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THE ROLE OF A.E. FERSMAN IN THE MINERALOGICAL MUSEUM OF THE RUSSIAN ACADEMY OF SCIENCE

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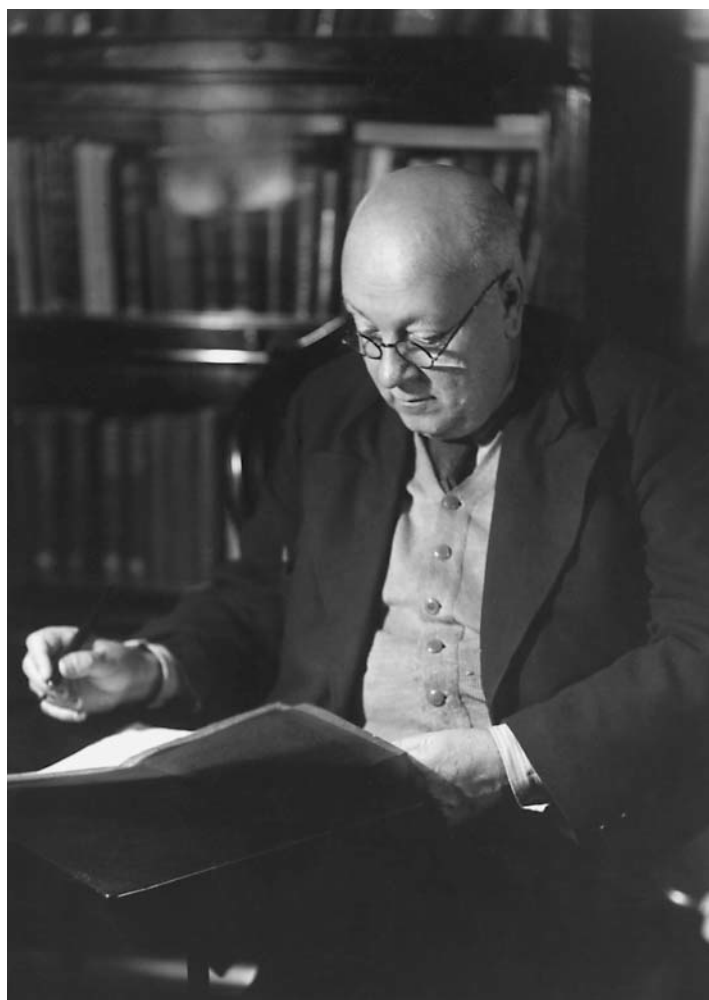
The paper portrays Academician A.E. Fersman as one of the founders and supporters of the Mineralogical Museum in Moscow; he guided the museum to form a new research center here.
Photo, 8 references.

I came to be a passionate mineralogist when just six years old
A.E. Fersman

In 2003 a community of mineralogists and geochemists will celebrate the 120th birthday of Academician Alexander E. Fersman.

«The first half of the 20th century was illuminated by names of outstanding scientists, who brought glory to the Russian and Soviet science. One of the first places belongs to Academician A.E.Fersman, a prominent geochemist and mineralogist. Several contemporaries were comparable by their scientific abilities, but it is hardly possible to find another scientist who combined his gift with improbable workableness, his public activities with practical studies on mineral resources, and scientific studies with popularization» (Perehman, 1968).

Life and work of A.E. Fersman was entwined with the Museum. The numerous field expeditions he led replenished the Museum collections. His broad scientific interests widened the thematic scope of the Museum staff: pegmatites of the Urals, Middle Asia, Transbaikalia, and Khibiny, mineralogy of diamond; jasper and gems, hypergene minerals, etc.



Academician Alexander E. Fersman in his study, Moscow, 1941, July,

A.E. Fersman was born on November 8, 1883, in St. Petersburg. He took the road to science as a six-year old boy, when he started with his first collection of minerals in Totaikoi (now Fersmanovo), Crimea, where his family used to spend summers. During 1901–1903 he was a student at Novorossiysk university, department of physics and mathematics. His education continued at Moscow university (1903–1907) where V.I. Vernadsky guided his mineralogical studies.

