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MINERALS NAMED IN HONOUR OF THE COLLABORATORS OF THE A.E. FERSMAN MINERALOGICAL MUSEUM

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Almost three hundred years history of existence and development of the Fersman Mineralogical Museum is closely connected with names of widely-known scientists who made an important contribution to development of mineralogy. Names of 28 outstanding mineralogists, collaborators of the Museum, became a part of the history of mineralogy forever. 23 mineral species, 9 mineral varieties, and stony-iron meteorites, pallasites, were named in their honour. In the article the scientific interests and attainments of collaborators of the Museum, whose names were conferred to minerals, are briefly described; also brief characteristic of these mineral species and varieties is given. 28 photos, 100 references.

A history of foundation and development of the Fersman Mineralogical Museum is closely connected with outstanding Russian statesmen and scientists. Creation of museum collection began in 1716, when a large at that time collection, consisting of 1195 specimens, was bought in Danzig from the doctor of medicine Gotwald by order of Emperor Peter I. This small on contemporary representations collection has become a basis of one of the biggest world collections of minerals. The collection was deposited at the first Russian museum, the Cabinet of Curiosities. The Mineral Cabinet attached to the Cabinet of Curiosities was opened; later it was reformed in the Mineralogical Museum. At present collection of the Fersman Mineralogical Museum RAS contains more than 139 thousand specimens. For nearly three hundred years history many widely-known scientists worked in the Museum; mineral collection were increased, classified, and studied by their efforts. Numerous expeditions in different regions of Russia, and then the Soviet Union, were organized. Thematic expositions were created according to the most progressive contemporary knowledge on mineralogy. Vast work on popularisation of attainments of mineralogy was carried out. Names of 28 outstanding mineralogists, collaborators of the Museum, became history of mineralogy. 24 mineral species and 9 mineral varieties were named in their honour.

Lomonosovite and beta-lomonosovite were named in honour of **Mikhail Vasilievich Lomonosov** (1711-1765), outstanding Russian naturalist of 18th century, academician, one of the first collaborators of the Mineralogical Cabinet. Nearly 5 years Mikhail Vasilievich investigated the collection and composed a catalogue which was published in 1745; in this work the chapters, containing descriptions of crystals, precious and decorative stones, fossils (in all nearly 3000 samples), were written by M.V. Lomonosov. M.V. Lomonosov's input in development of Earth sciences in Russia is great. He created conceptions about connection of minerals with volcanism, earthquakes, and mountain formation, which were stated in the work «A word about metals origin by Earth shaking» (Lomonosov, 1757). In the work «On Earth layers» M.V. Lomonosov has paid attention to duration of geological processes and alteration of Earth face under their influence (Lomonosov, 1763, 1949). Mikhail Vasilievich was the first who began to speak about ore veins with different age; he believed that formation of minerals, including metals, was a non-stop process. In the thesis «On origin and nature of nitre», M.V. Lomonosov, basing on results of measurements of nitre crystals, correlated for the first time the main law of crystallography, the law of constancy of interfacial angles, with inner structure of crystals; he supposed that crystals consisted of separate globular corpuscles, which were packed in closest way, that determinated crystal form; thus he was the author of the doctrine about atomic structure of crystals (Lomonosov, 1949).

Lomonosovite, $Na_4Ti_2(TiO_2[Si_2O_7]^{u2}_2 \cdot 2Na_3[PO_4]^{\star}$, and **beta-lomonosovite,** $Na_4Ti_2|Ti(O,OH,F)_2\ [Si_2(O,OH,F)_7]^{u2}_2 \cdot 2Na_3H_3\ [PO_4]_2$, was found by V.I. Gerasimovskii in pegmatites among sodalite syenites in the Lovozero alkaline massif. **Lomonosovite** occurs in the form of lamellar-tabular segregations up to 7x5x0.6 cm in size. The mineral is dark brown to black, some segregations are pink-violet; lustre is vitreous to brilliant on cleavage plans and from vitreous to greasy on fracture. Hardness is 3-4; cleavage is perfect on {100}. Lomonosovite is associated with gakmanite, lamprophyllite, eudialyte, arfvedsonite, microcline, ramzaite (Gerasimovskii, 1950).

Mikhail V. Lomonosov

Vasilii M. Severgin

Beta-lomonosovite forms lamellar-tabular segregations up to 5x4x0.3 cm in size. It is light, yellowish-brown, sometimes with pink tint. Beta-lomonosovite is associated with microcline, aegirine, gakmanite, ussingite, nepheline, ramzaite, lamprophyllite, eudialyte, murmanite (Gerasimovskii, 1962).

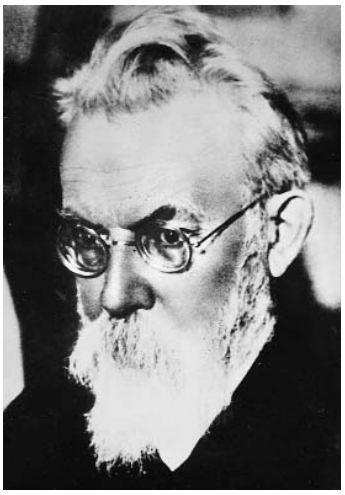
Severginite was named in memory of **Vasilii Mikhailovich Severgin** (1765-1826), academician, scientific leader of the Mineral Cabinet since 1804, director of the Mineral Cabinet since 1807 till 1826. Russian scientist-mineralogist, known by the fist fundamental works on mineralogy in Russian, consecutive naturalist-materialist, continuator of traditions of Lomonosov's school in natural history, Vasilii Mikhailovich, basing on careful study of already accumulated to that time materials of the Mineral Cabinet, has created a mineral classification by chemical and physical features; he has arranged exposition of the Mineral Cabinet, according to it classification. In the end of 18^{th} – beginning of 19^{th} century, the Mineral Cabinet has been changed by diligence of V.M. Severgin in the main base of mineralogical investigations of the Russian Academy of Sciences. V.M. Severgin has elaborated M.V. Lomonosov's ideas about joint occurrence of minerals, which was named contiguity of minerals by Vasilii Mikhailovich. Later this ideas has been developed in doctrine about parageneses and paragenetic mineral assemblages. V.M. Severgin is the author of such works as «The first fundamentals of mineralogy or natural history of fossil bodies» (Severgin, 1798), «Experience of mineralogical Earth description of the Russian State» (Severgin, 1809) and «New system of minerals based on external distinguishing features» (Severgin, 1816).

