil and agricultural engineers, soil conservationists, and foresters. This led to practical applications of geomorphology to erosion-control problems, channel stabilization, and river engineering (Strahler, 1964).

The impact of Art's change of direction transformed geomorphology. For example, as a graduate student and young employee of the Geological Survey, I recognized that geologists viewed much of geomorphology with disdain, but as an understanding of process became more evident

and contributions to sedimentology, stratigraphy, and engineering became common, geomorphology became an equal partner in the earth sciences. In fact, at present, many contracts written by the U.S. Army Corps of Engineers require geomorphic input.

In his first contribution to the new geomorphology, Art used statistics to relate channel gradient to hillslope morphology (Strahler, 1950). The 1952 paper, *Dynamic Basis of Geomorphology* (Strahler, 1952a), summarized Art's vision of a dynamic geomorphology based upon physical and chemical processes. This was followed by a series of papers that provided procedures and guidance for geomorphic research worldwide (Strahler, 1952a, 1954, 1956, 1958).

It is interesting that Art's simple modification of Horton's stream ordering system led to the application of this procedure to anatomical morphometrics, such as the network morphometry of pulmonary arteries and airways (Woldenberg, 1968; Woldenberg et al., 1970; Singhal et al., 1973).

Obviously, Art's impact on his students was profound. Dick Chorley describes his first meeting with Art in September 1951, and perhaps many of his students had a similar experience. According to Chorley, "Art was a 34-year-old mid-westerner, tall, rather gangling with light brown hair. He had an open face and very direct eyes and I knew immediately that he and I would get along. His manner was diffident—although I did not fully realize it at the time, it was my immense good fortune to have arrived at Columbia to study geomorphology at a particular opportune moment. By the time of my arrival, he had decided to change the whole thrust of his approach from the qualitative historical to the quantitative dynamic. This opportunity was largely unrecognized in the U.S.A. and Britain at that time, but it was soon borne upon me that I had stumbled into the control center of a scholarly revolution." This quantitative revolution transformed geomorphology from a historically-oriented descriptive science to one that had both scholarly and practical applications as noted above.

Art's contribution to education in the earth sciences was second only to his research accomplishments. For example, in addition to his research, Art published 17 books between 1971 and 1998, which deal with topics ranging from basic physical geography and physical geology to the evolution-creation controversy (Strahler, 1989), the scientific method (Strahler, 1992b), and plate tectonics (Strahler, 1998). Art had the ability to assimilate vast amounts of diverse material and to organize it and present it to audiences ranging from high school students to professional colleagues, and this aided his research by allowing him to branch out from traditional geologic subjects to a variety of engineering and statistical areas. His guidance of students into these areas greatly enhanced their ability to deal with geological engineers, soil scientists, etc. Strahler was a Fellow of the Geological Society of America, the American Geographical Society, the Association of American Geographers, and the American Association for the Advancement of Science. He was also a member of the American Geophysical Union, Phi Beta Kappa, Sigma Xi, the American Meteorological Society, and the National Association of Geology Teachers. In 1959, he received the Distinguished Service Award from the Geographic Society of Chicago.

Arthur Newell Strahler was a geomorphologist and an educator, and his contributions to geomorphology and to the education of earth scientists are immense. He single-handedly transformed geomorphology from a historical descriptive science that lagged decades behind other geologic disciplines to a dynamic quantitative science with significant applications to sedimentology, stratigraphy, hydrology, and civil and agricultural engineering.

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