



## About the Activity of "Fergana Rare Metal Mining Society"

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<http://dx.doi.org/10.18415/ijmmu.v8i3.2486>

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### **Abstract**

It was founded in 1908 in Central Asia, in particular in Fergana Valley, in the deposits "Tuya-Moyin" and "Jil Bulak", rare metals mining - in addition to copper, radioactive chemical elements such as uranium, vanadium, radium, provided information about "Fergana rare metal mining society". The charter of the "Fergana rare metal mining society" was also analyzed. "Fergana rare metal mining society" was founded by railway engineer Sergei Egorovich Palashkovsky and mining engineer Kh.I. Antonovich. During the "Fergana rare metal mining society's existence from 1908 to 1918, the "Fergana rare metal mining society" mined 820 tons of ore, out of which 655 tons were shipped to St. Petersburg and uranium and vanadium preparations were processed and exported to Germany. In the 70s and 80s of the XIX century - early XX century, foreign investment was widely attracted, especially in the field of copper mining. The article analyzes the fact that the deposits in Fergana are one of the first uranium deposits in the Russian colony and have their own advanced experience.

**Keywords:** *Mining; Fergana Valley; Rare Metals; Joint Stock Company; Copper; Uranium; Vanadium; Radium; Tuya-Moyin; Jil-Bulak; Deposits; Charter; Minerals*

### **Introduction**

Mining is an activity of mankind mainly related to the use of mineral resources. It includes all minerals types development in the earth's crust with the aim of exploiting minerals, and conducting research related to their initial development[1]. This area today also includes the following comprehensive studies. Mining is a set of industries for the search for mineral deposits, their underground mining, primary processing, enrichment. The mining industry is divided into the following main groups: **fuel** - oil, natural gas, coal, shale, peat extraction; **ore-iron ore**, manganese ore, non-ferrous metals, ores of precious and rare metals, mining of radioactive elements; **mirror mining and local building materials industry** - mining of marble, granite, asbestos, chalk, dolomite quartzite, kaolin, gypsum, marl, feldspar, limestone and others; **mining** - mining of apatite, potassium salts, nepheline, nitrate, sulfur pyrite, boron ores, phosphate raw materials; **hydromineral waters** - activities such as mineral groundwater, water supply and other purposes [2].

Some rare metals of the Central Asian region's mineral resources were discovered in 1899. During this period, these territories came under the Russian colony control. Uranium ore deposits of rare metals and radium-bearing ores were found in Fergana Valley area, known as "Tuya-Muyin", which was a colony of the Russian Empire and was abandoned by the Chinese in the Middle Ages. In 1908, a private company called "**Fergana rare metal mining society**" was established. **It is known from historical chronicles that this society functioned before the outbreak of the First World War [3].** This society had already established export relations with Germany. They agreed to export uranium (radioactive chemical element) and vanadium (chemical element, metal) ores to foreign markets. Many historical sources confirm that the locals knew that the "**Fergana rare metal mining society**" specialized in extracting copper from the Tuya-Muyin deposit. However, research shows that this society not only mined copper, uranium, vanadium, radium (a chemical element with radioactive properties) [4].

The technology used to produce them (processing the ore with hydrochloric acid) converted radium along with barium into a liquid "residue" that was not used and accumulated in the warehouses of the "**Fergana rare metal mining society**". In the years before World War I, the Academy of Sciences awarded A.P. Karpinskiy, V.I. Vernadsky and other scientists, in particular, began to study Tuya-Muyin ores, despite opposition from the "**Fergana rare metal mining society**", which was concerned about the local minerals disclosure, including radioactive raw materials, as well as its "production secrets".

There are many sources about the Tuya-Muyin radium deposit in Fergana Valley [5]. As information about such a mine became known to the public, attempts were made in Russia to extract the first chemical element "radium". A graduate of the Derpt University (now Tartu) V.A. Borodovsky (1878-1914) in 1911 managed to obtain 5 kg of radioactive waste from the "**Fergana rare metal mining society**". Produced the analysis under semi-craft conditions and fully analyzed their composition. Then in late 1912, according to witnesses, he isolated a mine that could glow in the dark. Vasily Andreevich always carried with him in his pocket the ampoules of ore, and he was inseparable from these ampoules even when he was seriously ill and sent to Italy for treatment. There Baraodovsky died on January 28, 1914. Obviously from radiation sickness. The ampoule he kept was missing[6].