Severginite, synonym is manganaxinite, $\{Ca_2(Mn,Fe)Al_2(OH)[Si_2O_7]_2BO\}^{u2}$, is an end-member of isomouphous series axinite – severginite. The mineral contains up to 14.79 wt % MnO or 95-100 mol. % of severginite. It was found by G.P. Barsanov in the specimens from the Tungatarovskoe deposit of metamorphosed sedimentary silicate manganese ores at the South Urals. The mineral forms wedge-shaped crystals (to several millimetres in size), massive grainy shelly segregations with bright-yellow colour on fresh fracture. Hardness is 6.5-7, cleavage is perfect on {100} and imperfect on {001}, {110}, and {011}. Severginite is associated with quartz and manganese oxides (Barsanov, 1951).

Koksharovite was named in honour of Nikolai Ivanovich Koksharov (1818-1892), academician, director of the Mineralogical Museum since 1866 till 1873, and prominent Russian mineralogist of 19^{th} century. N.I. Koksharov saw his own main objective in implementation the colossal work on measurement of crystals: «It seems to me that by means of large number of observations and precise measurements it is possible to ascertain many things, which is not yet found out, and also obtain a key to understanding of some laws that determine correlations of crystal form, chemical composition, and specific weight». N.I. Koksharov created the fundamental work «Materials for mineralogy of Russia» in six volumes (Koksharov, 1852-1855, 1856, 1858, 1862, 1872). In 1863 his lectures on mineralogy was published (Koksharov, 1863).

Koksharovite, synonym is edenite, $NaCa_2(Mg,Fe^{2+})_4(OH)_2[Al_{0.5}Si_{3.5}O_{11}]_{u2}$, is a mineral of the amphibole group, colourless to light bluish-green, with vitreous lustre. Hardness is 5-6.

Nikolai I. Koksharov



Vladimir I. Vernadsky

It forms grainy and columnar aggregates. Koksharovite occurs in contact-metasomatic formations, crystalline dolomites, grainy limestones, and altered magnesium-bearing basic igneous rocks.

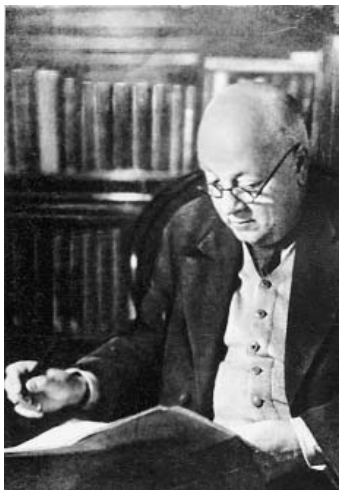
New mineral species, **vernadite**, and **vernadskite**, antlerite pseudomorph after dolerophanite, were named after the name of **Vladimir Ivanovich Vernadsky** (1863-1945), academician, director of the Mineralogical Museum since 1912 till 1919. Vladimir Ivanovich Vernadsky is a founder of genetic mineralogy, biogeochemistry, and idea about noosphere. He considered mineralogy as chemistry of the earth crust; that allowed him including natural waters and gases in a number of objects of mineralogy and that result in formation of new sciences, hydrochemistry and geochemistry. He developed genetic, dynamic ideas about mineral and has practically reformed mineralogy. V.I. Vernadsky wrote: «I have put in a basis the wide study of mineralogical processes of the earth crust, paid main attention not only on study of process product (mineral) but also on the process, not only on statistic study of process products but also on the dynamic study of the process». He elaborated the most interesting part of mineralogy, isomorphism. His outstanding organization abilities have proved useful to foundation in the Museum the chemical-mineralogical laboratory and the laboratory of spectral analysis, to attraction to museum work a number of prominent chemists and mineralogists, to organization of many expeditions that have provided very important scientific results and supplemented museum collection. Mineralogical material was systemized, the following collections were separated: systematic, deposits, crystals, pseudomorphs, and a collection of forms of mineral aggregates. V.I. Vernadsky has published nearly 400 scientific works, 30% of them are on mineralogy. Main works on mineralogy are following: «Experience of descriptive mineralogy» (Vernadsky, 1908-1922); «Earth silicates, alumosilicates and their analogues» (Vernadsky, 1937); «History of minerals of the Earth crust» (Vernadsky, 1923-1936).

Vernadite, $MnO_2 \cdot nH_2O$ ≠ $Mn(OH)_4$, has been found by A.G. Betekhtin in metamorphosed sedimentary manganese ores at the South Urals as a product of oxidation of calcium-bearing rhodonites. This powdery ocherous mass is dark brown or pitch-black in massive varieties. The mineral is opaque or translucent with red-brown colour; it has high lustre and it is brittle. Hardness is 2-3; fracture is conchoidal. Vernadite is associated with braunite, hematite, chalcedony, quartz, rhodonite, spessartine, piemontite, psilomelane, pyrolusite (Betekhtin, 1937).

Vernadskite is a pseudomorph of antlerite, $Cu_3^{2+}(OH)_4[SO_4]$, after dolerophanite, $Cu_2^{2+}O[SO_4]$. It occurs as a product of interaction of acid fumaroles with dolerophanite at Vesuvius. Vernadskite was described by F. Zambonini as an aggregate of pale-green crystals associated with dolerophanite, anglesite, conichalcite (Zambonini, 1935).

V.I. Vernadsky has named pink variety of beryl the **vorobievite** in memory of **Viktor Ivanovich Vorob'yov** (1875-1906), scientific curator of the Mineralogical department of the Peter the Great Geological Museum of the Emperor Academy of Sciences (A.E. Fersman Mineralogical Museum was named so since 1900 till 1906). Talented young scientist made efforts to arrange mineral collection, to study and to enlarge it. V.I. Vorob'yov was a

Viktor I. Vorob'yov



Alexander E. Fersman

researcher of geological formation and mineralogy of the Caucasus, the Urals, and Siberia. He studied tourmalines from different deposits of the Urals (Shaitanka, Lipovka, Sarapulka), the Ceylon Island, the USA, Saxony (Vorob'yov, 1901); garnets (grossular from Yakutia, demantoid and uvarovite from Ural alluvial placers) (Vorob'yov, 1897); prehnite from Mongolia; beryl, euclase, quartz, and feldspars from the Urals (Vorob'yov, 1905).

Vorobievite is a variety of beryl, containing Cs (to 3.1% Cs_2O) and Li (to 1.39% Li_2O). It was found at the Urals. Vorobievite forms tabular and short-columnar crystals from nearly colourless to pale-pink and bright-pink colour (Vernadsky, 1908).