His love of minerals in all of their forms and a passion to collect grew into serious scientific interests, which covered the whole sphere of the natural and human history and culture. «All my life and further work was predetermined by this childish entertainment: instead of caring for a small personal collection came the tasks related to guidance of a large state museum of world reputation» he wrote later about himself. This was the Mineralogical Museum of the Russian Academy of Sciences which he headed from 1919 to 1945; later the Museum was named after him.

He started scientific studies when a student. «During this period, Vladimir I. Vernadsky introduced a notion on dispersed, non-mineral occurrence of chemical elements in nature. Vernadsky founded the principles of geochemistry, the science that studies the history of chemical elements in the Earth's crust. (Perelman, 1968). Due to his talent and deep knowledge of physics and chemistry, A.E. Fersman absorbed the pioneering ideas from his professor and joined him in developing the new scientific discipline. The academic studies of the young scientist came together with his museum work: in 1909 he was invited to join the staff of the Mineralogical bureau (Moscow university) as an assistant. At first he described minerals and arranged the collection systematically. In the same year he was elected a member of the Russian Mineralogical society and awarded the A.I. Antipov¹ medal for his studies in mineralogy. One year later at the age of 27 A.E. Fersman was elected a professor of Mineralogy in the A.L. Shanyavsky People's university². This was where the first course in geochemistry was read (Perelman, 1968).

In 1911, V.I. Vernadsky moved from St. Petersburg to Moscow and in 1912 he

started work in the Peter the Great Geological Museum of the Russian Imperial Academy of Sciences leading its mineralogical branch. Fersman followed his teacher and at the end of 1912, became the senior custodian of the mineralogical branch. Academician F.N. Chernyshov was the director and head of the geological branch of this museum. In fact, the two branches of the Museum were individual research institutions. In 1912 the Museum was renamed to the Peter the Great Geological and Mineralogical Museum, it became the only academic institution in Russia which united the geological scientific disciplines. A new page was opened in the Museum's history, when new laboratories addressing or working with mineral chemistries and spectral analysis, started to bring interesting results. For the following fifty years, practically all mineralogical and geochemical research institutions of the national Academy of Sciences stemmed from these two laboratories (Barsanov, Kornetova, 1989). A.E. Fersman along with V.I. Vernadsky was the founder and builder of this grandiose scientific framework. Since then, the whole life and studies of A.E. Fersman became inseparable from the Museum.

In 1914, V.I. Vernadsky was appointed a director of the Peter the Great Geological and Mineralogical Museum. He organized a series of expeditions, and the materials and data obtained from these supplemented the mineralogical collections. Fersman actively participated in the formation of a substantial systematic collection and thematic collections (mineral deposits, natural crystals, pseudomorphs, and meteorites). A.E. Fersman, V.I. Vernadsky, and V.I. Kryzhanovskiy as members of the Urals expedition visited the Ilmen Mountains and then the Murzinka mines. This field trip introduced the young scientist to pegmatites. From 1912 to 1918 Fersman published over one hundred papers and essays «having amazed everybody by his vivid style, wide scope, and fruitfulness» (Perelman, 1968). Many people of various ages and professions read these publications. For many geologists and mineralogists these books were the first which gave direction to the professionals.

In 1915, the Commission on Studies of Natural Productive Forces of Russia

¹ Alexey I. Antipov (1833–1909), a Russian geologist, mining engineer, and businessman

² The first non-government university in Russia funded by donation from Alfonse L. Shanyavsky (1837–1905), a businessman in the gold industry

(CONAPF) was established at the Russian Academy of Science, and Fersman became its scholarly secretary. His activities were aimed at the collection and evaluation of data on potential economic mineral deposits. New laboratories studied chemistries of the required ore components and estimated technological possibilities for their economic extraction. Geological expeditions were sent to Crimea, Middle Asia, the Urals, Transbaikalia, Altai, and Mongolia, and the Museum specialists joined the field teams. As a result, by 1917 the mineralogical collection of the Museum exceeded 25,000 samples.

