MINERAL COLLECTION OF THE STUCKENBERG GEOLOGICAL MUSEUM AT THE KAZAN UNIVERSITY

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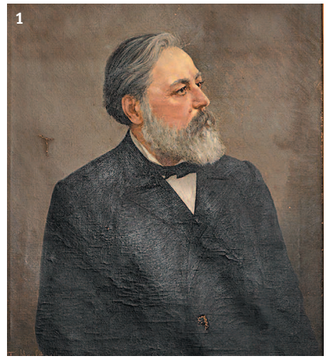
1



1. Alexander A. Stuckenberg (1844—1905), professor of geology and paleontology at the Kazan Imperial University. The Geological Museum named after him. Portrait by G. Medvedev, 1905, oil on canvas. GM KFU.

Specimens from the collection of Stuckenberg Geological Museum of Kazan (Privolzhsky) Federal University*.

Photo: Michael B. Leybov

The Stuckenberg Geological Museum at the Kazan (Privolzhsky) Federal University, which will celebrate 215 years of its establishment on November 17, 2019, is one of oldest and best natural history museums in Russia.

The museum is a member of the International Council of Museums (ICOM) and the Commission for Mineralogical Museums, Russian Academy of Sciences. The Museum of Natural History of the Tatarstan Republic was established on its basis of the Stuckenberg Museum. The contribution of the Stuckenberg Museum to the protection of the planet's mineralogical diversity was highly estimated both nationally and internationally. The mineral collection of the museum was started more than two centuries ago and is nowadays one of the oldest mineral collection not only in Russia but also in the world. It counts of more than 22 thousand ore and mineral specimens, including about one thousand crystals.

The museum houses a unique meteorite collection of 267 specimens and a remarkable collection of pseudomorphs. Together with the petrographic and paleonthological collections, the museum possesses more than 150 thousand specimens from 60 countries worldwide.

The museum of the Kazan University also differs from other mineralogical museums in Russia in that it is a house for rock and mineral specimens that were collected in many countries starting at the late 18th century through the first quarter of the 19th century.

* in the article abbreviation GM KFU means Kazan (Privolzhsky) Federal University.

2. Main staircase of the Stuckenberg Geological museum.

2

3. Anatolii G. Nikolaev with the crystal of spinel (25 x 24 cm) from the Nikolae-Maximilianovsky pit, Southern Urals, Russia (GM KFU #6116).

4. Paleontology hall of the Stuckenberg Geological museum.

5. During photographing of the spinel crystal (25 x 24 cm) from Nikolae-Maximilianovsky pit, South Urals (GM KFU #6116) – Michael B. Leybov (*right*) and Igor Pekov. May 2019.

6. Rimma D. Petrova, curator of mineral collection, and Gennady V. Sonin during photographing of mineral specimens.

7. Staff of the Stuckenberg Geological Museum of Kazan Federal University and Georgii A. Yurgenson (*left*), author of this article and KFU graduate of 1959; and (*from left to right*) Anna V. Khusainova, Vladimir V. Silantyev (Museum Director), Gennady V. Sonin, Rimma D. Petrova, Oksana Yu. Vasilyeva; Milyausha N. Urazaeva.

8. One of the Mineralogy hall, Stuckenberg Geological Museum of the Kazan University.

Museum Foundation and Early History

The museum and university were established simultaneously and have since been historically wedded. The Kazan University and its Mineral Cabinet, which provided a basis for the would-be museum, were founded on November 17 (November 5 in the Julian Calendar), 1804, on the Establishment Chart by the Emperor Alexander I and the simultaneously issued Charter. According to the Charter, four faculties or divisions were established at the university, which included 28 departments and auxiliary units, with the Mineral Cabinet among others (Shulikov *et al.*, 2004).