Fersmanite and **fersmite** was named by the name of **Aleksandr Evgenievich Fersman** (1883-1945), prominent mineralogist, academician, and director of the Mineralogical Museum since 1919 till 1930. The great merit in further development of the Museum in the Academy of Sciences as scientific museum establishment belongs to A.E. Fersman. Main tasks, which were put by A.E. Fersman to the Museum staff, can be combine in three main groups: 1) accumulation of comparative scientific material, its systematisation, and creation of exhibitions for science popularisation; 2) organization of large expeditions for exploration of mineralogy in different region of the country; 3) development of laboratory research base of the Museum. To carry out these tasks the new laboratories and a special library were created, the new young staff was engaged. Sphere of interests of A.E. Fersman was extremely wide: mineralogy, crystallography, geochemistry, mineral recourses, and technology of mineral raw materials. He was a researcher and an organizer of industrial exploration of a number of deposits of the Kola Peninsula, the Urals, Middle Asia, an author of a theory of pegmatite genesis. Results of his scientific studies were published a lot. Main works by A.E. Fersman on mineralogy are following: «Gems of Russia» (Fersman, 1921); «Pegmatites. Volume 1. Granite pegmatites» (Fersman, 1940); «Geochemistry», 4 volumes (Fersman, 1955, 1958, 1959); «Mineral resources of the Kola Peninsula» (Fersman, 1941).

Fersmanite, $Ca_5Na_3Ti_3Nb[Si_2O_7]_2O_8F_2$, was found by A.N. Labuntsov in rich in aegirine nepheline pegmatites in the Khibiny alkaline massif. The mineral is dark brown to goldish-yellow; streak is white with pale-brown tint; lustre is vitreous. Hardness is 5-5.5. Fersmanite forms pseudotetragonal, thick-tabular crystals, intergrowths. Fersmanite is associated with feldspathoids, pectolite, aegirine, lamprophyllite, rinkite, sulphides (Labuntsov, 1929).

Fersmite, $(Ca,Ce,Na)|(Nb,Ti,Fe,Al)_2(O,OH,F,)^3_6$, is rare accessory mineral of the nepheline syenites and carbonatites. It was found and described by E.M. Bonshtedt-Kupletskaya and T.A. Burova. The mineral occurs in miarolitic cavities in dikes of albitized pegmatites. Colour is black, dark brown, lemon-yellow, yellow-brown; lustre is pitch. Hardness is 4-4.5; the mineral is brittle; fracture is conchoidal. Fersmite is associated with columbite, pyrochlore, plagioclase, microcline, biotite, apatite, titanite, quartz, zircon, xenotime (Bonshtedt-Kupletskaya, Burova, 1946).

In 1955 E.I. Semenov and T.A. Burova have named a new mineral, **labuntsovite**, in honour of **Aleksandr Nikolaevich Labuntsov** (1884-1963), collaborator of the Mineralogical Museum since 1922. A.N. Labuntsov studied mineralogy of the Khibiny and Lovozero, actively supplemented collection of the Museum. In

1926 he discovered apatite deposit in the Khibiny. He studied in details pegmatites of North Karelia, was a curator of works on determination of absolute age. He worked in Middle Asia, Sayany, at the Slyudyanka and the Urals. A new mineral, fersmanite, has been found in the Khibiny Tundras by A.N. Labuntsov; in 1926 titanoelpidite was described, which was not a variety of elpidite in fact, but a new mineral species later named labuntsovite. At present over 30 mineral species belonging to the labuntsovite family are discovered. First discoverer of the uranium ore in the USSR. He has published over 70 scientific works devoted predominantly to minerals of the Khibiny, including the monograph «Pegmatites of North Karelia and their minerals» (Labuntsov, 1939).

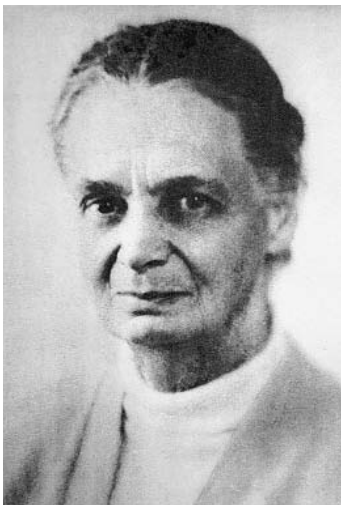
Labuntsovite, $|(Ti,Nb)_9(O,OH)_{10}[Si_4O_{12}]_4^{u3}(K,Ba,Na,Ca)_8(H_2O)n$, was found in pegmatites of the Khibiny and then Lovozero massifs in the cavities among druses of albite or natrolite in the form of pink prismatic crystals up to 12x3x2 mm in size or radial-fibrous intergrowths. Hardness is 6; cleavage is perfect on {102}. The mineral is quite widespread in the Lovozero and especially in the Khibiny massifs. Labuntsovite is associated with albite, natrolite, aegirine, nepheline, ramzaite, eudialyte, murmanite, and microcline (Semenov, 1955).

Irina Dmitrievna Borneman-Starynkevich (1890-1988), mineralogist and chemist, worked in the Mineralogical Museum since 1922 till 1932. She has solved a problem of separation of Ti, Nb, and Ta by chemical method, elaborated a method of determination of rare-earth elements in calcium phosphates. She studied rare minerals of the Khibiny and Lovozero (eudialyte, lamprophyllite, enigmatite, murmanite). She investigated isomorphism in titanosilicates and phosphates. About this work of Irina Dmitrievna V.I. Vernadsky said that this was the best and most important work on chemical mineralogy. I.D. Borneman-Starynkevich was engaged in detection of an admixture of rare-earth elements in uranium ore. Mineralogists use her work «Guide on calculation of mineral formulas» (Borneman-Starynkevich, 1964) till now. A number of such large works on mineralogy as «Isomorphous substitutions in minerals» (Borneman-Starynkevich, 1951) belongs to pen of I.D. Borneman-Starynkevich. Bornemanite and thorium-bearing loparite, irinite, were named in honour of Irina Dmitrievna Borneman-Starynkevich.

Yu.P. Men'shikov with co-authors found **bornemanite**, $BaNa_3\{(Na,Ti)_4[(Ti,Nb)_2O_2(Si_4O_{14})](F,OH)_2\}[PO_4]$, in natrolite zone of pegmatoid vein called Yubileinaya in the Lovozero alkaline massif and described it in 1975. Bornemanite forms yellow lamellar segregations, 10x8x0.2 mm in size, occurring along cleavage and on the surface of large tabular crystals of lomonosovite, rarely it forms segregations of curved lamellae in natrolite. Lustre is pearly; hardness is 3-4; cleavage is perfect on {001} (Men'shikov *et al.*, 1975).

Irinite, thorium-bearing loparite, was found by L.S. Borodin and M.E. Kazakova in agpaitic pegmatites confined to complex of foyaites composing the central part of the massif of nepheline syenites. Segregations of irinite are confined to the zone of albitization of arfvedsonite-microcline pegmatite. The mineral forms crystals, 0.5-1 cm in size, colour is red-brown, brown-yellow. Lustre is greasy. Irinite is associated with aegirine, microcline, arfvedsonite, catapleiite (Borodin, Kazakova, 1954).