In a Supreme Counsel for People's Economics, a new institution organized after the October revolution, Fersman, along with other scientists, discussed the problems of planning in a new way: formulation and solving of large national-scale problems come to the front stage. These giant amounts of public and management activities ran in parallel with research studies of the senior scholarly custodian of the Mineralogical Museum.

In February of 1919 at the age of 35 Fersman was elected a member of the Academy of Science of the USSR (Department of Physics and Mathematics). In *Notes on the Scientific Merits of Prof. A.E. Fersman* compiled by Academicians V.I. Vernadsky and A.P. Karpinsky wrote: «A.E. Fersman is one of the most talented mineralogists, a remarkable connoisseur of minerals, an energetic researcher of minerals in all relevant aspects, which display his close aptitude for other branches of knowledge, their origin and their role in the field sometimes named now geochemistry» (Perelman, 1968).

Being appointed a director of the Museum in 1919, Academician A.E. Fersman opened a new stage in its history. Along with purely museum work, i.e. replenishment of mineralogical collections, studies of the stored materials, preparations for new thematic exhibitions, he made research based upon modern laboratory techniques and methods a key task of the Museum staff. During that hard period, he used the CONAPF framework to carry out regional studies of the national mineral resources: significant expeditions were organized to visit Kola Peninsula, Pamir, East Siberia, and the European part of Russia.

Beginning in 1921, Fersman Thursdays (readings in mineralogy) were conducted at

the Museum. Among the members who attended or presented papers were F.Yu. Levinson-Lessing, D.S. Belyankin, S.M. Kurbatov, and other outstanding scientists. The Fersman Thursdays played a significant role in the progress of Russian mineralogy and geochemistry. «It has been a kind of university for us, young geochemists, for no special courses existed then. That's why we, geochemists, praised highly A.E. Fersman's presentations: we got the knowledge on the situation in geochemistry in the country and abroad,» A.A. Saukov recalled (Saukov, 1965). The tradition of scientific meetings in the Fersman Thursdays style lasted in the Mineralogical Museum until 1975. After the Museum building was closed for repairs, these meetings continued to be held at IGEM (the Academy of Sciences of the USSR). To keep the standards of research at the cutting edge, promising young specialists were invited to work in the Museum, among them B.M. Kupletsky, V.I. Vlodayets, D.I. Shcherbakov, I.D. Borneman-Starynkevich, E.M. Bonshtedt-Kupletskaya, N.N. Gutkova, E.E. Kostyleva, A.N. Labuntsov, and others. Being aware of the significance of crystal chemistry and solid state physics in the development of mineralogy, along with growing importance of crystals in technology, A.E. Fersman organized research groups of such profiles in the Museum and invited leading specialists, among them A.V. Shubnikov, G.G. Lemlein, and N.V. Belov (Barsanov, Kornetova, 1989).

Fersman worked in investigation of colored stones and gems and as a leader of scientific management. In 1919, within the CONAPF framework he first offered the course, *Color Stones and Gems of Russia*, and in 1920 his monograph on the subject was published. This publication astonishes with the breadth of the subjects addressed, from the description of the gem and colored stone deposits, their mineralogy and geochemistry to the history of stone processing and its role in the cultural progress of mankind.

In subsequent years the Museum collections were being actively supplemented. On A.E. Fersman's initiative, numerous items from the State Fund of the Palace Articles and duplicate specimens from the State Hermitage collection of gems and colored stones were transferred to the Museum, along with the acquisition of formerly private collections (V.A. Ioss, E.O. Roma-

novsky, M.F. Norpe, the Stroganovs and Balashovs, etc.).

