

## COLLECTION OF MINING ENGINEER I.N. KRYZHANOVSKY

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Collection of mining engineer I.N. Kryzhanovsky was purchased for the Mineralogical museum of the Academy of Science by the efforts of academician V.I. Vernadsky, A.E. Fersman and V.I. Kryzhanovsky in 1912. The collection accounts more than 4500 mineral specimens mainly from the Urals and Siberia and had an exceptional scientific significance for the studies of mineralogy of Russia. It was gathered and professionally formatted by the father and the sons Kryzhanovsky. There is a full catalog with precise designation of a mineral, its original locality and comments on the collection gathering and brief description of the minerals by groups. Overview of the collection material held at the Mineralogical Museum of the Russian Academy of Science is provided.

15 photos, 15 references.

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Funds of the Mineralogical Museum of the Academy of Science had risen to the new level of quality in 1912 and the museum was ranked among the best mineralogical collections of the world. This jump was connected to the purchase of the famous collection of count Kochubey, financed from the government funds (Proceedings..., 1914). However, the Academy of Science had purchased for the museum also another wonderful collection, the collection of mining engineer I.N. Kryzhanovsky, in the same year. (Proceedings..., 1913, Matvienko, 2007). Academician V.I. Vernadsky, addressed to the department with the request to purchase "about 4500 numbers of exceptionally Russian minerals" on September 5, 1912 and emphasized: "The collection is very rich in material that is new for mineralogy of Russia and not scientifically studied and well gathered. It presents a significant scientific value especially in respect to crystallography and paragenetic associations. It is absolutely exceptional in this respect representing number of deposits in the Urals which were not described, very old and sometimes depleted ones with fine samples from old collections from the Urals, which were purchased during thirty years... This collection has an exceptionally rich scientific material that not only our museum has lack of but also all scientific collections that I know. From the scientific point of view this collection is more valuable than the one of Kochubey... Purchase of this collection is extremely important for executing the task that the Academy of Science has to accomplish, which is to comprise a mineralogical data from all territory of Russia, that we do not have yet" (Minutes of the meeting..., 1912). The description of the collection of engineer

I.N. Kryzhanovsky was composed by academician V.I. Vernadsky and A.E. Fersman, the senior scientific custodian of the museum from 1912 (Barsanov, 1989), and was included in the note to the following meeting department of Physics and Mathematics of the Academy of Science (Appendix II ..., 1912).

It is very remarkable that the collection was organized in due form: it had a catalog with notes of the mineral names and localities of their origin and was accompanied with hand written notes by author's sons, mineralogists Vladimir Il'ich and Leonid Il'ich. They worked in the museum on the overview and the history of the collection (V. Kryzhanovsky, 1912; L. Kryzhanovsky, 1912). It was a collection formed by professionals.

The Kryzhanovsky family made an exceptional contribution to the museum to make it an outstanding mineral assembly (Matvienko, 2008). The father and the sons were "the authors" of more than 10 thousands of specimens.

Ilya Nikolaevich Kryzhanovsky (1854 – 1927) (fig. 1) had a solid background (Internet publication). Graduate of Petersburg Mining Institute he denied to stay at the department after graduation and went to Krasnoufims in Perm province with his family to become a teacher in industrial college. Later he transferred to the mining service in Ekaterinburg. He had personal nobility himself and for the merits in mine-rescue service was granted The Cross of Saint Vladimir of second degree which gave the rights of hereditary nobility. Then, in 1920 he became the director of Kolivan' polishing and lapidary factory in Altai. He was transferred to Petersburg polishing and lapidary factory as a director in 1923. Ilya Nikolaevich worked in the Commission of Natural Productive Forces (KEPS in the



*Fig. 1. Mining engineer I.N. Kryzhanovsky. Ekaterinburg, early 1900s. N.G. Barsanova's archive.*

*Fig. 2. The brothers Kryzhanovsky: Vladimir (on the left) and Leonid, Ekaterinburg. 1910. N.G. Barsanova's archive.*

Russian abbreviation) with the Academy of Science of the USSR from 1925.