Alexander N. Labuntsov



Irina D. Borneman-Starynkevi

The mineral **belyankinite** and a variety of creedite, **belyankite**, were named in honour of **Dmitrii Stepanovich Belyankin** (1876-1953), academician-secretary of Department of geological-geographic sciences of AS of the USSR since 1949 till 1953, director of the Mineralogical Museum since 1947 till 1952. D.S. Belyankin was a researcher of geology, petrography and mineralogy of the Il'meny and Vishnevye Mountains (the Urals), the Caucasus and Zakavkazie. He studied mineralogy of refractories, including clays and feldspars. He researched cristobalite and other minerals SiO2. He was interested in role of water in composition of minerals. Annual issue of «Proceedings of the Mineralogical Museum» («New data on minerals») and mineralogical meetings known as Mineralogicheskiy krujok were recommenced under the guidance of D.E. Belyankin. He has discovered and studied many rocks, discovered a new mineral, vishnevite. His main works are following: «Introduction in crystallography and mineralogy», Part 1; «Crystallography», Part 2; «Mineralogy» (Belyankin, 1934); «Petrographic tables. Textbook for practical studies» (Belyankin, 1915); «Crystallooptics» (Belyankin, 1951).

Belyankinite, $Ca(Ti,Zr,Nb)_6O_{13}\cdot 14H_2O$, was described by V.I. Gerasimovskii and M.E. Kazakova in pegmatites of alkaline massif. The mineral occurs in the form of lamellar and lamellar-tabular segregations 20x12x0.5 cm in size. Colour is light yellowish-brown, altered varieties are pale-yellow. Lustre is pearly; hardness is 2-3. Belyankinite is associated with microcline, aegirine and nepheline (Gerasimovskii, Kazakova, 1950).

Belyankite is a variety of creedite, $Ca_3[SO_4][Al_2F_8(OH)_2]\cdot 2H_2O$. It was found by M.D. Dorfman in mine workings of Central Kazakhstan. The mineral is connected with kaolinized granites jointing to quartz-topaz greisens. Belyankite forms flattened or rarely kidney-shaped concretions 2x1.5x1-9x10x1-2 cm in size. In cavities it occurs in the form of small, colourless, elongated-prismatic crystals up to 0.5x0.7 mm in size. Colour is white, porcelaneous; lustre is vitreous. Belyankite is associated with kaolinite, fluorite, and pyrite (Dorfman, 1950).

A new mineral, **nenadkevichite**, and variety of coffinite, nenadkevite, were named by name of **Konstantin Avtonomovich Nenadkevich** (1880-1963). K.A. Nenadkevich, member-correspondent of the Academy of Sciences of the USSR. He worked in the Mineralogical Museum. Being chemist and mineralogist, he studied new forms of mineral resources, invented methods of extraction of rare metals from ores.

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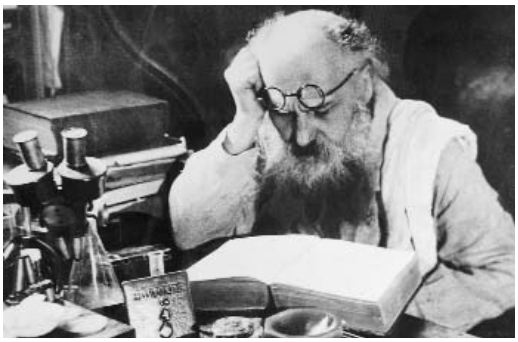
Dmitrii S.

He has suggested technology of production of metallic bismuth from domestically produced raw materials and smelted the first experimental batch of it. Main his scientific works are following: «To question of soda industry in the USSR (Doroninskoe soda lake)» (Nenadkevich, 1924); «Electrolytic method of separation of nickel and cobalt» (Nenadkevich, 1945).

Nenadkevichite, $\left|(Nb,Ti)_2(O,OH)_2[Si_4O_{12}]\right|_3^u \cdot (Na,K)_{2-x}(H_2O)_4$, was found by M.V. Kuz'menko and M.E. Kazakova in 1947 in natrolite-albite pegmatite occurring in lujavrites. Nenadkevichite forms lamellar segregations from several millimetres to 4x2.5x0.4 cm in size between microcline crystals. Colour is dark brown, brown, brownish-pink to pink. Hardness is 5; cleavage is perfect on {001} (Kuz'menko, Kazakova, 1955).

Nenadkevite is a variety of coffinite, $U[(SiO_4)_{1-x}(OH)_{4x}]$. It was found by V.A. Polikarpova in the zones of sodium metasomatosis of iron-uranium deposit in the USSR. The mineral forms intergrowths of the finest long-prismatic crystals (0.001-0.05 mm in size) and compact masses with black, green-black, brown, red-brown, orange and yellow colour depending on chemical composition. Nenadkevite is associated with brannerite, uraninite, U-bearing malacon, and apatite (Polikarpova, 1956).

Kryzhanovskite was named by N.I. Ginzburg after honour of **Vladimir Il'ich Kryzhanovskii** (1881-1947), scientific curator (since 1907 till 1932) and director (since 1932 till 1947) of the Museum. The Mineralogical Museum was the main occupation of creative life of V.I. Kryzhanovskii during 40 years. Under his guidance museum collection was replenished. All museum collections were moved from St.



Belyankin

Petersburg to Moscow. New expositions were created. The Museum became a scientific institution with the task of researching of minerals composition and properties besides of keeping and conservating of specimens. V.I. Kryzhanovskii was the best mineralogist-diagnostician of that time. His main mineralogical interests were connected with mineralogy of the Urals: pegmatites of Il'meny and Vishnevye Mountains; with minerals of Lipovka, Mokrusha, Murzinka, Shaitanka, Adui. V.I. Vernadsky wrote about V.I. Kryzhanovskii: «It is difficult to compute and rightly estimate the work of that kind, which is not expressed in a book, but in museum creation, deliberate and continuous selection, classification, and use of material, collected in museum, by everyone who are looking for data». 42 works are published, including «Chevkinite from the Il'meny Mountains» (Kryzhanovskii, 1924); «Observations in the Il'meny mineralogical reserve in summer 1926» (Kryzhanovskii, 1927a); «Pegmatite veins in environs of Urga in Mongolia» (Kryzhanovskii, 1927b).

Kryzhanovskite, $MnFe^{3+}_2(OH)_2[PO_4]_2 \cdot H_2O$, was found in pegmatites of Kalba. It occurs in the form of prismatic crystals up to 2-3 cm in size, has brown, greenish-brown, bronze colour and vitreous lustre. Hardness is 4; cleavage is perfect on {001}. Kryzhanovskite is associated with triphylite, sicklerite (Ginzburg, 1950).

