

Obituary

Hatten S. Yoder, Jr. (1921–2003)



Hatten S. Yoder, Jr., internationally known experimental petrologist and geochemist, Emeritus Director of the Carnegie Institution of Washington's Geophysical Laboratory in Washington, D.C., and an Honorary Fellow of the Mineralogical Society of Great Britain and Ireland, died on the 2nd of August, 2003.

Hat was born on 20th March, 1921 and was raised in Cleveland, Ohio. He obtained his B.S. degree at the University of Chicago in 1940, and his PhD at the Massachusetts Institute of Technology in 1948. He was the recipient of honorary doctorate degrees from the University of Paris VI (France) and from the Colorado School of Mines and was a member of the National Academy of Sciences, The American Philosophical Society, and a Fellow of the American Academy of Arts and Sciences. He held honorary memberships or was a fellow of ten professional national and international associations, including the Mineralogical Society of

Great Britain and Ireland. He was the recipient of numerous national and international awards including the Arthur L. Day Prize of the National Academy of Sciences, the Arthur L. Day Medal (American Geological Society), The Roebling Medal (Mineralogical Society of America), the A.G. Werner Medal (German Mineralogical Society), and the Wollaston Medal (Geological Society of London)

Hatten S. Yoder, Jr. spent his 55 year scientific career at the Geophysical Laboratory of the Carnegie Institution of Washington where he held positions as Experimental Petrologist (1948–71), Director (1971–86), and Emeritus Director until his death (1986–2003). In addition, he was visiting professor at CalTech (1958), University of Texas (1964), University of Colorado (1966), and University of Cape Town (1967).

Hat dedicated his research career to experimental petrology and geochemistry at high

temperature and pressure. Prior to 1948, when he arrived at the Geophysical Laboratory, high-pressure experiments were limited to the uppermost portions of the Earth's crust. Because of the obvious experimental need to reach the pressure and temperature conditions of the crust and the mantle, Hat immediately set out to design an apparatus that could reach the necessary pressure and temperature conditions. The resulting instrument, the internally-heated, high-pressure apparatus, is still in use.

This new apparatus was used in Hat's early work on jadeite stability relations in 1950 and on the effect of pressure on the melting point of diopside in 1952. Those investigations were followed by several experimental studies on the stability relations of micas (with H.P. Eugster and J.V. Smith). The interest in mica stability relations culminated in a detailed study of the melting relations of phlogopite (with I. Kushiro). This was the first experimental demonstration that a hydrous mineral such as phlogopite was stable at upper-mantle pressures to its melting point. Hat established, therefore, about 35 years ago, that phlogopite could be a principal mineral in which H₂O could be recycled from the Earth's crust into its deeper interior. Hat's interest in phase relations of H₂O-bearing systems also led him to conclude, as early as in his 1968 studies of plagioclase-H₂O and enstatite-H₂O (with I. Kushiro and M. Nishikawa), that H₂O has profound effects on high-pressure magmatic processes including andesite petrogenesis in the upper mantle.

Inspired by Norman L. Bowen and Frank Schairer, Hat focused on melting relationships

among silicates. This interest is reflected in a number of simple-system experimental studies published in the 1950s. Those, in turn, led to the classic study on the origin of basalt magmas (with C.E. Tilley) published in 1962. It was here that the now-classic basalt tetrahedron first appeared. The phase relations within the basalt tetrahedron remain the guiding light for anyone interested in basalt petrogenesis to this day. There is hardly a topic in modern experimental petrology and geochemistry where he was not involved. More often than not, he led the way.

One might surmise that Hat would be content working at the Geophysical laboratory with the unique research circumstances offered by this organization. This, however, was not his style. He used his success as a scientist to help other people and to influence public policy. In addition to his services to the numerous professional societies, he was, for example, a member of the National Research Council's Executive Committee, as well as the US National Committees for Geochemistry, and for History of Geology. He has served on a dozen departmental visiting committees across the country and the world. Hat advised Congress on issues ranging from natural resources to the hazards of asbestos.

Hatten S. Yoder, Jr. was the beloved husband of his wife of 42 years, Elizabeth Marie Yoder, who died in February 2001, and father to Hatten S. Yoder, III, who died in November, 1998. Survivors include his daughter, Karen M. Yoder Wallace, son-in-law, Keith A. Wallace, and granddaughter, Brianna Elizabeth Wallace.

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