The sons were mineralogists with brilliant education and made all efforts to create and purchase father's collection (fig. 2). The elder son V.I. Kryzhanovsky (1881 – 1947), by the words of V.I. Vernadsky, excelled with a special talent for "museum creativity" (Barsanov, 1949) devoted all his life to the museum. He started working there in 1907 and later headed the museum from 1932 to 1947 (Godovikov, 1989). Apart from everything else Vladimir Il'ich studied way of handling mineral specimens in biggest foreign mineralogical museums and mineral firms in Europe. It was him who received the famous Kochubey collection in Austria. His brother Leonid Il'ich (1884 – 1925) had a mineralogical firm himself (Internet publication...). He specialized mainly in precious stones and in association with A.E. Fersman organized business organization "Russkie Samotsveti" (Russian Colored stones) and became its commercial director and gem specialist.

Manuscripts that remained after the sons (V. Kryzhanovsky, 1912; L. Kryzhanovsky, 1912) have information on the history of the father's collection gathering. Ilya Nikolaevich started collecting minerals being a student in 1880s. He lead field trips to various mines and processing plants of the Urals almost every year during those 16 years when he headed mining department in Krasnoufimsk College.

I.N. Kryzhanovsky's collecting passion grew to a larger scale from 1890s due to taking a position in mining service and moving to Ekaterinburg. Also it was due to his older sons became interested in minerals. Vladimir and Leonid Il'ich described in details their trips ("excursions") to Urals and Siberia in those years. The brothers lived up to several months in some places getting a local job, for example, in the Asbestos mines in the Urals.

Their reviews specify mineralogical collections including very old ones which were purchased and kept, describe people, who favored gathering the collection: miners, officials, stone lovers. We wanted to distinguish some collections purchased from people, who played "important role in educational-industrial life of the Urals" (L.I. Kryzhanovsky):

- Famous collection of D.P. Shorin, the valet of the prince San-Donato Demidov, the owner of Tagil plants, who became close to him and got him interested in stones;

- Gathering of famous Ural collector O.E. Kler, which contained minerals from collection of mining engineer Akhmatov;

- Rich collection of P.O. Korevo, the owner of the Asbestos mines, former gold miner and manager of Emerald mines.

L.I. Kryzhanovsky wrote: "All the best, all the most valuable and scientifically interesting from those collections, from personal gathering during field excursions and samples

bought separately formed the mineralogical assembly of I.N. Kryzhanovsky... Our motto was to present mineralogy of Russia and gather all the rare, the interesting as complete, and as beautiful as possible".

L.I. Kryzhanovsky emphasized presence of extraordinary specimens in every section of the collection, occurrence of minerals first discovered in a deposit and yet absent in other collections. He noted that "the vast majority of minerals known in the Urals is presented here with sufficient and sometimes with comprehensive number of samples".

Collection of I.N. Kryzhanovsky perfectly describes many deposits: the Asbestos mines, the Emerald mines, Murzinka, Mednorudnyanskoe, Beryozovsky zavod (Urals), Adun-Chilon, Sherlovaya Gora (Transbaikalia), Zolotushinsky and Zmeinogorsky mines (Altai) and others.

Almost literary reproduction of the brief description of the collection made by V.I. Vernadsky and A.E. Fersman for the Academy of Science was published in the Proceedings of the museum in the section "List of collections acquired by the museum" in subsection "Collections purchased by the museum". It was "absolutely exceptional position" of the collection of mining engineer I.N. Kryzhanovsky "transferred to the possession of the museum on October 10" (Proceedings..., 1913). The introduction stressed that "the possibility to organize crystallographic studies at the museum on scientific approach occurred due to the presence of the collection, because crystals of Russian minerals composed the main value of the collection. Moreover, the collection significantly replenished gaps in the academic collection...". Registering the specimens to the main funds of the museum started immediately.