E.I. Semenov named a new mineral, **kupletskite**, in honour of **Boris Mikhailovich Kupletskii** (1894-1965), collaborator of the Mineralogical Museum. B.M. Kupletskii was a researcher of mineral resources of the Kola Peninsula, Karelia and other regions of North of the USSR, Siberia, the Urals (Il'meny Mountains), Middle Asia (Turkestan Range), and West Mongolia. He studied basic and ultrabasic rocks of Monche-Tundra (Kupletskii, 1937), alkali-basic massif Afrikanda, deposit of graphite at Aliber (East Siberia), tungsten at the Urals.

Kupletskite, $(K,Na)_3\{(Mn,Fe^{2+})_7 (OH,F)_4 (Nb,Ti)_2 (OH,F)_3[Si_4O_{12}]^{\upsilon 2}_2\}_{\upsilon 2}$, was found in pegmatites of the Lovozero massif of nepheline syenites. It forms lamellar segregations up to 5x3x1 cm in size, consisting of single flakes with perfect cleavage on {100}, sometimes it occurs in the form of needle-shaped or small-flaky segregations. Colour is dark brown, black; lustre is high, vitreous. Hardness is 3. Kupletskite is associated with schizolite, neptunite, ramzaite, eudialyte (Semenov, 1956).

A.P. Khomyakov with co-authors has named a new mineral discovered by them, **bonshtedtite**, in memory of **El'za Maksimovna Bonshtedt-Kupletskaya** (1897-1974), collaborator of the Museum since 1920. She was a researcher of mineralogy of the Kola Peninsula. Since 1920 till 1923 and since 1929 till 1930 she took part in expeditions of the Academy of

Konstantin A. Nenadkevich

Boris M. Kupletskii

Vladimir I. Kryzhanovskii El'za M.

Bonshtedt-Kuplet skaya Ekaterina E.

Sciences in Khibiny, studied minerals of alkaline massifs of the Khibiny Tundras. She researched mineralogy of agpaitic pegmatites using museum specimens in Norway, Denmark, and Germany. In 1940th E.M. Bonshtedt-Kupletskaya studied mineralogy of rare-metal deposits of the Urals and pegmatites of the Vishnevye Mountains (Bonshtedt-Kupletskaya, 1951b). She was an author and deputy chief editor of the first six volumes of encyclopaedic reference-book «Minerals» («Nauka» AN SSSR), which has been published since 1960 till now. She is an author of works: «Determination of specific gravity of minerals» (Bonshtedt-Kupletskaya, 1951a); «New minerals, 1954-1972» (Bonshtedt-Kupletskaya, 1974).

Bonshtedtite, $Na_3Fe^{2+}[CO_3][PO_4]$, was found in the Khibiny and Kovdor alkaline massifs at the Kola Peninsula. In the Khibiny the mineral has been found in core of bore-holes at depth 540-1875 m. It forms small tabular crystals up to 0.5x2x5 mm in size, transparent, colourless or it has pinkish, yellowish, greenish tint, vitreous or pearly lustre. Hardness is 4; cleavage is perfect on {100} and {010}. Bonshtedtite is associated with thermonatrite, cancrinite, shortite, burbankite, trona, ferrotychite, aegirine, albite, potassic feldspar, calcite, etc. In the Kovdor massif bonshtedtite forms small-grained aggregate in shortite mass (Khomyakov *et al.*, 1982).

A.P. Khomyakov with co-authors name a new mineral, **kostylevite**, after **Ekaterina Evtikhievna Kostyleva-Labuntsova** (1894-1975). E.E. Kostyleva-Labuntsova has been working in the Mineralogical Museum since 1932 till 1943. She was engaged in study of zeolites of Nizhnyaya Tunguska, topazes of the Urals and Mongolia, non-metalliferous mineral resources, mineralogy of the Khibiny. Classification of agpaitic pegmatites, revelation of peculiarities of mineralogy of the contact zone of the massif, typomorphic peculiarities of rock-forming minerals, titano- and zirconium silicates, apatite have occupied the central place during study of mineralogy of the Khibiny. New mineral species, ramzaite (1923) and yuksporite (1932) was found and studied by Ekaterina Evtikhievna. More than 100 works were published. She was an author of large monographs and information editions, including: «Minerals of the Khibiny and Lovozero Tundras» (Kostyleva-Labuntsova, 1937); «Some methods of study of ore-bearing quartz» (Kostyleva-Labuntsova, 1964); «Mineralogy of the Union» (Kostyleva-Labuntsova, 1936); she was a co-author of a monograph «Mineralogy of the Khibiny massif» (Kostyleva-Labuntsova *et al.*, 1978), which was awarded to A.E. Fersman premium in 1983.

Kostylevite, $|Zr[Si_3O_9]|^{u3}K_2(H_2O)$, was found in core of bore-hole of the Khibiny alkaline massif in the form of colourless, water-transparent columnar crystals with vitreous lustre. Hardness is 5. The mineral is associated with aegirine, natrolite, pectolite, lomonosovite, potassic feldspar, scherbakovite, rasvumite, arctite, villiaumite, halite, thenardite, umbite, eudialyte (Khomyakov *et al.*, 1983b).

In 1954 E.M. Es'kova and M.E. Kazakova named a new mineral, **scherbakovite**, in honour of **Dmitrii Ivanovich Shcherbakov** (1893-1966), well-known geologist and geochemist. D.I. Shcherbakov was a researcher of Middle Asia, Zabaikalie, Kazakhstan, the Urals, the Crimea, Karelia, and the Kola Peninsula. He was an organizer of the Tajik-Pamirs expeditions. He studied mineral resources and metallogeny of this region. He paid a lot of attention to description of material composition of ores of separate

Kostyleva-Labuntsova

Dmitrii I. Shcherbakov

deposits of Hg, Sb, Sn, fluorite, considering minerals as a result of physical-chemical processes. In geochemical studies he found regularities confirming in many cases uniformity in co-occurrence of different elements. He was an author of more than 450 scientific works, including: «Peculiarities of metallogeny of Middle Asia» (Shcherbakov, 1935); «About maps of prognosis for magmatogene ore deposits» (Shcherbakov, 1952).

Scherbakovite, $K_2NaTi^{4}_{2}\square O(OH)[Si_4O_{12}]$, was found in pectolite-natrolite pegmatite vein genetically connected with alkaline rocks. The mineral forms long-prismatic, elongated on c axis crystals up to 1.5-2 cm long, 0.3-0.8 cm wide, and 0.05-0.2 cm thick. Colour is dark brown; lustre is vitreous on faces and greasy on fracture. Hardness is 6.5. Scherbakovite is associated with natrolite, pectolite, potassic feldspar, astrophyllite, apatite, albite, galena, sphalerite, molybdenite, etc. (Es'kova, Kazakova, 1954).