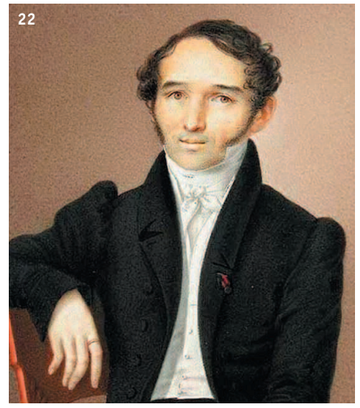
During its first years, the Cabinet acquired materials from the Kazan upper secondary school (gimnaziya), whose collections were composed of gifts from individual collectors. Much of these materials were brought to Kazan in 1798 as a grant from the prominent statesman of the time Prince Grigory Potemkin-Tavrichesky (Figure 21). On an order by the Emperor Pavel I, both this collection and the library were transferred to the Kazan Gimnaziya and later became part of the Mineral Cabinet after the opening of the Kazan University. The collection consisted not only of minerals but also of so-called natural objects, such as "*...an elephant tooth of extreme size*", topaz, labradorite 4 puds 20 pounds (ca. 74 kg) in mass, G.A. Potemkin's "*...brilliant-encrusted pearl necklace <or bracelet> of extra quality*" (http://www. e-reading.by/chapter.php/1035392/35/Bolotina_-_Potemkin.html.) etc.

Later on the collection was appended with gifts an purchases from various localities in Russia and abroad. Numerous and various showpieces were found

20. Building of Institute of Geology and Oil-Gas Technologies where Stuckenberg Geological Museum of Kazan University is situated.

21. Grigory A. Potemkin-Tavrichesky (1739–1791), Russian statesman, Prince, donator.

22. Carl F. Fuchs (1776–1846), Kazan University Rector in 1823–1827, professor of natural history, first curator of the Natural History Cabinet of Kazan University in 1805.



by expeditions and brought to the museum by researchers and students of the Kazan University.

At first, the whole collection of the Mineral Cabinet was hosted in two cabinet units in the library. For a few months upon its establishment, the Cabinet (and the University as a whole) was headed by Prof. I.F. Yakovkin. Starting on September 4, 1805, the office was assumed by Karl Fedorovich Fuchs (Figure 22), who was a well-known Kazan professor of natural history, therapy, and pathology and also was the actual founder of the Cabinet. K.F. Fuchs was the first to lecture (from September 1805 through 1806) on mineralogy at the Kazan University. Similar to many scientists of that time, K.F. Fuchs was an all-round scholar and even simultaneously headed the Cabinet of natural history, which then housed paleontological, zoological, botanical, and archeological collections. His invaluable contribution to the mineral Cabinet was a collection of minerals from the Urals, which was received by the Cabinet in 1824 (Shulikov *et al.*, 2004). The museum still stores a specimen of marcasite with quartz (Figure 35). K.F. Fuchs part in the development of science in Kazan was so important that a monument (by A. Balashov and I. Kozlov) to the scientist was erected in 1997 in the Fuchs Park (established in 1896) on the bank of the Kazanka River.

In 1805, on an initiative of S.Ya. Rumovsky, who was then the trustee of the Kazan Educational Area, the University Council asked teachers of the education institutions to collect rarities and curiosities "of all natural realms". The Cabinet then received specimens of copper and iron ores, limestones, dolomites, gypsum, and other rocks. A collection of copper ores, minerals, and rocks from the Southern Urals was granted in 1807 by Pavel Protopopov, the director of educational and training institutions of the Orenburg Territory (guberniya). In 1809, the Cabinet received a collection from Kungur citizen Yukhnev, and later museum collections were replenished by materials from Magister of the Imperial Kazan University Kodyrev (1809), Director of educational and training institutions in the Irkutsk Territory (guberniya) Miller

Historical Mineral Specimens

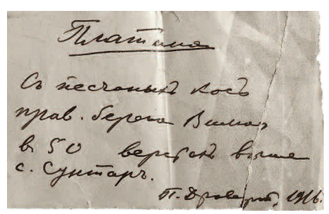
During its longer than two-century history, the Museum has witnessed several ups and downs.