L.I. Kryzhanovsky especially emphasized existence of "full catalog of the collection with exact notes on the very mineral and its original locality". He wrote: "our multiple excursions in the Urals and Siberia, acquaintance with the very deposits and locations of minerals played a great role in composing the present catalog and made it possible to reconstruct deposits of some minerals which were purchased to the collection and had not been described before". Absence of catalog or its incompleteness significantly decreases a value of any collection. Even the famous collection of P.A. Kochubey did not have a catalog, whereas "this collection has an ideal order as in the catalog recordings, as in mode of

enumeration of the sample by numbering with enamel paint".

The catalog kept in our archives is comprised of two similar volumes (fig. 3). They resemble the books which were kept for recording of the museum collection starting from 1912. Apparently, the data was recorded gradually using the original catalog: the recording started in 1913 and ended in 1916. Minerals were recorded by groups, according to Dana classification with numeration within the groups. The most part of the recordings was made by Leonid Il'ich by hand with black China-ink: the names, descriptions ("the state of occurrence"), deposits. Prices were put in pencil. Vladimir Il'ich, then a custodian of the mineralogical museum, made additions, corrections, notes, proved the accuracy of the data, signed and put a date with black and red China-ink or a colored pencil. He marked samples to allocate them to collection of deposits or rarely to collections of crystals or pseudomorphs and united recorded specimens "under one number". The through numeration is absent as well as numbers attached during the recording to the catalog of the main museum's collections. It makes difficult to compare data and sample search, because the collection was dissolved in the mass of the main museum collection. To compare the data is especially hard if there is no enamel number on the sample. It is impossible to find all the samples. Number of the specimens insignificantly declined because of recording "under one number". Also samples could be recorded with names of people who gave the specimen to the author of the collection. Unfortunately, such a "diffusion" of collections is a common practice in remaking ca-

Fig. 3. The catalog of the collection of mining engineer I.N. Kryzhanovsky.

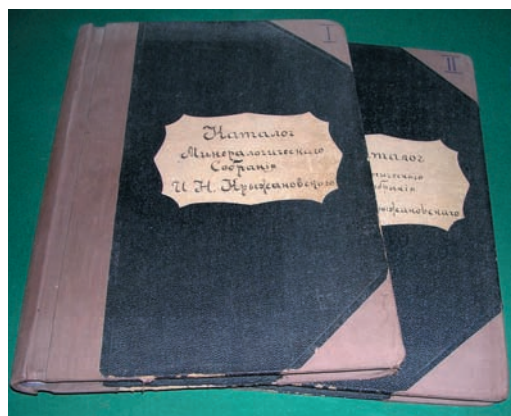






Fig. 4. Ilmenite with Vladimir I. Kryzhanovskiy's label. 9 cm. Ilmeny Mts, South Urals. FMM No 23287. Photo by Elena Matvienko.

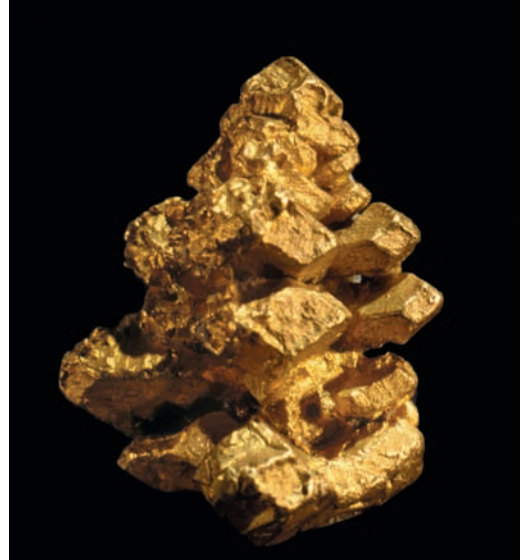


Fig. 5. Native gold. 13 gram. Nev'yanskaya dacha, Middle Urals. FMM No 23097. Photo by Michael Leybov.



Fig. 6. Amethyst. 9 cm. Lipovka, Middle Urals. FMM No 22248. Photo by Michael Moiseev.

Fig. 7. Heliodor and aquamarine. 5 cm and 9 cm accordingly. Murzinka, Middle Urals. Adun-Chilon, E. Transbaikalia. FMM No 23975 and FMM No 24020.

