

Jubilee:
105 Years Anniversary

ALEXANDER S. POVARENNYKH: THE FOUNDER OF THE CRYSTAL CHEMICAL SCHOOL IN UKRAINE

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1. Alexander Sergeevich Povarennykh (1915–1986). Photo 1985.

Alexander Sergeevich Povarennykh (1915–1986) is an outstanding mineralogist of the second half of the 20th century. *"He is known in the history of mineralogy as its self-sacrificing devotee and scrupulous annalist and also as an outstanding scientist, whose ideas greatly impacted progress in mineralogy worldwide in the second half of the 20th century"* (Platonov et al., 2015).

Alexander Povarennykh was born on February 3, 1915, in Petrograde (now St. Petersburg) to the family of an official. In 1924, he entered a seven-year school in Tashkent, Uzbekistan, and graduated from school in 1931. It was at a public lecture by Acad. Alexander E. Fersman in Tashkent in 1930, when Alexander saw the famous mineralogist for the first time, got acquainted with him, and received from him his book *Popular Mineralogy* as a present. This book largely predetermined the fate of the would-be scientist. Alexander entered the Middle-Asian Geological Exploration Technical School (1931–1934) and then studied at the Middle-Asian Industrial Institute in Tashkent (1935–1940). The gifted young man was eagerly involved in fieldwork at the Chatkal Range, Uzbekistan, and was the first to identify there some minerals (cassiterite, topaz, triplite, orthite, beryl, and monazite). Together with mining engineer A.O. Kaiser, he discovered two deposits – the Ayu-Tyur wolframite deposit and Oi-Kaiyng topaz deposit – more than great achievements for a student, are they not?

Upon graduating from the Mining faculty of the Middle-Asian Industrial Institute, Povarennykh got drafted into the Soviet Army, he did his military service at the Leningrad (now St. Petersburg) Military District, and there became enamored with singing. Throughout the whole Great Patriotic War (WWII), he was at the front lines and was awarded with orders and medals.

It was that time when Povarennykh's life style and career almost took an absolutely unexpected turn. Later he told Acad. I.G. Magakyan and myself at the Kiev Hotel in Bratislava in 1973 that *"...still being in the military service after the war, I took a vacation to go to Leningrad and became a student of the Leningrad Music Conservatory, majoring in vocal (baritone). My mobilization from the army was significantly postponed, and when I arrived at the Conservatory, I found my name in the list of the washed-outs. I then entered the Mining Institute, where Prof. D.P. Grigor'ev worked. Under his tutorship and supervision at this famous institute I was a postgraduate student and defended my first doctoral (candidate of science in the USSR) dissertation "Mineralogy of Tungsten Deposits in the Southwestern Tien Shan" in 1949"*.

Alexander Povarennykh's work at the Leningrad Mining Institute was soon completed so he left Leningrad for Ukraine in 1949 to start teaching at the Krivoi Rog Mining Institute. He first worked as an assistant professor in the Department of Mineralogy and Petrography, and starting in 1951 as a deputy director for research work. Alexander

2. Alexander S. Povarennykh with his wife Inna Golovina (left of him) at a concert at the Kiev Philharmonic Hall, 1982.



3. Alexander Povarennykh as a student at the Middle-Asian Industrial Institute, 1939.



did his best to develop the Mineralogical museum, which now is named after him. From 1953 through 1955 he studied as a post-graduate doctoral student at the Geological Institute, Academy of Sciences of the USSR in Moscow and defended his doctoral dissertation *"Crystal Chemical Fundamentals of a Modern Educational Book on Mineralogy"* in 1957. Continuously addressing this work of unique content and wording, I arrived at the conclusion that this was a prototype of his main academic monograph which brought him worldwide fame. I will later touch upon this below.

In 1960 Povarennykh was invited by the First Vice-President of the National Academy of Sciences of Ukraine N.P. Semenenko to head the Department of Mineralogy and Crystal Chemistry at the Institute of Geological Sciences, National Academy of Sciences of Ukraine, and so he moved to Kiev. His efforts were then centered primarily on developing the crystal chemical avenue of research, and he explored into the theory of the structures and properties of minerals and experimentally studied them. Starting at the establishment of the Institute of Geochemistry and Physics of Minerals (currently the Semenenko Institute of Geochemistry, Mineralogy, and Ore-Forming Processes), National Academy of Sciences of Ukraine, for the rest of his life he headed the Department of Mineralogy and Crystal Chemistry at this institute.

The spectrum of scientific interests of this researcher, which is reflected in more than 400 publications, including six monographs, is extremely broad: history and methodology of mineralogy, crystal chemistry of minerals, physics of minerals, regional mineralogy, mineralogical crystallography, terminology and nomenclature of minerals, and philosophy of natural sciences, as well as reviews, translations, and reviews and editing translations from foreign literature.

History and methodology of mineralogy. Following V.I. Vernadsky, Povarennykh believed that principally important research avenues in mineralogy cannot be identified without in-depth analysis of the evolutionary history of this science. He was the first to

formulate the following conclusion pertaining to the history of mineralogy: the history of mineralogy can be subdivided into periods and/or stages based on how much and how deeply the nature of minerals is understood. He classified the history of mineralogy into the following stages: physical (from the beginning of 16th through the end of 19th centuries), chemical (early 19th to early 20th centuries), and crystal chemical (starting in the early 20th century). During each of these evolutionary stages of mineralogy, its fundamental concepts were revised and redefined. The differentiation of the Earth science led to individualization of general geology, paleontology, petrography, science of mineral resources, combustible fossils etc., and the scope of the concept of mineral thereby narrowed, as also did the span of problems and materials studied by mineralogy itself.

A detailed analysis of the history of mineralogy and its fundamental concepts and paradigms is presented in the book *Crystal Chemical Classification of Mineral Species* (Povarennykh, 1966) and a series of his historical papers. A principal conclusion drawn from the historical analysis of mineralogy is that the onset of its third (crystal chemical) evolutionary stage requires a rapid but fundamental revision of the theoretical fundamentals of this science on a new structural level, a basic revision of the classification of minerals, and redefining of the principal paradigms.

Upon justifying the historical imminence of a fundamental *"rebuilding"* of mineralogy, Povarennykh actively participated in this complicated and hard work and periodically published papers to attract attention to the principal research avenues and tasks of this science.

Simultaneously, the scientist helped historians of the science in Ukraine. Being a member (from Ukraine) of the Soviet Subcommittee of the International Committee on the History of Geology, he was actively involved in organizing studies on the history of geology in the Sector of the History of Natural Sciences and Technologies of the Institute of History of the Academy of Sciences of

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