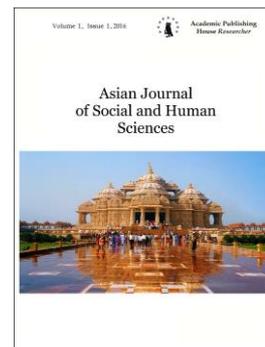


Copyright © 2017 by Academic Publishing House Researcher s.r.o.



Published in the Slovak Republic  
Asian Journal of Social and Human Sciences  
Has been issued since 2016.  
E-ISSN 2500-3763  
2017, 2(1): 28-35

DOI: 10.13187/ajshs.2017.2.28  
[www.ejournal45.com](http://www.ejournal45.com)



## **Geology Education in Asiatic Russia in the 18th –the early 19th century: Historical and Regional Aspect**

Vladimir N. Shaidurov <sup>a, b, \*</sup>

<sup>a</sup> Saint-Petersburg Mining University (Mining University), Russian Federation

<sup>b</sup> East European Historical Society, Russian Federation

### **Abstract**

Over a period of the 18th – 19th centuries, the two-level system of personnel training for the mining industry developed in the Russian Empire. The system comprised mining schools that opened during the period mentioned in the main centers of ferrous industry and nonferrous metallurgy development (the Urals, Siberia, Donbass, Poland). A higher vocational institution was the Saint Petersburg School of Mines that had close educational links with regions. The system of training of geologists and engineers allowed Russia to become one of the leaders in the mining and metallurgical industries. Russian mining educational institutions were at the same level as the Mining Academy of Freiberg (Germany). This article will discuss the key aspects of the geologist and engineer training process in Russia. The historical experience may be leveraged today to optimize the educational process in geologist training.

**Keywords:** geology, geological education, Russia, mining schools.

### **1. Introduction**

One of the essential conditions for the booming national economies in Russia, India, China, Brazil and other countries is the efficient development of mineral deposits. This is accomplished only if a pool of highly qualified geologists and mining engineers is available. Today, there is a number of generally recognized training centers for top experts (Germany, Russia, France, and England), which formed back in the middle of the 18th century. Over 250 years they have trained thousands of geologists. Most of them were ordinary participants in the discovery and development of deposits. Only a very small part of them grew into outstanding scientists. If we nowadays speak of the geological education in Russia, we should mention academicians Gelmersen, Fedorov, Karpinsky, Gubkin, and Obruchev among geologists who made a significant contribution to the development of geology, crystallography, petrography, petrology and other sciences.

### **2. Sources and Methods**

This article will discuss various aspects related to how the system of training geologists and engineers formed and developed in primary vocational institutions of Russia in the 19th century. As a working material, the paper will use the example of the Barnaul School of Mines in Siberia, which specialized in preparing experts in copper, silver, and gold ore survey and masters for metallurgical plants for almost 100 years.

---

\* Corresponding author

E-mail addresses: [s-w-n@mail.ru](mailto:s-w-n@mail.ru) (V.N. Shaidurov)

### 3. Discussion

Studies on the history of the geological education are distinguished for their nation-specific content. The most important publications appear before anniversaries of educational institutions. In 1873, the St. Petersburg Mining Institute celebrated its centennial. This event set up an occasion for a study "A Historical Sketch of the Mining Institute" by A. Loransky (1873). Five decades later, a collective work "The anniversary collection. 1773–1923", in which Mining Institute professors presented materials not only on the issues of the past, but also evaluated the place of the Mining Institute in the professional personnel training system. Additionally, the study specifically uses a combination of the historical and regional approaches. Some monographs examine the personnel training system for the mineral raw materials complex of the Urals and Siberia, which in the 18th-19th century were major mining and metallurgy centers. In 1956, a work "Mining and metallurgical schools of the Urals" by N.V. Nechayev was published (1956), which described the early years and development of mining schools, which prepared masters for Ural plants. In 2010, a monograph "History of the mining education in Transbaikalia" was published by T.A. Konstantinova (2010). About the role of mining education in Russia, academicians of Helmersen and Fedorov wrote in his articles V.N. Shaidurov (2014, 2015).

Most of the research works are aimed at examining educational institutions at a local level, within a particular region. There are practically no publications where authors tried to look at the way elementary, secondary and higher mining schools interconnect in Russia, and compare them with mining training institutions in different countries.

### 4. Results

The formation of the vocational training in mining in the Altai region can be divided into several stages. The first stage is associated with the work of schools at mining and metallurgical plants (1753-1779). The second stage is determined by the creation of the two-level training system in 1779 (in fact, since 1785). The third stage (since 1827) is connected with efforts to regulate the mining education in the Altai, which was associated with two regulatory acts dated November 2, 1827 and August 4, 1836. The documents formalized the system of secondary vocational education in the region.

Since the mid-18th century, the Altai has been one of the centers of ferrous metallurgy in Russia. Building the mining and metallurgical complex in the region (mines, silver- and copper smelters) was associated with the business operated by Demidov. After his death, Empress Elizabeth ordered to make over the Altai plants from Demidov's heirs "to us." Since the mid-1740s, the Altai was controlled by the Cabinet. As the governing body, it attached great importance to human resources and educational policies in managing the Kolyvan-Voskresensk plants.

First technical institutions in the Altai were schools opened at mining and metallurgical plants. The issue of the first school established at a mining facility in the Altai region remains unresolved in the research literature. The pre-revolutionary authors, well-known Altai ethnographers, who also had access to the archive materials of the time, S.I. Gulyaev and P.Ye. Semianov, dated the start of the mining school at the Kolyvan plant back to 1739, i.e., to the Demidov period, and in the settlement of the Barnaul plant – back to 1747.