Fig. 8. Spessartine. 3 cm. Krasnobolotsky mine, the Emerald Mines, Middle Urals. FMM No 24443.

Fig. 9. Rubellite. 3 cm. Lipovka, Middle Urals. FMM No 23581. Photo by Michael Moiseev.

Fig. 10. Topaz. 3 cm. Kamenka river, South Urals. FMM No 22608.



Photo by Elena Matvienko.

talogs. The labels for the samples neatly written by Vladimir Il'ich by hand (fig. 4) provide a lot of help by having on the other side a stamp mark "coll. min. eng. I.N. Kryzhanovsky", author's number and some commentaries, for example, a person's name that the sample was acquired from.

The brothers Kryzhanovsky placed minerals by the groups in their manuscripts (V. Kryzhanovsky, 1912; L. Kryzhanovsky, 1912), mentioning quantity, some commentaries and the estimated value. Leonid Il'ich made the most detailed notes also with prices mentioned. Data on the quantity and the quality of the specimens is summarized in the brief review by academician V.I. Vernadsky and A.E. Fersman (Appendix II..., 1912). Appraisal and emphasis on the most interesting objects are similar in all the reviews. All the mentioned papers are cited below.

"A whole series of specimens which have a big value for crystallographic studies and study of some specific problems of gold occurrence in the Urals" is emphasized by V.I. Vernadsky for the **group of native gold** (total 132 specimens, native gold – 115 samples). Leonid Il'ich especially allocated samples where gold occurs in mineral or rock and also its "magnificent crystalline intergrowth" (fig. 5).

**Group of quartz** (377 samples) "gives a rich and various material of every variety of SiO<sub>2</sub> encountered in the Urals and Siberia" (L.I. Kryzhanovsky). It "presents an excellent set of curious crystallographic forms" and complex resorption patterns noted V.I. Vernadsky. V.I. Kryzhanovsky noticed a "very good and interesting collection of the Urals's quartz" (fig. 6).

**Group of beryl** (476 samples) contains magnificent collection of emerald and beryl specimens from the Emerald mines, beautiful beryl from Murzinka village and Aduy creek (the Middle Urals), vorobievite, roosterite and aquamarine from Transbaikalia (fig. 7) and "has without doubt one of the most valuable groups in the assemblage" (V.I. Vernadsky).

**Garnet group** (194 sample numbers) "presented... with appropriate to the group beauty and variety" (L.I. Kryzhanovsky). It contains among the other specimens crystals of "andradite with perfect faces of such a rare crystal forms for garnet as cub and pyramidal cub from Nikolae-Maximilianovskaya mine" (ibid); antique almandine from Ahmatovskaya mine (V.I. Kryzhanovsky), collection of big well formed spessartine crystals from, then newly discovered, Krasnobolotsky deposit, in the field of the Emerald mines in the Urals

(fig. 8); transparent garnet and "superior material on demantoid garnets and which is very interesting by the novelty of the deposit of the Asbestos mines" (V.I. Vernadsky).

**Tourmaline group** (404 specimen numbers), by V.I. Vernadsky words, is "the outstanding gathering of crystals": "...this material, organized by the deposits and crystallographic types, has a big scientific value". The classic deposits near villages Murzinka, Alabashka, Sarapulka, Shaitanka and Lipovka (Middle Urals) are represented here with hundreds of samples (fig. 9). The collection is also rich with samples from Borchshovochniy Range, from localities near Nerchinsk (Transbaikalia). The Kryzhanovsky brothers stressed the high value of the collection, which also was noticed by V.I. Vorob'ev, a well known expert in minerals.

"**Minerals of topaz group** (215 specimen numbers) also have a distinguished place in the collection and have some rare crystallographic forms" (V.I. Vernadsky). "Borchshovochniy range, Adun-Chilon, Murzinka, Ilmen Mountains and river Kamenka (fig. 10) have their best representative samples" (L.I. Kryzhanovsky). The brother, Vladimir Il'ich, pointed out the topaz "from old workings from Mokrusha mountain" (near Murzinka village, Middle Urals).