Russian scientists realized the need to establish a field for the radioactive drugs production. Even a private factory construction had begun. It was not until the summer of 1917 that the war effort halted this work. The search for radium and uranium was driven by the need for military defense. The Academy of Sciences has set up a special commission to determine the natural production potential in Russia. This work is the most famous and in the world of science, well-known scientists such as V.I. Vernadsky, I.P. Pavlov, N.S. Kurnakov, A.P. Karpinsky, A.E. Fersman were involved. They were later joined by I.Ya. Bashilov. Ivan Yakovlevich Bashilov (1892 - 1953) had just graduated from the metallurgical department of the St. Petersburg polytechnic institute, founded in 1902, and in 1917 began research on uranium ore deposits and "radium" ore.

In 1919, I.Ya. Bashilov will be sent on a business trip to the Bereznik plant in the Northern Urals. There he came to the storage place of radioactive raw materials sent earlier from Pertrograt, that is, the product confiscated from the former "**Fergana rare metal mining society**" [7], and according to the biography of the scientist I.Ya. Bashilov, he continued his scientific research.

It turns out that before the liquidation of the "**Fergana rare metal mining society**", the raw materials mined by the company were confiscated by the government of Tsarist Russia.

### ***About How the Tuya Muyin Deposit Was Found***

A quarter of a century after the Kokand Khanate conquest by the Russian Empire, the Central Asian Railway was built in 1899. Geological surveys were conducted along the route, including: lawyer and entrepreneur V.A. Spechev claimed the Tuya-Muyin ore deposit as a copper ore deposit. This deposit was discovered with the locals help, V.A. Spechev collected ore samples here, including uranium minerals. V.A. Spechev's relatives delivered the samples to Tashkent and handed them over to B.G. Karpov, a chemist of the Geological Committee, who was sent to Turkestan. Karpovush delivered these samples to St. Petersburg.

In the metallurgical laboratory of the Moscow technological institute, Professor I. A. Antipovva B. G. Karpov conducted ore research. I.A. Antipov found rock deposits of chalcocite or copper uranium in two calcite samples, and B.G. Karpov determined the uranium presence in the samples analytically. I.A. Antipov described the discovery at the St. Petersburg mineralogical society meeting in 1900:

"So far, uranium compounds have been found to be the rarest in Russia. It is a practical interest as a mineral-rich uranium ore supplied by B.G. Karpov" [8].

In 1904, Kh. I. Antunov began a search of the mine, which they carried out successfully. In 1907 he founded the private enterprise "**Fergana rare metal mining society**", in the same year he mined the first ore. In 1908, the company in St. Petersburg launched an experimental plant for processing uranium-vanadium ore from this deposit.

In 1904, the mining engineer Kh.I. Antunovich began exploration work, including the use of diamond drilling. From 1907 to 1913, the Tuya-Muyin uranium-vanadium deposit was managed by the "**Fergana joint stock company for rare metals mining**", which had a processing plant for this ore in St. Petersburg. "**Fergana rare metal mining society**" **produced 820 tons of ore during its existence; from which 655 tons were sent to St. Petersburg, and uranium and vanadium preparations were processed and exported to Germany.** [9] From 1908 to 1917, academician V.I. Vernadsky, geologists D.I. Mushketov, D.V. Nalivkin, V.N. Weber and D.I. Shcherbakov, in 1914, the Moscow radius expedition was organized and funded by the industrialist P.P. Ryabushinsky.

The Tuya-Muyin deposit, the only industrial source of radium in Russia, continued to operate only in 1923. The ore reserves prepared for mining by the existing deposits were estimated by the State Radiation Institute expedition at 5,000-3,000 tons of ore containing 1 g radium metal. In 1923 the mine was handed over for industrial exploitation. The Bonduge chemical plants association, led by I.Ya. Bashilov, who developed radium extraction technology, has created a radium plant from complex Tuya-Muyin ores.

The Tuya-Muyin deposit development was carried out underground, and by the time the mine was closed, the development depth had exceeded 220 meters.

**Tuya-Muyin settlement. Photo:**  
**1926**



*Photo archive Mineralogical Museum named after A. E. Fersman Russian Academia Science.*

One such company in Central Asia is the “Fergana rare metals mining society”. The charter of this society, kept in the Central Archives of Uzbekistan, was approved on July 4, 1908 by the Russian emperor in Peterhof[10].

