

Memorial of Dimitriy Sergeyevich Korzhinskiy on the centenary of his birth, 1899–1985

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One of the great founders of modern physico-chemical petrologic science, which approaches the exact sciences, was born on September 13 of the last year of the last century in St. Petersburg to a family of the distinguished scholar-botanist, Sergey Korzhinskiy, who died early (1900). D.S. Korzhinskiy's childhood and youth were spent in the difficult years of the first World War, October Revolution, and Civil War, years of hunger and disruption, service as a soldier, and occasional earnings as a dock worker. In 1926, he graduated from the Leningrad Mining Institute where he studied under outstanding Russian geologists, and began work in the Central Scientific-Research Geological and Exploration Institute. He led surveys and research over all the vast country. During mapping of metamorphic complexes in the Aldan shield and the Lake Baikal area, he early on showed surprising ability of researcher-theoretician. He discovered that mineral and ore associations were regular and depended both on rock composition, and on a whole number of external factors, while processes of high-temperature mineral formation to a significant degree were subjected to the laws and principles of equilibrium thermodynamics.

The gift to sense such relationships and to separate them out of the apparent chaos of data led to the creation of a physico-chemical theory of mineral parageneses and to a fundamental scientific discovery—the differential mobility of components. That is, he discovered the existence of open systems, i.e., systems with perfectly mobile components, and their important role in the formation of minerals in nature. A paper was presented on this at the Moscow session of the International Geological Congress in 1937. From this time, D.S. Korzhinskiy began work in Moscow at the Lomonosov Institute of Geology and Mineralogy (currently the Institute of Geology of Ore Deposits or IGEM), a part of the Academy of Sciences. In his Doctors dissertation (1938), he worked out the theory of mineralogical depth facies, which retains its topicality to the present day and which geological experience and experiment have confirmed.

In the years of the Great Patriotic War, he worked in the Urals, where, together with research activity, he directed the exploration for skarn copper deposits that were indispensable for military needs. At this very time began the exploitation of phlogopite deposits, which were discovered from his predictions made before the war. In the post-war years, D.S. Korzhinskiy made a whole spectrum of theoretical discoveries, beginning with a theory of skarn formation, a theory of metasomatic zonation, a theory of stages of post-magmatic processes, and a theory of acid-basic interaction of components in fluids and magmas and ending with the principles of magmatic replacement, a theory of metamorphism, i.e., the interaction of transmagmatic fluids with magmas, and the foundation of applying the extremal states of systems to paragenetic analysis. In the 1950s his theoretical investigations provoked bitter discussions—petrographers did not have sufficient physico-chemical and mathematical training. Little by little his works gained great scientific authority. Physico-chemical equations for open systems are now known as “Korzhinskiy's mineralogical phase rule” and “Korzhinskiy's potentials.” His principal works have been translated into the world's major languages. He was elected to be active or honorary member of academies and scientific societies of many countries



Portrait of D.S. Korzhinskiy from the early 1940s.

and was awarded scientific and governmental awards of high honor. MSA awarded him the Roebing Medal in 1980. Despite deteriorating health, Korzhinskiy continued to write papers in the 1980s on the relationship between magmas with transmagmatic fluids, e.g., the formation of Cu-Ni deposits by transmagmatic sulphurization. His work is now an integral part of petrological training in Russia and abroad. A four-volume set of his collected works was published in 1993–1994, and a third edition of his classic “Theoretical Foundation for the Analysis of Mineral Parageneses” is now being prepared, as is a collection of reminiscences by Korzhinskiy and about him.

By his scientific works, D.S. Korzhinskiy was ahead of his time and even now several of his investigations have not yet received wide development. This giant of science, a surprisingly humble, gentle, and cheerful person, sparkling with humor, has enriched our severe 20th century.