American Mineralogist, Volume 99, pages 248–249, 2014

Memorial of James Burleigh Thompson, Jr., 1921–2011

Charles W. Burnham[1], Stein B. Jacobsen[2], Ulrich Petersen[2] and M.R. Van Baalen[2,*]

[1]2522 Cottonwood Creek Road, Durango, Colorado 81301-6183, U.S.A.
[2]Department of Earth & Planetary Sciences, Harvard University, 20 Oxford Street, Cambridge, Massachussets 02138-2902, U.S.A.

Jim Thompson was born in Calais, Maine, to parents also born in Downeast Maine. The family moved to New Jersey for a few years during Jim's childhood, but later returned to Princeton, Maine, where the family camp on Big Lake was a favorite retreat. Childhood summers spent there imbedded in Jim a lifelong love of the outdoors.

During his undergraduate days at Dartmouth he realized that geology was a perfect way to combine his love of the outdoors with science. He graduated Cum Laude from Dartmouth in 1942 with an AB in geology and a lifelong affection for Dartmouth as well as skiing.

Jim spent four years, 1942 to 1946, in the Army Air Force as a weather forecaster. They turned out to be prophetic as an introduction to the behavior of air masses and stimulated his lifelong passion for thermodynamics. After the war Jim entered graduate school at MIT and received his Ph.D. in geology in 1950.

In 1949, Jim was hired by Harvard as an instructor in petrology, replacing the retiring Esper Larsen. The following year he was promoted to Assistant Professor, and to full Professor in 1960. He was named Sturgis Hooper Professor of Geology in 1977. During the early years in his academic career he interacted closely with Francis Birch and Marland Billings, both then professors in the Department of Earth and Planetary Sciences. Birch was interested in changes of physical properties of rocks with depth in the Earth, and Jim proposed to him that these changes could, in part, be explained by a change in the coordination of silicon by oxygen in silicate minerals from 4 to 6 with increasing pressure, which proved later to be true. Jim's association with Marland Billings led to their joint supervision of about 26 Ph.D. theses that dealt with the bedrock geology of New England.

In 1954, Jim proposed that the Northern Appalachians contained huge fold nappes, similar to the Alpine nappes of Switzerland—a revolutionary idea at the time. This hypothesis was later verified and extended by his students, and it has become an integral part of the understanding of the geological complexity of the Appalachian Mountains in New England.

In 1955 Jim published one of his most cited papers, "The Thermodynamic Basis for the Mineral Facies Concept." It applied the rigor of J. Willard Gibbs's work on chemical thermodynamics to metamorphic rocks containing fluids, thus putting earlier concepts based on observations on a firm chemical and mathematical basis. Then in 1957 with "The Graphical Analysis of Mineral Assemblages in Pelitic Schists," he introduced graphical projections for the analysis of mineral assemblages in multicomponent systems that led to thermodynamic and conceptual tools for the analysis of chemically open systems and other tools. This work is indelibly woven into the fabric of much of the research on metamorphic rocks being published today. Developed in an era before computer graphics or modern visualization tools, Jim's imaginative and rigorous graphical projections of multicomponent systems form an important part of his legacy.

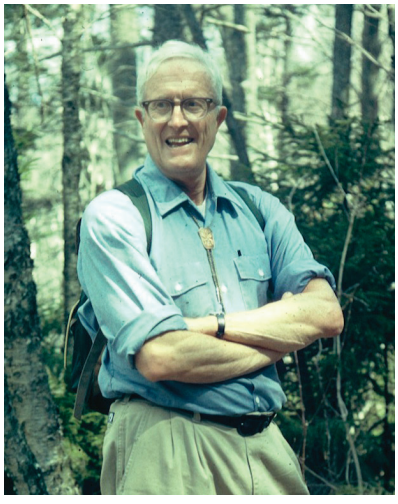

Photo by Louisa Van Baalen

In the 1960s, as calorimetric data became more accessible and as a wealth of information about cation distributions in silicate minerals emerged, Jim saw that the two could be profitably combined to yield important characterizations of thermodynamic properties of non-ideal crystalline solutions. His collaborative experimental work with several graduate students aptly provided more complete understanding of alkali feldspars.

Jim firmly believed that to understand better the origins and occurrences of rocks it was essential to have an understanding of the structures and properties of the minerals making up the rocks. In a landmark 1978 paper, "Biopyriboles and Polysomatic Series," he expressed the structural relations between sheet and single- and double-chain silicates in a novel, previously unrecognized way. Using his imaginative scientific approach and his flair for elegant simplicity, he then predicted the possible existence of several hypothetical complex silicates. At about the same time several new minerals having such structures were discovered in a Vermont quarry. One of them, containing triple silicate chains, was aptly named jimthompsonite.

Recognition of Jim's scientific talent came somewhat early in his career. He was elected a member of the American Academy of Arts and Sciences in 1958, and a member of the National Academy of Sciences in 1967. He was awarded the Arthur L.

*E-mail: mvb@harvard.edu

0003-004X/14/0001–248$05.00/DOI: http://dx.doi.org/10.2138/am.2014.639

Day Medal of the Geological Society of America in 1964, the Mineralogical Society of America Roebling Medal in 1978, and the V. M. Goldschmidt Award of the Geochemical Society in 1985. In accepting these awards, Jim's words manifested a deeply held concern: as experimental capabilities became ever more sophisticated, and ever faster computing capabilities put remarkable power in the minds of theoreticians, it was important not to forget or ignore the importance of observations. His papers, regardless of subject, were always based on solid field observations. In his acceptance speech for the Day Medal in 1964 he said, "True success in the laboratory should stimulate field investigations rather than discourage them. It would be embarrassing indeed if we were to construct an internally consistent geology, chemically and physically sound, perfect in fact but for one flaw: the lack of a planet to fit it."

The group of students who studied under Jim were guided and inspired by his impeccable logic and his knack for looking at old problems in new and revealing ways. All told, about 50 graduate students benefited from Jim's supervision. His legendary course, *Phase Equilibrium in Mineral Systems*, was a rite of passage for all these students. Jim always exemplified scientific integrity, modesty, and consideration for others. Although he made significant contributions to each student's thesis, when the work was complete he generously stepped back quietly, allowing the student the sole credit. As he remarked in his acceptance of the Roebling Medal, "There is no better stimulus to the sharpening and honing of an idea than that provided by an able student who wishes to share it. In this I have been blessed."

Jim was predeceased by his wife, Eleanora, and he is survived by his son, Michael.