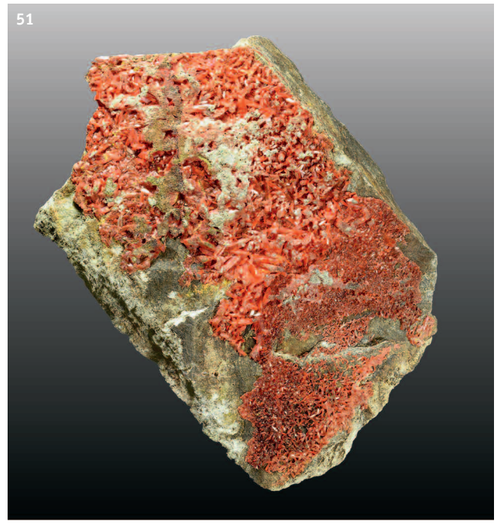
Thanks to efforts of many researchers and mineral amateurs, unique collections of minerals, rocks, and meteorites have been composed. The mineral collection of the Geological Museum at the Kazan University currently consists of mineral and rock specimens from all over the world and narrates the evolutionary history of the world's mineralogical knowledge over more than two centuries.

Many of the preserved old showpieces are specimens acquired from Kranz's trading firm, which had an extensive dealer network throughout the world. Specimens bought from them replenishment Museum's collections from 1840 through 1894. They include specimens of native elements (bismuth from Hanau, Germany; awaruite from California, United States; arsenic from Jarzen and Harz, Germany; and tellurium from Semigradin), sulfides (cobaltite, pyrite with sphalerite on quartz, acanthite pseudomorph after argentite from Freiberg, antimonite twin in the form of an aggregate of feather-shaped crystals from Borneo, etc.), sulfosalts (tetrahedrite with quartz from Hungary), and oxides (quartz, agates and onyxes from Brazil, which were purchased in the 1890s, and rutile in quartz).

The Museum houses platinum specimens from deposits in the Urals. This platinum was used (on an order of Russia's Minister of Finance Egor F. Kankrin) to mint coins. A new chemical element ruthenium was discovered

49. **Platinum** (with old label) from Placer of alluvial deposits of Vitim river in Siberia, Russia. FOV 7 x 4 cm. GM KFU #5076.





50. **Pargasite**. 12 x 9 cm.
Aldan, Yakutia, Russia.
GM KFU #5812, Gorte donation, 1950.

51. **Crocoite**. 17 x 12 cm.
Berezovskoe deposit, Central Urals, Russia.
GM KFU #8728, V.Z. Garipov donation, 2006.

52. **Pyrite** concretions.
Large sphere diameter 6.5 cm.
Vilui river, from placers near
mouth Kuchugui-Uryakh, Yakutia, Russia.
GM KFU #8320,
from Peter L. Dravert's collection.

Unique Mineral Specimens

The Museum displays some world-class mineralogical specimens.

First of all, it is worth mentioning the giant spinel crystals, with an interesting topography of their faces, from the Nikolae-Maksimilianovskaya Mine in the Southern Urals (Figures 54, 55).

The Museum is also proud of its spinel crystals from the Gonovskoe deposit, southern Yakutia, which were brought to the Museum by mineral collector Gorte (Figure 61).

A giant analcime crystal from Nizhnyaya Tunguska (Figure 62) is the most outstanding specimen of the Museum. It was gifted by Ravil Vagizovich Galiulin (1940–2010), a famous Russian crystallographer and receiver of the Fedorov Award.

One of the most distinguished showpieces of the Museum is goethite crusts with almost metallic luster from the Bakal iron ore deposit. A large fragment of such a crust is shown in Figure 60.

A beautiful pyrite crystal with perfect faceting, and of remarkable size, from the Berezovsk gold deposit in the Central Urals is shown in Figure 59.