The wide scientific scope of A.E. Fersman defined new directions for the research being done by the Museum staff. Due to growing collections replenished by numerous expeditions, new exhibitions, e.g., mineral-forming processes, mineral parageneses, colored stones and gems, and the development of the laboratory base, in 1925 the Museum was divided into the Peter the Great Geological Museum and the Mineralogical Museum of the Academy of Sciences of the USSR. Having marked the 200th jubilee of the Academy of Sciences of the USSR, the Museum was re-opened, and the series of scientific publications was resumed, *Proceedings of the Mineralogical Museum of the Academy of Sciences of the USSR* (Godovikov, 1989).

Fersman cared much about the raising of the young researchers and maintaining the theoretical level of their studies. In 1925, the General Session of the Academy approved the program for the training of young researchers in academic museums, including the Geological, Mineralogical, Zoological, and other museums. In 1929, the post-graduate courses were established there. The admittance regulations and selection were carried out by a special commission that comprised academicians A.E. Fersman, A.F. Ioffe, and others (Komkov *et al.*, 1977).

During the 1920's and 1930's Fersman wrote his best known popular books and essays on mineralogy and geochemistry based upon a treasury of his field and research experience. His *Popular Mineralogy* and *Popular Geochemistry* brought him glory as a classic in the popular science.

The Khibiny epopee played a very special role in Fersman's life, in the development of the Earth sciences and the world-class specialists in the USSR; it gave birth to a new industrial and research center located beyond the Polar Circle (Perelman, 1968). From 1920 to 1926 Fersman was the leader of the annual expeditions sent to the Kola Peninsula. He persuaded his colleagues from the Museum to join him in these expeditions. In 1926 the Khibiny apatite deposits were discovered, and in 1930 Fersman's team brought from Monche-Tundra the first samples of the massive sulfide Cu-Ni ore. During the course of the interdisciplinary studies in Khibiny, the geochemical regulations in the localization of apatite ore as related to

alkali magma were established. The first results were published in a book edited by A.E. Fersman, *The Khibiny apatite* (1922).

Taking much care about the museum work (replenishment and systematic studies of the collections exposures and exhibitions demonstrating the latest achievements in mineralogy), Fersman guided the activities of the research staff to solve problems of national-scale. priority was given to inter-disciplinary studies of the national mineral resources using the latest research methods. Fersman was a real leader both in scientific and management aspects of the Museum activities; he understood the need for development of new scientific institutions in mineralogy and geochemistry (Barsanov, Kornetova, 1989). To do so, the Institute of Mineralogy and Geochemistry was organized by the Soviet Academy of Sciences (1930), and Fersman was appointed its' director, whereas V.I. Kryzhanovskiy, his colleague who had shared the hardships of museum work for many years, became the head of the Museum. The Museum became a department of the institute. Fersman remained a formal leader and continued his academic activities. While director, he completed his studies of pegmatites. Fersman considered these rocks to be a product of the magmatic melt evolution. He introduced a classification of pegmatites based upon the genetic features of its mineral constituents, their structure and chemistry. The first volume of his monograph *Pegmatites* was published in 1931. One year later, the institute he organized was restructured into the Lomonosov Institute of Geochemistry, Mineralogy, and Crystallography (LIGEM), and Fersman remained its director until his death (Godovikov, 1989).

In 1934 the Museum as a branch of LIGEM was moved to Moscow and occupied the former manege <hall for training in riding> in Count Orlov's manor, the Neskuchny Palace. Restructuring and repairs inevitably occurred. At the time, the collection of the Museum contained about 80,000 items. In 1937 another re-organization occurred in the Academy of Sciences, and the Museum was again re-named, the A.P. Karpinsky Geological Museum. As before, the Museum remained a branch of the institute, the latter was renamed to the Institute of Geological Sciences of the Academy of Sciences of the USSR. In fact, the Museum was an individ-

ual research center, for it had individual themes in research and was located separately from the head institute.

