MY SIXTY YEARS IN MINERALOGY

Georgiy A. Yurgenson

Institute of Natural Resources, Ecology and Cryology, Siberian Branch of RAS, Chita, yurgga@mail.ru



1. Georgiy Aleksandrovich Yurgenson as a Full Cavalier of the Badge of Honour "Miner's Glory" of three degrees, awarded by the Supreme Mining Council of the Mining Industrialists of Russia in the uniform of Professor of Mining Sciences. 2010.

2. Georgiy Yurgenson off to travel in search of celestine to Uslon, Pechischi on the right bank of the Volga River. Kazan, Autumn, 1956.



t all started in 1946 with the discovery of two fascinating books at a school library in Tuymazy, Bashkortostan. One of them was titled "*Traces on a Rock*". Its author Leonid Saveliev wrote an engaging account of the potential of studying and interpreting rocks. The other book taught precisely that. It was a course book on mineralogy and geology by M.P. Potemkin and V.V. Malinko aimed at final-year school students, published in 1939. Much of it uncovered a whole new perspective onto the world beneath our feet. A simple rock had become a source of knowledge about the origins of the Earth, the formation of its continents and oceans, the rise of mountains, the activity of volcanoes, the origin of life itself, and, most importantly, these books talked about the fundamental properties of minerals and crystals and the beauty of symmetry. In 1948, two years on from the happy discovery of these books, when my family moved to in the Mongolian city of Sükhbaatar, surrounded by mountains, cliffs and gullies, I was searching for rocks, collecting, illustrating and describing my finds.

My life as an eleven-year-old boy started to revolve around these books. I was inseparable from them up to the point of my admission, in 1954, into the geological department of Kazan University, a historic institution famed for its associations with notable names in science and culture.

The trustee of the university, as well as of all Kazan educational institutions for that matter, was no one other than Mikhail N. Musin-Pushkin, the founder of Arabic studies in Russia and one of the most avid collectors of jaspers. Its first provosts include the founder of non-Euclidean geometry Nikolai I. Lobachevsky. Famous chemists who worked here include Alexander M. Butlerov, Nikolay N. Zinin and Karl Ernst Claus, the latter was responsible for the discovery of a new chemical element ruthenium, named after Russia Other notable names who worked here include mathematician Nikolay G. Chebotarev, the academic father and son duo Alexander E. and Boris A. Arbuzov and many other celebrated Russian scientists, including Ivan M. Simonov, one of the pioneers of Antarctica, Adolph Theodor Kupffer, founder of Russian meteorology, Andrey A. Trofimuk, one of the founders of petroleum geology as well as the fathers of Soviet geology Nikolay A. Golovkinskiy and Alexander A. Shtukenberg, not to mention such famous writers as Leo N. Tolstoy and Sergey T. Aksakov.

By September 1954, we discovered the abundance of gypsum and celestine (*Fig.* 4) crystals and quartz near Kazan on the right bank of the Volga River, in the dolomites of the Kazanian Stage, belonging to the Permian Period in the Earth's history. Specimens of these minerals are on display in the university's

3. The main building of Kazan Federal University (right), opposite a monument to student Vladimir I. Ulyanov, whose name Kazan State University bore from 1925 to 2009. Monument by V.E. Tsigal and V.V. Kalinin, opened on the 21st November, 1954, during the celebration of the university's 150th anniversary (bronze, grey polished granite).



geologica boarded a River. We were the from the Uslon are chalcedon crystal he Gorshkow these disc became e We did, h and celest seum. Its these dona sky-blue s Afghan-T ber readir lestine and



4. Crystals of **celestine** in the rock. Field of view 10 x 16 cm. Morkvashi village, Tatarstan, Russia. A.A. Shtukenberg Geological Museum, Kazan Federal University, No. 6090. Photo: M.B. Leybov.



geological museum. In October after several geological lectures and tutorials, we boarded a retro ferryboat "Volgar" to reach the coveted right bank of the Volga

We were mesmerised by the incredible beauty of the sky-blue celestine crystals from the Permian dolomites, which formed Volga's steep embankments in the Uslon area outside Kazan and sparkled against the fine black velvety layers of chalcedony in its cavities; by quartz shimmering with the multitude of its tiny crystal heads. We would lose track of time in observation. My friends Gennady V. Gorshkov, Yury S. Rubtsov and I resisted our urge to own these wonders and left these discoveries intact for fear of destroying this work of nature. Both my friends became expert geologists later on.