In 1966 V.I. Vasil'ev has named a variety of metacinnabar, **saukovite**, in memory of **Aleksandr Aleksandrovich Saukov** (1902-1964). A.A. Saukov, geochemist, member-correspondent of the Academy of Sciences of the USSR. His main researches were devoted to geochemistry of rare elements, especially mercury. He has invented the method of detection of small amounts of mercury, studied its distribution in rocks. He dealt with questions of genesis of mercury deposits and has suggested a method of their prospecting on the basis of study of «dissemination nimbuses» (Saukov, 1936). He studied a problem of migration of chemical elements, invented geochemical methods of prospecting for deposits of mineral resources (Saukov, 1975).

Saukovite is a variety of metacinnabar, containing zinc and cadmium. It is an intermediate member of isomorphous series metacinnabar HgS – hawleyite CdS. Saukovite was found in mercury ores of quartz-barite-carbonate veins of the Ulandu and Kuraiskaya ore zone of the Gornyi Altai. It forms grains up to 1-1.5 mm in size with black, grey-black colour and high metallic to brilliant lustre. Saukovite is associated with cinnabar, hematite, chalcopyrite, pyrite (Vasil'ev, 1966).

In 1986 a new mineral was named **ginzburgite** in honour of **Natan Il'ich Ginzburg** (1907-1993) by A.V. Voloshin with co-authors. N.I. Ginzburg worked in the Mineralogical Museum since 1942 till 1956, researched mineralogy and geochemistry of rare-metal pegmatites, studied the zone of hypergenesis of pegmatites, regularities of formation and metasomatic substitution of tantalo-niobates and other rare-metal minerals during

Natan I. Ginzburg

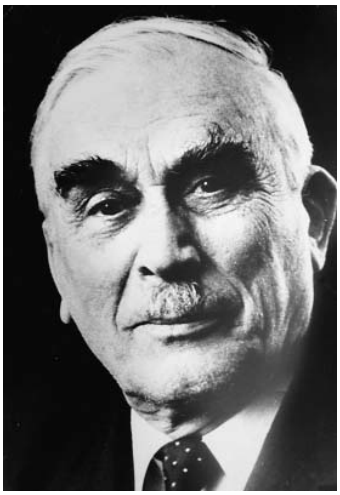
development of pegmatite process, isomorphism of micas, tourmalines, tantalo-niobates and other minerals with complex composition. He has discovered three new mineral species and found more than twenty for the first time at the territory of the USSR. He suggested to use typomorphic features and minerals-indicators of mineralization in prospecting purposes (Ginzburg, 1989). He is an author of 280 publications, co-author of wide-known three-volume monograph «Ore deposits of the USSR». Since 1958 till 1968, 35 numbers of the series «Geology of deposits of rare elements» has been published under the editorship of N.I. Ginzburg and with his assistance.

Ginzburgite, or roggianite, $Ca_2[Be(OH)_2Al_2Si_4O_{13}]\cdot 2.5H_2O$, was found in zones of hydrothermal alteration of desiliconized pegmatites of the Urals. It forms spherulites with radial structure and up to 2 cm in diameter. The mineral is colourless, white; lustre is vitreous; cleavage is perfect on {110}. Ginzburgite is associated with bavenite, behoite, bityite, analcime, phillipsite, albite (Voloshin *et al.*, 1986).

In 1963 M.D. Dorfman with co-authors named a new mineral, **barsanovite**, in honour of **Georgii Pavlovich Barsanov** (1907-1993). In 1969 barsanovite was discredited, but in 1999 it was proved as an individual mineral species, but it was accepted under the name **georgbarsanovite**. G.P. Barsanov was a collaborator of the Mineralogical Museum since 1930, and since 1953 till 1976 he was the director of the Museum, since 1961 on a voluntary basis. Researcher of rare-metal mineralization of the Il'meny Mountains (the Urals). Creator of the theory of metamict process. In 50th years of 20th century he created the scientific fundamentals of almost all expositions of the Museum in accordance with standard of mineralogy of that time, including expositions: «Structural-chemical classification of minerals»; «New minerals and mineral varieties discovered at the territory of Russia and the USSR»; «Reasons of mineral colour». Author of 144 scientific works, including: «Mineralogy of jaspers of the USSR (Urals, Altai)» (Barsanov, Yakovleva, 1978); «Mineralogy of industrial and semi-precious varieties of fine-grained silica» (Barsanov, Yakovleva, 1984); «To mineralogy of South Osetia» (Barsanov, 1937). G.P. Barsanov was the permanent editor of publication of this magazine in 1948-84 (named «Proceedings of the Mineralogical Museum of Academy of Sciences of the USSR» since 1949 till 1963; «Minerals of the USSR» in 1963-64; «New Data of Minerals of the USSR» since 1965 till 1981; «New Data on Minerals» since 1981).

Georgbarsanovite, $Na_{12}(Mn,Sr,REE)_3Ca_6Fe^{2+}_3Zr_3NbSi_{25}O_{76}Cl_2\cdot H_2O$, was found in aegirine-augite-nepheline-feldspar pegmatite in the upper course of the Petrelius River in the Khibiny Tundras. Georgbarsanovite replaces eudialyte, from which it is difficultly distinguished. It forms compact segregations with irregular outlines up to 8-10 cm in diameter. Colour is reddish-brown, rarely yellowish-green; lustre is vitreous. Hardness is 5.5; cleavage is imperfect on {0001} (Dorfman *et al.*, 1963).

A.P. Khomyakov with co-authors have named a new mineral species, **sobolevite**, in memory of **Vladimir Stepanovich Sobolev** (1908-1982), academician, director of the Mineralogical Museum since 1980 till 1982. V.S. Sobolev is well-known mineralogist, researcher of mineralogy and petrology of the Siberian platform. He studied regularities of alkaline-basic and alkaline-ultrabasic magmatism of the



Aleksandr A. Saukov

Georgii P. Barsanov

Siberian platform. Comparing these data with the African platform, he came to the conclusion about presence of diamonds in the north part of the Siberian platform (Sobolev, 1936). He has formulated the most important relations between inner structure of silicates, their properties, and genesis peculiarities (Sobolev, 1949). He actively developed researches on metamorphism and metamorphic facies (Zavaritskii, Sobolev, 1961). He is on author of about 200 scientific works.

Sobolevite, $Na_{11}(Na,Ca)_4 (Mg,Mn^{2+}) Ti_4O_3F_3 [Si_2O_7]_2[PO_4]_4$, was found in a pegmatite of the Lovozero alkaline massif. The pegmatit mineral composition is close to those of this massif pegmatites of ultraagpaitic type. Parallel intergrowths with lamprophyllite and lomonosovite are typical for sobolevite. Sobolevite forms flattened crystals up to 5 mm wide, nearly 0.1-0.3 mm thick, with brown colour and high submetallic or pearly lustre on plane of lamellae and pitch lustre on transversal fracture. Hardness is 4.5-5 (Khomyakov *et al.*, 1983a).