By the beginning of the 17th International Geological Congress in Moscow (1937) new thematic exhibitions were being prepared in the Museum *Mineral Deposits of the USSR and New Discoveries during the Soviet Period*. It should be emphasized that the principles of exhibiting minerals in compliance with their geochemical classification and by minerals representing individual chemical elements were new in the world practice. These exhibitions showed a historical sequence of mineral-forming processes in the Earth's crust (Barsanov, Kornetova, 1989). An exhibition that demonstrated the mineral wealth of the USSR was organized by the staff of Museum and Institute of Geological Sciences in the Moscow Conservatory where the IGC sessions occurred. Valuable samples were sent especially for this purpose from many mines and deposits of the country. Later these samples were incorporated into the collections of the Museum. This enormous work was done under the leadership and with the active participation of Fersman who was elected a Secretary General of the 17th IGC.

During WWII, the most valuable part of the Museum collection was evacuated to the Urals. As required by the Presidium of the Academy of Sciences of the USSR, Fersman left Moscow for Sverdlovsk (now Ekaterinburg) to mobilize the mineral wealth of the Urals for the needs of the national defense; he did much as a geologist and coordinator visiting mines and prospects (Perelman, 1968).

In 1943 Fersman was 60, and the Soviet government decorated him with the Labor Red Banner Order to honor the 40th anniversary of his fruitful scientific work. The London Mineralogical Society awarded him with the Wollastone palladium medal as the most prominent mineralogist.

In 1944 the research institutions of the Academy of Sciences started to return to Moscow. The Museum collections were back in Moscow, and intense work on the restoration of the expositions and restoration of the collections began. In 1942 Fersman had been appointed a director of Institute of Geological Sciences. Since then he formally ceased to be a leader of the Museum, but he always remained in contact with its staff. Further perspectives of research were outlined under his leader-

ship, along with a schedule of new exhibitions. The restoration period was short but intense, and on July 1, 1944, the Museum was again open to the public.

In January, 1945, V.I. Vernadsky died at the age of 82, and it was a heavy blow for Fersman. A.E. Fersman began working on V.I. Vernadsky's scientific biography, but failed to complete this work due to his own weakening health (Perelman, 1968).

Alexander E. Fersman died in Sochi on May 20, 1945. He was buried in the Novodevichye cemetery in Moscow. Prof. V.I. Kryzhanovsky was appointed the director of the Mineralogical branch of the A.P. Karpinsky Geological Museum.

In 1948 the Mineralogical branch of the museum became an individual research institution of the Academy of Sciences, and in 1955 it was re-named after A.E. Fersman.

The foundation of the Mineralogical Museum and its development as a new-type research institution was inseparable and unthinkable without A.E. Fersman. He believed that mineralogical collections should not just stimulate the development of the natural sciences, that they should match the latest approaches in these sciences and their greatest achievements. From the viewpoint of a museum associate, the problems of new geochemical studies of the Earth's crust requires proper systematic allocation and new theories for the objects represented in such a museum (Fersman, 1925).

A.E. Fersman's own collections registered in the Museum comprise more than 3000 species from Russia and abroad. «His collections, which represent the whole scope of mineralogy, represent Fersman both as a tireless explorer, thorough thinker, an efficient scientist and an author of numerous research publications» (Kryzhanovsky, 1965).

A memorial which includes A.E. Fersman's stud was organized in the Mineralogical Museum; it shows his working study previously located in Sretensky Blvd., Moscow. The exposition demonstrates personal possessions of Fersman (his writing set, spectacles, a knapsack and geological hammer, etc.), his books and a series of his publications. The Museum serves as an archive of his manuscripts and photographs, which were donated by his widow, Ekaterina M. Fersman (1903–1980).

Currently, the major collection of the A.E. Fersman Mineralogical Museum in-

cludes about 130,000 items; it is one of the five largest mineralogical museums in the world.

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