In is also worth mentioning a splendid topaz crystal 3 pounds 3 zolotniks in weight (ca. 1300 g), which was bought in the 1840s and is still one of the highlights of the Museum (Figure 58).

Another highlight is a beautiful cluster of pyrite crystals from the famous Akchatau deposit in Kazakhstan (Figure 70).

The unique Inder deposit in Kazakhstan is represented by perfect specimens of hydroboracite (Figure 63), inderborite (Figure 64), and colemanite (Figure 66).

Still other two showpieces worth of mentioning are an azurite secretion (Figure 68) from the surrounding of Lyon in France and an aggregate of rhodonite crystals (Figure 69).

Among the specimens of the so-called "Home Collection" held at the Museum, I'd like to mention an almost perfect octahedral crystal of hauerite (Figure 65), a manganese sulfide, which was likely also purchased from the Kranz trading company.

The Museum displays a unique specimen of phytofulgurite, which is made up of plant stems replaced by anthraxolite (Figure 67) and was produced by a stroke of lightning in a haycock near the village of Podvolok in the Chita Territory in August 2002 (Lysyuk *et al.,* 2006).

Pound is old weighing unit used in Russia, equal to 96 zolotniks.

Zolotnik is an old Russia unit of weight, equal to 4.2657 grams.

54. Well formed **spinel** crystal (biggest in the world). 25 x 24 cm, weight 21.02 kg.
Nikolae-Maximilianovskaya pit, Southern Urals, Russia. GM KFU #6116, A.F. Komov donation, 1886.

Mineralogical Classics

The Museum houses representative specimens of many mineral groups.

The fluorite collection attracts keen interest owing to the wealth of morphologies and colors of the specimens. It includes fluorite crystals on matrix from the famous deposits at Cumberland in Great Britain (Figure 73). The Durham locality is represented by fluorite in aggregates with baryte and galena (Figure 75). The visitor is impressed by a 3150-g lilac octahedron (a block bounded by cleavage surfaces) from the Keremettas, Kazakhstan, a cluster of dark violet cubic crystals from Akchatau, Kazakhstan (Figure 71), a cleavage block of optical-quality purple fluorite from the Suran deposit, Bashkiria (Figure 72), a rare specimen with colorless (locally pale greenish) cubic crystals from the Vishnevye Gory Mountains, Southern Urals (Figure 74), and unforgettable clusters of yellow fluorite crystals on matrix from the Black Forest (Schwarzwald) and Saxony (Figure 17).

An original holding of pyromorphite specimens represents classic deposits and specimens, including beautiful ones from Cumberland (GM KFU #5579), Breibach (GM KFU #7610), and the Berezovsk deposit (the label reads Berezovskii Zavod) (Figure 76). The latter specimen seems to be one of the oldest in the Museum.

The crocoite samples originated from two of its most famous localities: the Berezovsk deposit in the Urals (Figure 51) and Dundas in Tasmania.

One of the classic specimens is dark green diopside-baikalite from the famous Slyudyanka Mine near Baikal, which have been studied by Eric Laxman.

71. **Fluorite**. 24 x 22 cm.
Akchatau, Kazakhstan.
GM KFU #5264.

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72. **Fluorite**. 19 x 7 x 8.5 cm.
Suran deposit, Bashkiria, Russia.
GM KFU #6098, A.L. Chernov donation.