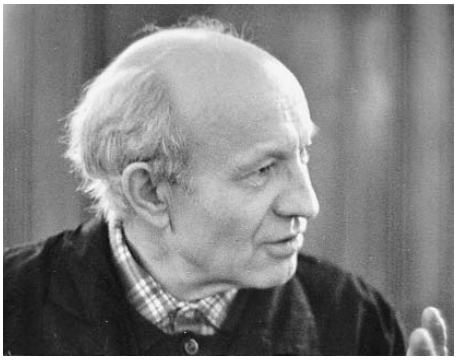
E.P. Shcherbakova with co-authors named a new mineral, **godovikovite**, in honour of **Aleksandr Aleksandrovich Godovikov** (1927-1995), well-known mineralogist, director of the Mineralogical Museum since 1983 till 1995. A.A. Godovikov was a open-minded mineralogist, specialist in field of theoretical and experimental mineralogy, crystal growth. Basing on contemporary knowledge on structure of atoms, he developed ideas about types of chemical bonds in minerals. He introduced a notion about force characteristics, which became a basis of revelation of the relations between structure of atoms and possibility of formation of some or other chemical compounds, including minerals. As a result Aleksandr Aleksandrovich has suggested the new classification of minerals. He is an author of the new Museum exhibition «Structural-chemical classification of minerals». A number of the new exhibitions were created under scientific guidance of A.A. Godovikov: «Caves», «Agates in igneous and sedimentary rocks». Together with V.I. Stepanov and M.A. Smirnova he created a unique exposition «Natural mineral forms». Earlier existed expositions were modernized and widened. A.A. Godovikov gathered the collection of minerals (nearly 4500 specimens), which he has donated to the Museum. He was an editor of magazine «Proceedings of the Mineralogical Museum of the Academy of Sciences of the USSR. New data on minerals» since 1985 till 1991. He is an author of 272 scientific works, including 15 monographs, 17 author's certificates. The main works are following: «Mineralogy» (Godovikov, 1975, 1983); «Chemical fundamentals of mineral systematisation» (Godovikov, 1979); «Structural-chemical systematisation of minerals» (Godovikov, 1997).

Godovikovite, $NH_4(Al,Fe^{3+})[SO_4]_2$, was found by B.V. Chesnokov in waste banks of coal mines of city Kopeisk (the South Urals) in 1982. It is one of the main minerals of sulphate crusts, originating during sulphate decomposition of fragmental products of waste banks. Aggregates of godovikovite are usually compact or porous, chalk-like 0.5-2 mm in size, sometimes thin-dispersed, forming stalactite-shaped segregations. Colour is white; lustre is dull (Shcherbakov *et al.*, 1988).

Dorfmanite was named by name of **Moisei Davidovich Dorfman**, collaborator of the Mineralogical Museum since 1957. M.D. Dorfman was born in 1908. He is a researcher of min-

Vladimir S. Sobolev

Moisei D. Dorfman



Aleksandr A. Godovikov

eralogy of wolframite deposits of Zabaikalie, Kazakhstan, pegmatites of the Khibiny. He is an author of classification of nepheline-bearing rocks. He has revealed that in the Khibiny there are the products of an intense pre-glacial process of chemical weathering, which were earlier rejected; he has found contemporary area zirconium crust of weathering. He discovered several new minerals. He is an author of 120 publications, including three monographs: «Mineralogy of pegmatites and zones of weathering in ijolite-urtites of the Mt. Yukspor of the Khibiny massif» (Dorfman, 1962); «Mineralogy of the Khibiny massif» (Kostyleva-Labuntsova *et al.*, 1978); «Mineralogical and geochemical peculiarities of the Khan-Bogdinskii massif of alkaline granites» (Dorfman *et al.*, 1981).

Dorfmanite, $Na_2[HPO_4]\cdot 2H_2O$, soluble hydrous phosphate of sodium, was described for the first time in the Khibiny by M.D. Dorfman and K.K. Abrashev in 1963, later its study was finished by Yu.L. Kapustin with co-authors. The mineral occurs in the form of thin powdery coatings on the fresh surface and in cavities of pegmatites of the Mts. Kukisvumchorr, Yukspor, Karnasurt, Alluaiv, Koashva. Walls of cavities are formed by druses of crystal of needle-shaped aegirine, anorthoclase, lomonosovite and covered by compact mass of dorfmanite (Kapustin *et al.*, 1980).

Collective of authors headed by L.A. Pautov has named a new mineral discovered by them, **vistepite**, in memory of **Viktor Ivanovich Stepanov** (1924-1988), collaborator of the Mineralogical Museum since 1986 till 1988, mineralogist-encyclopaedist. V.I. Stepanov, outstanding master of visual diagnostics of minerals, attached great importance to ability seeing evolution of studied object. He was a researcher of caves of the Crimea, Middle Asia, and the Caucasus. He has divided facies of cave minerogenesis and corresponding them types of mineral aggregates in those growing in air medium by film feeding, under surface of water, or at the border air – water. Viktor Ivanovich studied ore deposits of Central Kazakhstan, Middle Asia, Zakavkazie, North Caucasus, mines of the Il'meny reserve, mineralogy of Podmoskovie, Equatorial Guinea. Together with A.A. Godovikov he created the exposition «Caves», together with A.A. Godovikov and M.A. Smirnova he made the exposition «Natural mineral forms». He collected the unique collection of minerals (nearly 20 000 samples) and donated it to the Mineralogical Museum.

Vistepite, $Mn_5Sn^{4+}B_2Si_5O_{20}$, was found in rhodonite body at the north slope of the Inyl'chek range (Kirgizia). It forms orange-yellow sheaf-like aggregates up to 15 mm in size. Lustre is vitreous. Vistepite is associated with rhodonite, quartz, tephroite, galena, huebnerite, chalcopyrite, sphalerite, stannite, rhodochrosite (Pautov *et al.*, 1992).

In 2001 N.V. Chukanov and co-authors have named a new founded mineral as **novgorodovaite**, in honour of **Margarita Ivanovna Novgorodova**, well-known mineralogist, director of the Mineralogical Museum since 1996. Under the guidance of M.I. Novgorodova collections of the Museum are actively being supplemented by new minerals and genetically interesting specimens, various temporal exhibitions in Russia and abroad have been organized. Publications: 5 monographs, proceedings on mineralogy of V.I. Vernadsky, new guide-book on the Museum, booklet on exposition «Natural mineral forms» have been issue; publication of the magazine «New data on minerals» is recommenced. The magazine is issued in Russian and in English for the first time. Scientific interests of M.I. Novgorodova are in the field of genetic mineralogy: study of problems of mineralogical indica-

Victor I. Stepanov
Margarita I.

tors of ore genesis, which diverse aspects are connected with research of phase and structural heterogeneity of minerals depending on conditions of origin, growth, and post-crystallization transformations; study of native metals, intermetallides, carbides, and other minerals (Novgorodova, 1983, 2004); research of phase mineral transformations, which take place under extreme conditions of microexplosive phenomena in minerogenesis (Novgorodova *et al.*, 2003).

