American Mineralogist, Volume 108, page 781, 2023

Presentation of the 2022 Roebling Medal of the Mineralogical Society of America to John W. Valley

Jade Star Lackey[1,*] and William H. Peck[2,*]

[1]Department of Geology, Pomona College, Claremont, California 91711, U.S.A.
[2]Department of Geology, Colgate University, Hamilton, New York 13346, U.S.A.

Madame President, fellow members, and guests: We are delighted to present John W. Valley, recipient of the 2022 Roebling Medal. John is the Charles R. Van Hise Professor, Emeritus, University of Wisconsin–Madison. As an MSA past-President, John needs little introduction here. He has been an active and tireless advocate for MSA, for mineralogy and petrology in general, and recently as a member of the Board of Governors of the Gemological Institute of America.

John Valley received his A.B. from Dartmouth College and his M.S. and Ph.D. from the University of Michigan, where he worked with Eric Essene. John's research on calc-silicate rocks in the Adirondacks soon branched out into stable isotope studies with Jim O'Neil, then still at the USGS. By applying stable isotopes to Adirondack rocks, he was not only constraining fluid conditions during granulite-facies metamorphism, but he was also helping resolve controversies about the nature of metamorphic fluid flow ongoing in the community. One memorable contribution was the revelation that a meteoric water signature in Adirondack skarns was evidence for shallow contact metamorphism before the granulite facies event, discovering what we now recognize as a protracted polymetamorphic history. Even early on, John was applying novel approaches to untangle geologic complexity in clever ways.

John taught at Rice University for a few years and then went to the University of Wisconsin in 1983, where he has been ever since. The stable isotope lab he built there eventually led to a research program with students and postdocs that broadened the use of light stable isotopes (especially O) to study hydrothermal systems, igneous rocks, sedimentary processes, and beyond. The state of the art of the time for oxygen isotope analysis was fluorination in nickel rod bombs, which frankly was inadequate for quantitative analysis of refractory minerals such as garnet, olivine, and aluminosilicates. These minerals are essential for unlocking high-temperature igneous and metamorphic histories. This need and the desire for better spatial resolution led to the development of laser fluorination in the early 1990s, which allowed assessing, for the first time, patterns of mineral zoning and alteration in stable isotopes. John's building of a laser fluorination lab at Wisconsin brought his research program to new collaborations and new studies, especially in igneous systems.

Today, it's rare for an issue of a major mineralogy-petrology journal to *not* contain a study employing oxygen isotopes of zircon. The path, to what some would regard as a staple analysis of the community today, went through Madison, Wisconsin. It all builds on the mostly empirical approaches for understanding diffusion rates and fractionation factors for zircon, made possible by laser and later ion probe analysis. The determination of mantle baseline values led quickly to tackling the variation of igneous $\delta^{18}O$ via zircon from Hadean to the very youngest rocks. Hadean zircons had to be analyzed by ion probe, and that work directly led to the recognition of a low-temperature oxygen isotope fingerprint in Hadean zircons and the "Cool Early Earth" hypothesis.

John's early work on developing techniques for ion probe analysis of zircon and other minerals showed him that remarkable efforts were needed to ensure that the high spatial resolution of the ion probe was matched with the necessary accuracy and precision. John and collaborators at the University of Edinburgh, and later in the WiscSIMS lab that he founded, literally set the standards for analysis of stable isotopes by SIMS.

The old carpenter's saying, "measure twice, cut once," barely begins to describe these pioneering efforts. The tricky analyses of new materials, some producing amazingly complex instrumental mass fraction and others displaying orientation effects, often meant measuring once, twice, or dozens of times to verify a method and standards. They pioneered methods to obtain accurate and precise data from essential rock forming minerals, as well as those of critical petrologic value, such as zircon and garnet.

Then and only then would the analyses be applied to questions of impact and value to the community, and John and his coworkers have ensured that the WiscSIMS lab is also the place to go to analyze samples of extraterrestrial origin, and they have transformed the way that stable isotope data are measured from speleothems and fossils, including some of the controversial earliest evidence for life. This effort revolutionized studies of paleoclimate and biogeochemistry. It should not come as a surprise then that John is also receiving this year's Distinguished Career Award from GSA's Geobiology and Geomicrobiology Division.

John is also well known through the success of his students and postdocs, who have gone on to careers as faculty, scientists at national labs, deans, provosts of research universities, and presidents and executive directors of GSA. As a mentor, John was always intentional about research longevity, helping the current students build upon the work of their predecessors. John's last student noted how her studies of corundum formation in southwestern Montana benefited greatly from studies there thirty years earlier by one of John's first graduate students.

John is an accomplished woodworker, who was doing this as far back as grad school, and for a stint in Montana before graduate school while his wife Andrée was Resident Artist at the Archie Bray Foundation in Helena. Some students might remember visits to the woodshop during gatherings at their place or his enthusiastic sharing of the news of a rare windfallen log acquired after a Madison storm.

In many ways, his geologic research shows the attitude of a woodworker who works with the grain of each tree and not against it, building new tools when the need arises. His career shows an astute and thoughtful approach to the unique challenges of working with geologic systems, identifying fruitful approaches, and seizing upon opportunities. His body of work shows the mark of a researcher who creatively works with complexity to further our understanding of the processes that shaped our planet, from ancient to modern.

* E-mail: JadeStar.Lackey@pomona.edu and wpeck@colgate.edu

0003-004X/23/0004–781$05.00/DOI: https://doi.org/10.2138/am-2023-AP108424