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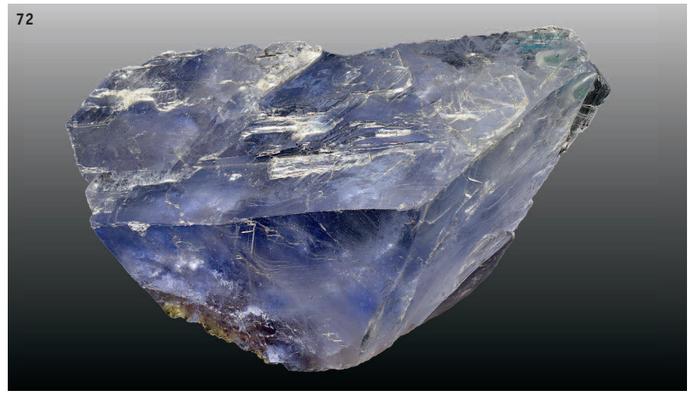

73. **Fluorite**. 33 x 22 cm.
Cumberland, United Kingdom.
GM KFU #5255.

73

74. **Fluorite**. 8 x 6.5 cm.
Vishnevye Gory Mts., Southern Urals, Russia.
GM KFU #5257, A.V. Donskov donation.

75. **Fluorite**. 21 x 16 cm.
Durham, United Kingdom.
GM KFU #5268.

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Pseudomorphs

One of the most important possessions of the Museum is its collection of pseudomorphs, which includes specimens brought to the Museum at different time and from different countries. The reader can find a brief review of this collection in a paper by Oleg N. Lopatin (2004).

Some of the specimens were bought from the Kranz enterprise, and others were brought by students at and graduates from the University.

It is worth mentioning a group of specimens of pseudomorphs of iron hydroxides after curved-faceted pyrite crystals from the Berezovsk deposit in the Urals (Figure 107).

The collection of pseudomorphs also includes specimens of malachite pseudomorphs after perfect octahedral crystals of cuprite (Figure 109) and galena, as well as after thick columnar pyromorphite crystals (Figure 104), and dolomite pseudomorphs after halite (Figure 103) from Permian rocks in the Volga area.

It is worth mentioning the malachite pseudomorphs after atacamite from Nizhnii Tagil (GM KFU #15256), pseudomorphs of doubly tapered calcite crystals after gaylussite, a typical mineral of soda lakes (Yurgenson *et al.*, 2011), which are rare and, for example, were only once documented in Russia (Yushkin, 1990).

102. **Calcite** containing iron hydroxides admixture pseudomrph after henbane flowers.
16 x 6 cm. Karvovy Vary (former Carlsbad), Czechia.
GM KFU #15284, delivered in 1843.

103. **Dolomite** pseudomorph after halite.
25.5 x 21 x 2 cm. Volga River region, Russia.
GM KFU #15256.

The Museum contains numerous specimens of manganese hydroxides in jasper and in volcanic and sedimentary rocks. One of them is a spectacular natural array of manganese oxides on dolomite. It looks like a picture of a poorly wooded Jurassic landscape in the Selenhofen area, Germany.

The specimen (GM KFU #12315) was bought from the Kranz trading company in 1894.

Instead of a Conclusion

Highlights of the mineralogical collections of the Museum are specimens gifted by P.L. Dravert, a poet of rocks and minerals and an explorer of the mineralogy of the Volga area. Numerous specimens at the Museum are his gifts, including interesting vesuvianite crystals from the Vilyui River, gold, platinum, grossular, andradite, and many others.

The Museum contains specimens collected by Kazan scientists. These are the collections of Prof. A.A. Stuckenberg, Prof. L.M. Miropolsky, Prof. V.M. Vinokurov, Prof. A.I. Bakhtin, Prof. O.N. Lopatin, and Prof. I.N. Penkov. It is particularly interesting that their studies triggered, or much facilitated the exploration, of new research avenues of mineralogy: topomineralogy and topogeochemistry (L.M. Miropolsky), EPR spectroscopy (V.M. Vinokurov), NQR spectroscopy (I.N. Penkov), optical spectroscopy of minerals (A.I. Bakhtin), and physical gemology (O.N. Lopatin).

Even a brief review of mineral collections displayed at the Geological Museum of the Kazan University shows how significant this museum is, and it seems to be reasonable to regard it as one of the world's most interesting mineral treasure-troves.

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