Novgorodovaite, $Ca_2(C_2O_4)Cl_2{\cdot}2H_2O$ was found in the Fersman Mineralogical Museum collection specimens were collected from core of borehole cutting evaporite sediments of Chelkar salt dome (Ural region, Kazakhstan). The mineral forms grainy aggregates with grains up to 7 mm in size. Separate grains are translucent, colourless. Novgorodovaite is associated with anhydrite, gypsum, halite, bishofite, hilgardite (Chukanov *et al.*, 2001).

Semenovite was named in honour of **Evgenii Ivanovich Semenov**, collaborator of the Museum since 1996. E.I. Semenov (born in 1927) is a researcher of minerals of rare-earth elements. He showed that each of sixteen rare-earth elements has proper minerals and genetic types of concentrations. He discovered nearly 30 new minerals, suggested new systematisation of minerals, basing on multivalent ions with low coordinate number. He created new classification of deposits basing on paragenetic mineral assemblages. Main scientific works are following: «Typochemism of mineral of alkaline massifs» (Semenov, 1977); «Systematisation of minerals» (Semenov, 1991); «Metallization and mineralization of rare-earth elements, thorium, uranium (lanthanides and actinides)» (Semenov, 2001).

Semenovite, $(Ca,Na)_8Na_{0-2}Ce_2H_x(Fe^{2+},Mn,Zn,Ti)[(Si,Be)_{10}(O,F)_{24}]^{u2}_2$, was found in alkaline massif Ilimaussaq (South Greenland) in cavities and cracks of albite, containing epididymite and eudidymite. The mineral forms crystals 0.1-1.0 mm in size, rarely up to 10 mm in size with dipyramidal habit and reddish-brown, pale-brownish-grey colour; lustre is vitreous. Semenovite over grows on eudidymite. Natrolite grows on semenovite crystals (Petersen *et al.*, 1972).

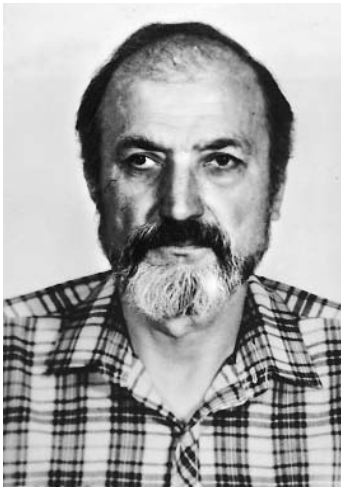
In 1988 a new mineral, **chernikovite**, was named in honour of **Andrei Andreevich Chernikov** (born in 1927), collaborator of the Museum since 1997, researcher of mineralogy and geochemistry of hypergenesis zone of uranium deposits as well as noble metal deposits in black-shale series. Main scientific works of A.A. Chernikov are following: «Exogenous epigenetic deposits of uranium» (Chernikov, 1965); «Behaviour of uranium in the zone of hypergenesis» (Chernikov, 1981); «Deep hypergenesis, mineral and ore formation» (Chernikov, 2001).

Chernikovite, $[(UO_2)(PO_4)]^{u2}{\cdot}[(H_3O){\cdot}(H_2O)_3$, was found for the first time by A.A. Chernikov in the USSR in 1958; it was named «hydrogen-autunite», then it was found in Brasilia. Chernikovite forms mica-like elongated lamellae. Colour is light yellow and lemon-yellow; lustre is vitreous (Atencio, 1988).

A new mineral, *dusmatovite*, found by L.A. Pautov with co-authors in 1996 was named in honour of **Vyacheslav Dzhuraevich Dusmatov** (1936-2004). V.D. Dusmatov worked in the Mineralogical Museum in 2001-04. He was a researcher of mineralogy, geochemistry, and petrology of alkaline rocks and their pegmatites as well as granite pegmatites of Tajikistan. He has discovered several new minerals, including

Novgorodova Eugene I.

Andrei A. Chernikov



Semenov Vyacheslav D.

Dusmatov Peter S.

tadzhikite-(Ce), baratovite, darapiosite, tienshanite, cesium kupletskite, sogdianite. He found for the first time at the territory of the USSR such minerals as reedmergnerite, stillwellite-(Ce), green variety of leucosphenite. He is an author of nearly 200 publications, including three monographs, among which there are «Marble onyx of Middle Asia» (Dusmatov, 1997); «Chemical composition of micas of the Darai-Piyoz massif» (Dusmatov, 1996).

Dusmatovite, $K(K,Na)(Zn,Li)_3(Mn,Y,Zr)_2[Si_{12}O_{30}]$, was found in pegmatites of the alkaline massif Darai-Piyoz (Tien Shan, Tajikistan). It forms aggregates of irregular form (40x50 mm in size) with dark blue to violet colour. Streak is light blue; lustre is vitreous. Dusmatovite is associated with quartz, microcline, aegirine, tadzhikite-(Y), cesium kupletskite, hyalotekite, betafite, and polylithionite (Pautov *et al.*, 1996).

Not only minerals was named in honour of collaborators of the Museum but also general name for all stony-iron meteorites, consisting of olivine grains cemented by iron. They were named pallasites in honour of academician **Peter Simon Pallas** (1741-1811), chief of nature-chamber in the Cabinet of Curiosities since 1767. P.S. Pallas organized expeditions in many regions of Russia in 1768-1774 and in 1719-1801. They explored a vast territory from Petersburg to the Caspian Sea, from the Urals to Zabaikalie. In 1772 P.S. Pallas brought from the Yenisei taiga the famous meteorite, weighing 687 kg, which later were named «Pallasovo Zhelezo» (Pallas's iron). Academician E.F. Khladni ascertained for the first time significant difference its structure and structure of earth substance. Thus, he has scientifically proved a possibility of appearance of extraterrestrial substance on the Earth. That was the beginning of a new science, meteoritics. Basing on study of sea shells at the territory between Uralsk and Astrakhan' (these shells cab be found at the bottom of contemporary Caspian and Black seas), P.S. Pallas concluded that the Caspian Sea were connected with the Black Sea earlier and the sea level of the former was higher. Reports of these expeditions were published in the work «Travels on different provinces of the Russian Empire» (Pallas, 1776).

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