



MINERALS OF THE MEDNORUDYANSKOE DEPOSIT

60. **Malachite**. 5.5 x 3 cm.
Mednorudyanskoe deposit. Fersman
Mineralogical Museum RAS #24588,
I.N. Kryzhanovsky, 1912.
Photo: M.B. Leybov.

61. Nodules of zonal split "plush" **malachite**
with inclusions of ferruginous clay. 2.0 cm.
Mednorudyanskoe deposit. Specimen: V.A. and
V.I. Popovs #705, collected by N.I. Kozin.
Photo: M.B. Leybov.



The Mednorudyanskoe deposit was renowned already in the first half of the 19th century thanks to the finds of gigantic masses of ornamental malachite and remarkable specimens of collectable pseudomalachite, libethenite and cuprite. Brochantite and delafossite were first discovered here. Many other minerals, including those found at the end of the 20th to the beginning of the 21st century, undoubtedly fascinate the museums and collectors alike (especially in Russia). Amongst these are copper, asbolane, goethite, hollandite, cryptomelane, manganite, pyrolusite, turquoise, and chalcociderite, as well as strengite, cacoxenite, volborthite and chalcophyllite, which are extremely rare for the Urals. Consolidated list of the Mednorudyanskoe minerals contained 34 mineral species to the middle of 20th century (Soloviev, 1953). Some of the minerals are presented or briefly described in a number of old publications (let's cite selected: Pallas, 1773; Levy, 1824; Menge, 1830; Shvetsov, 1836; Rose, 1837; Iossa, 1839; Shchurovsky, 1841; Koltovsky, 1846; Hermann, 1846; Nordenskiöld, 1857; Koksharov, 1860, 1867; Friedel, 1873; Planer, 1876; Meyer, 1876; Eremeev, 1880, 1892, 1894; Gladkiy, 1888; Trushkov, 1905; Boldyrev, 1927; Zavaritsky, 1929; Sumin, 1941, 1949; Vakhromeev, 1942; Grigoriev, 1949, 1953). Some minerals were characterized later (Vertushkov and Veretennikova, 1975; Bushmakin, 1998_{1,2}; Bushmakin and Kobyashev, 1998).

The list of minerals, mineral types and mineral compounds consisted of 73 mineral species at the beginning of the 21st century. Typically it is accompanied by an extensive bibliography, which is very useful indeed (Bushmakin *et al.*, 2002). It was compiled in the 1990s by Anatoliy Filippovich Bushmakin, an Ilmeny mineralogist, based on available literature and characteristics of 159 specimens from the collection of the "Gornozavodkoi Ural" Reserve Museum at Nizhniy Tagil. 92 specimens from the collection were studied instrumentally. Bushmakin planned to continue working on the deposit's mineralogy had his life not ended in a tragic accident in 1999. Many experts from Yekaterinburg have followed in his footsteps (Ponomarev *et al.*, 2000, 2007; Kleimenov *et al.*, 2003; Ponomarev, Kleimenov, 2004; Ponomarev, Erokhin, 2005, 2006, 2008, 2009; Ponomarev, Shagalov, 2004; Ponomarev, 2011, 2012).

We have investigated most part of Nikolai Ivanovich Kozin's private collection while working on this paper. Kozin had been collecting Mednorudyanskoe minerals in the course of 40 years (his collection includes 1,334 specimens predominantly of small size), which help us to expand the list compiled by Bushmakin (2002) to 97 minerals (Popova *et al.*, 2015). About 300 mineral specimens from the collection of Vladimir Sergeevich Ponomarev (Institute for Geology and Geochemistry, Urals Branch, Russian Academy of Sciences, Yekaterinburg) and about 20 specimens from the Urals Geological Museum of Urals State Mining University

The Researchers of Mednorudnyanskoe deposit

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1. Fotii I. Shvetsov
(1805–1855), *General manager of Mine at the times of find and mining malachite colossal block.*

2. Grigory E. Shchurovsky
(1803–1884), *Researcher of region geology.*

3. Gustav Rose (1798–1873)
Who studied ore minerals.

4. Rudolf F. Germann
(1805–1879), *Researcher of copper phosphates.*

5. Dmitry I. Planer
(1820–1882) *Who published reviews on new minerals discovered and studied in 1872-76.*

6. Adolf E. Nordenskild
(1832–1899) *Who studied copper minerals.*

7. Charles Fridel
(1832–1899), *French mineralogist who studied oxidized ores of the deposit.*

8. Pavel V. Yeremeev
(1830–1899), *Researcher of the deposit geology and mineralogy.*

9. Nikolai I. Koksharov
(1819–1892) *Who studied crystallography of minerals.*

10. Nikolai P. Barbote de Marni
(1829–1877), *Researcher of the region geology.*

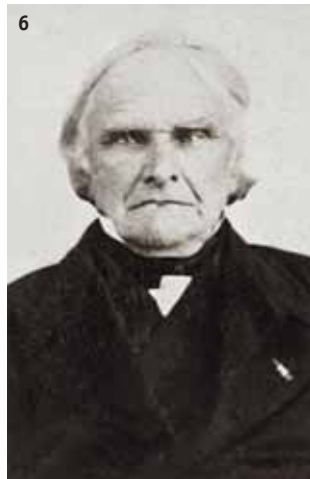
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11. Petr V. Gladkii
(1851–1918)
Head of laboratory of Nizhny Tagil mining district who run experiences for extracting copper from ores of Mednorudnyanskoe deposit.

12. Yevgraf S. Fedorov
(1853–1919) *who studied the deposit geology and genesis.*

13. Vasily V. Nikitin
(1867–1942) *Who studied geology of Middle Urals.*

14. Nikolai I. Trushkov
(1876–1947), *Researcher of the deposit geology and mineralogy.*



15. Anatoly K. Boldyrev
(1883–1946), *Researcher of the deposit geology and mineralogy.*

16. Aleksander N. Zavaritsky
(1884–1952) *Who studied geology and petrography.*



17. Sergey A. Vakhromeev
(1899–1984) *Ore researcher.*

18. Dmitry P. Grigoryev
(1909–2003) *Who analysed malachite spherulite structure.*

19. Grigory N. Vertushkov
(1909–1994) *Who studied the deposit mineralogy and perspectives.*

20. Anatoly F. Bushmakin
(1947–1999), *Researcher of ore fine, especially oxidized ones, mineralogy.*



21. Vladislav B. Semenov
(b 1939), *Researcher of history of the deposit investigation, author of "Malachite" book.*

22. Nikolai I. Kozin
(b 1952), *Mineral collector who presented a part of his collection to authors for investigation.*

Mining Museum of St.-Petersburg Mining Institute: photo 18;
Museum of Natural History, Berlin: photo 3, after Rohrbach lithograph of Paul Buerde – portrait and photo in Museum of Natural History, Berlin;
Mineralogical Museum of Russian Mining Academy: photo 2;
From private archives of: V.A and V.I. Popovs: photos 4, 8, 19; N.P. Konyukhova: photo 20; E.V. Semenova: photo 21; A.D. Radostev: photo 22.