We did, however, obtain some specimens containing gypsum crystals, chalcedony and celestine from the fractured dolomites and brought them to the geological museum. Its director Tatiana A Tefanova was always genuinely delighted to receive these donations. Many years later, in 1978, I had the pleasure of encountering these sky-blue strontium sulphates yet again in the adits of the Kartaw deposit, in the Afghan-Tajik depression, home to the Amu Darya River. Back in school, I remember reading a story in Alexander E. Fersman's *"Fascinating Mineralogy"* about celestine and the existence of radiolarians with a celestine skeleton in the sea lagoons where strontiferous dolomites were formed. In 1978, while studying the aforemen-



33. Map of the location of gemstones in the Transbaikalian Region, Russia:

1 – Precambrian metamorphic and magmatic complexes;

- 2 Paleozoic sedimentary-metamorphic complexes;
- 3 Paleozoic magmatic complexes;

4 – Mesozoic granitoids of Kukulbey, Borshchovochnyi, Kunaley, Amudzhikan-Sretensk, Shakhtama and other magmatic complexes:

5 – Jurassic volcanogenic-sedimentary deposits of the Transbaikalian-type depressions:

6 – Cretaceous volcanic-sedimentary deposits of the Transbaikalian-type depressions;

7 – Cenozoic volcanogenic formations;

8 – Cenozoic unconsolidated sediments;

9 – faults.

Geological maps at a scale of 1:1,000,000, edited by I.G. Rutstein.



34. Location of some of the most important gemstone provinces in Transbaikalia, Russia. 1 – deep faults;

- 2-5 zones, provinces and their numbers:
- 2 rock crystal,
- 3 nephrite,
- 4 emerald,

38



35. Front covers of several monographs by Georgiy A. Yurgenson.



5 – agate.

the basis for the first monography on the subject (Yurgenson and Solodukhina, 2018). From 2006, at the request of Transbaikalian archaeologists, we have been working on a new direction of research at the crossover of mineralogy, petrography and archaeology. During a renowned Mineralogical seminar, which traditionally takes place in Syktyvkar, I expressed my views on the need to study the Paleolithic humans' knowledge of raw mineral materials, and their means of adapting stonework technology to new materials in the absence of the traditional jasper, flint and chalcedony. This new direction won immediate support from Academician Nicolay P. Yushkin and is being successfully implemented by a new generation of our archaeology colleagues as a technological archaeominerageny. The author deeply thanks Dr. Peter Modreski (Denver, USA) for editing English style in this article. References

356 p. (in Russian).

Bezrodnykh Yu.P., Narkelyun L.F., Trubachev A.I., Yurgenson G.A. (1968) Gold in sedimentary strata of the Kodaro-Udokan region // Doklady USSR Academy of Sciences, Vol. 179, No. 4, pp. 927–930 (in Russian). Giruvol M.T., Alkhazov V.Yu, Yurgenson G.A. (1980) Mineralogy of pegmatite productive mineral complexes with precious stones in Nuristan (DR of Afghanistan). Gem mine-



chain: geological substrate (rock, ore) \rightarrow weathering crust (oxidation zone) \rightarrow soil $(\text{technosoil}) \rightarrow \text{plants} \rightarrow \text{domestic animals} \rightarrow \text{humans}$. One of the most important outcomes of this has been the summarising of arsenic geochemistry in the landscape of the Sherlovaya Gora ore field, carried out in collaboration with M.A. Solodukhina. It became

Bulakh A.G. (1999) General mineralogy. St. Petersburg: St. Petersburg University Press,

Eremin O.V. (2005) Cryomineralogenesis in the oxidation zone of the Udokan deposit. PhD dissertation. Irkutsk, 2005, 20 p. (in Russian).

Samsonov Ya.P., Turinge A.P. (1985) Gems of the USSR. Edited by V.I. Smirnov. Moscow, Nedra, 336 p. (in Russian).

Shabynin L.I., Pertsev N.N. (1956) Varvikite and Serendibite from Magnesian Scarns of South Yakutia. Zapiski RMO ("Proceedings of the Russian Mineralogical Society"). Part 85, Iss. 4, pp. 515–528 (in Russian).

Trubachev A.I. (2015) Prognosis and evaluation of gold-silver mineralization on the basis of vein quartz typomorphism. Vestnik of Transbaikal State University, No. 12 (127), pp. 152–156 (in Russian).

Selected publications of Georgiy A. Yurgenson