Leonid Il'ich wrote about the collection of serpentine (121 samples) and stresses that it was gathered as a material for V.I. Kryzhanovsky's work "Deposit of serpentine-asbestos in Kamenskaya and Monetnaya dacha in the Urals" (Proceedings..., 1907) with later additions to it. Together with minerals of other groups the collection "in assembly gives the most comprehensive picture of the whole deposit". Vladimir Il'ich himself mentioned "the very good collection of serpentine-asbestos".

V.I. Vernadsky characterized samples of **copper minerals from oxidation zone** as exceptional. There were libethenite, ehrlite (pseudomalachite) (fig. 15), olivenite, lettsonite (cyanotrichite) and others among them. L.I. Kryzhanovsky underlined the beauty, the rarity, the difficulty to identify all those interesting minerals and "usual absence of them in private mineral collections". Almost all of them originate from Mednorudnyanskoe mine (Nizhniy Tagil, Middle Urals).

V.I. Vernadsky reported: "the group of malachite definitely has a big value because of beauty of hand samples and variety of the material". The group was comprised of malachite and azurite then. L.I. Kryzhanovsky wrote about the **malachite** collection (74 spe-



Fig. 11. Malachite. 30 cm. Gumeshevsky mine, Middle Urals. FMM No 24622.

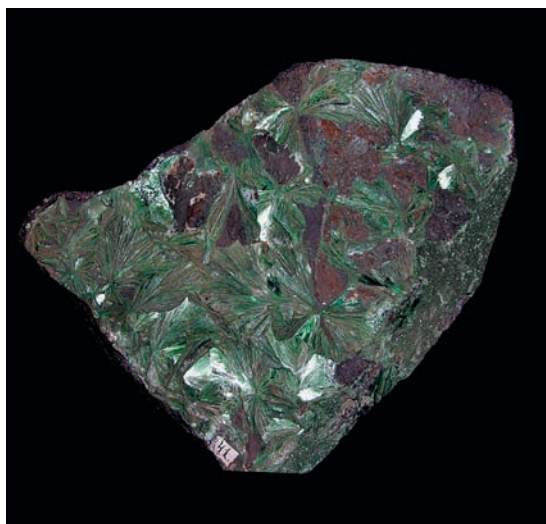
Fig. 12. Cuprite. 4.5 cm and 10 cm. Gumeshevsky mine, Mednorudyansky mine, Middle Urals. FMM No 22786 and FMM No 22812.

Fig. 13. Fuchsite. 23 cm. Bairamgulovo, South Urals. FMM No 23537.

Fig. 14. Rutile. 3.5 cm. Kosoi Brod, Middle Urals. FMM No 22365.

Fig. 15. Pseudomalachite. 5 cm. Mednorudyansky mine, Middle Urals. FMM No 24828.

**Photo**  
by Elena Matvienko



cimens): "There is as much beauty as originality. Graceful and original sinters, bright and subdued colors and shades of solid lapidary malachite make the gathering very interesting..." We want to mention samples from Gumeshevskoe deposit, which had being depleted a long time ago (fig. 11). The authors also marked azurite from Altai.

Gathering of hand samples of platinum, osmiridium, native copper, pyrite and marcasite, molybdenite, cuprite (fig. 12), crystals of chalcocite, corundum, hematite, alexandrite, zircon, rutile (fig. 14), perovskite and pyrochlore, rare niobates and tantalates, ilmenite (fig. 4), gibbsite, limonite, vesuvianite, phenacite, epidote and fuchsite (fig. 13) catch particular attention as well as crystals of feldspars, chromium chlorites, clintonite, minerals of the group of apatite, libethenite, crocoite and wulfenite.

L.I. Kryzhanovsky wrote, finalizing his overview, that his father "had to place the collection for sale" nevertheless he asked the minimum price for it "taking in consideration financial difficulties of his highest purchaser" and "had brought to the altar of the national science all our work carried out for many years". The father suggested "that this collection has big both scientific and national interest... Because of this he passionately desired that the collection would stay in Russia and not flew abroad, as it usually happened with Russian national treasures".

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