This industry development has a long history in Central Asia. In the mining, especially in the late XIX and early XX centuries, various companies formation is noticeable. Such companies have their own *charter*, which covers all issues related to the company's activities.

The mining "*charter*" reflects the founder of the company, what specializes in the minerals extraction, the territory and size of mining, goals, rights and duties. The first information about the "*charter*" system of companies engaged in mining and extraction and sale of mineral resources in Central Asia was identified during our research since 1870. This is the new charter "Permitting the private gold production in the territory of the governor-general of Turkestan" [11]. The addition of the word "new" to this "*charter*" indicates that before 1870 in practice in this area in practice there was a "*charter*" - a charter regulating this issue.

In particular, the “**Fergana rare metals mining society**” was founded by railway engineer **Sergei Egorovich Palashkovsky**.

The Charter consists of Article 77, as stated in Article 1 “For the copper extraction and related rare and other rare metals and minerals, mining engineer **KH.I. Antonovich** established a joint-stock company called "**Fergana rare metals mining society**" in "Tuya-Muyin" and "Jil-Bulak" regions of Fergana region. [12].

According to Article 2 of this charter, the size of the mining area is clearly indicated: three areas in the "Tuya – Muyin" area, 104 дес.[13] 398 sq. сажн.,[14] each measuring three areas in the “Jil-Bulak” area: 91 дес. and the first, 352 sq. саж. , other - 78 дес. 720 sq. саж.т, the third - 75 дес. 2.046 sq. саж.

Mining Engineer Kh.I. Antunovich as a district engineer of the Turkestan Mining District in accordance with document No. 857 on 28 September 1907; 859, 861, 863, 865 and 867, all the property and contracts belonging to them are held by the owners, the terms and obligations, in accordance with all existing legal provisions granted by the owner to the company, the above property transfer are agreed with the final property owner provided, and if such an agreement is not observed, the society is considered unreal.

Materials on liability before transferring property to the company and for all that occurred on the property itself, as well as the transfer of such debts and obligations to the company with the consent of the creditors, are permitted under applicable civil law”- is displayed.

This charter is the main regulatory document of the society, it states that news in public life should be published in accordance with Article 6, such as the “State Bulletin”, “Finance Bulletin”, “Industry and Trade”, “Statements of the Capitals”, “Turkiston Vedomosti” and the “Sheet of St. Petersburg administration and metropolitan police”.

The total capital of the joint-stock company, known as the “**Fergana rare metals mining society**”, was 450,000 rubles, divided into 4,500 shares, each amounting to 100 rubles[15].

According to the charter, if the company wants to increase its fixed capital, it must obtain permission from the Ministry of Trade and Industry.

In the charter text the name "Fergana rare metals society" is abbreviated, and in the last sentences it is indicated by the word "Society". Article 3 states that "Society" is based on the acquiring property purpose and establishing a society on the basis of current laws, regulations and the rights of individuals, the right to lease real estate and movable property, to determine the mining area, to start work there, to carry out ore washing, to organize mining production routes, to use their own and others' equipment in agreement with the owners, installation of industrial water pipes, drainage works and facilities for mining of all metals and other ores types, their operation, including the establishment and factories operation for the extraction and refining of metals and other minerals.

The rights and duties set forth in this article are briefly appended throughout the text. That is, in this application: “Society” is the possession of personal property or property and real estate that can be temporarily owned in the local area, foreign nationals and members of the Jewish religion are not allowed to be allowed in the specified size territory, where the mining company has started mining, where the law prohibits it. [16].

“**Fergana rare metals mining company**” is a joint-stock company with foreign investment in the charter (charter) it means that they tried to follow the local laws as well as the religious beliefs instructions among the population.

According to the “**Fergana rare metals mining company**” charter, it was headed by three directors elected for a certain period of time at the shareholders' meeting. Candidates for the directorship are nominated from among the 25 shareholders. The time and place of shareholders receiving dividends from their shares were provided by the "society" through publications.

## Conclusion

So, the industry development in this period, to a greater or lesser extent, benefited only Russia and foreign countries. During the short activity of “Fergana rare metals mining society” (1908-1918), rare metals and minerals were mined at the “Tuya-Muyin” and “Jil Bulak” deposits in Fergana Valley. They were among the first deposits in the Russian colonies to extract chemical elements with radioactive properties such as uranium, vanadium, radium in addition to copper, and had their first and most advanced experience.

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