Based on the documentary evidence, today's scholars have dated the mining school in the settlement of the Barnaul plant back to January 18, 1753 (Goncharov, 2003: 12). The same date is specified by the Barnaul encyclopedia. Later, such schools were arranged at the Zmeinogorsk mine, as well as Pavlovsk, Suzun and Tomsk plants.

The Cabinet's Altai facilities launched their own mining and metallurgical schools thanks to A.I. Poroshin, second director of the Kolyvan-Voskresensk plants. He was a highly skilled professional in his field, who received a first-rate mining education in Sweden. A.I. Poroshin is generally acknowledged to have been the most prominent figure in the Russian mining sector. Altai mining schools were created as comprehensive entry-level institutions but with a focus on mining. They, as a rule, taught children of masters and mining employees. They usually enrolled boys aged between 5-7 years, who studied at the schools until the age of 14. Studies were a continuous process throughout the calendar year, so no holidays were provided under the training program. The academic year was divided into thirds consisting of four months each. After 1761, the training procedure underwent some modifications. The teaching and learning process was divided into three stages (classes): language and literature, arithmetic, geometry and trigonometry. Students

studied for several years in each class. At the last stage, students learned the basics of mining, mechanics, draftsmanship, drawing, and became proficient in a variety of mining crafts under the guidance of experienced masters. The educational institution became known as the school of the Barnaul plant.

Research works have already noted that the Altai schools at mining and metallurgical plants were well supplied with textbooks, required materials, and illustrated study guides. As he believed that the mining and industrial success of the region and the development of geological prospecting and exploration relied on skilled and trained professionals, A.I. Poroshin organized a library in Barnaul in 1763, first such establishment in the region, with a collection mostly oriented on mining. The mining library eventually became a major cultural value of Barnaul<sup>5</sup>. Even before this the first chief of Kolyvan-Voskresensk plants, A.V. Baier established a mineralogical museum which also allowed the mining schools to use its exhibits in the educational process.

Graduates of the mining schools continued their vocational training in the form of apprenticeship in the Cabinet's institutes for at least 2-3 years. After they mastered practical skills and confirmed professional competencies, they became mine workers (pickmen), smelters, and were given mining ranks. But some worked as apprentices for quite a long time – 10 years or more. For example, Gerasim Zyryanov, who discovered the country's richest polymetallic deposit, which received his name, was an apprentice mechanic until his death (Mukaeva, 2008: 120-121).

While he was the head of the Kolyvan-Voskresensk district, A.I. Poroshin succeeded in strengthening Cabinet-owned enterprises with geological and technical personnel. Owing to his petitions, the enterprises invited mining masters from abroad, as well as domestic experts. Only in 1761, 11 young specialists came to the Kolyvan plants and mines from the Moscow State University and other educational institutions. They were the "cadet sergeants" – G.S. Brovtsyn, N. de Kroer, V.S. Chulkov and others. Of them only one "Cadet Sergeant" was qualified professionally unfit and sent back. Others, by working at Altai plants and mines, thoroughly studied mining and gained valuable experiences in managing mining businesses. Many of them were plant managers, and V.S. Chulkov rose to the rank of major general and became the chief of the Kolyvan-Voskresensk plants. They pioneered in discovering many deposits of polymetallic ores, iron, and colored ornamental stones. A particularly significant role was attached to the 1786 survey season, when they discovered multiple rich deposits of silver lead ores, high-quality porphyries, jaspers, breccias, and various marbles, and carried out thorough mapping surveys of rivers and areas visited by geological parties. In the 80-90-s of the 18th century, Altai geological prospectors collected extensive geological materials which formed the basis of the works by I.F. German, V.M. Severgin and other scientists in Russian geology and mineralogy. Hence, 1753 marked the beginning of vocational education in the Altai. Authors today evaluate the general technical training of mining specialists of lower ranks at the time as being at quite a high level (Mukaeva, 2008: 120-121).

The next stage in the development of the system of technical mining education in the Altai was the launch of the Barnaul School of Mines in 1779. The idea of creating a school of mines in Barnaul belonged to the famous Russian mineralogist of the last third of the 18th century, I.M. Renovants. He also made the first personnel scheduling chart and training program for the establishment where he worked for a number of years. The scientist brought to the Altai a mineralogical collection consisting of 2300 ores (samples), which was bought by the Cabinet agency for 2 thousand rubles, a very large sum for the time. The collection, intended for the Barnaul School of Mines, was so substantial that, according to A.M. Rodionov, its description in the German language alone "barely fitted 86 pages," and its Russian translation made by the oberbergmeister Pyatin was of the same size (Rodionov, 2007: 68).

In fact, the vocational school began operating in 1785. Its opening was delayed due to the lack of teachers. Finally, the vocational school managed to recruit collegiate assessor Martov, archivist Schramm and Pastor Gabriel. Martov taught arithmetic, geometry, basics of algebra, physics, general and Russian geography, history and Russian grammar with exercises. Schramm taught chemistry, mineralogy and metallurgy, and Gabriel – Latin, German and French.

In the first year, the Barnaul School of Mines enrolled 20 a young men. Subsequently, the number of students gradually increased, and in six years it reached 90 people.

The school of mines was originally intended for children of the "noble" estates, mainly from the families of mining officers and aristocrats. It is no coincidence that the school had a second name – the Barnaul noble school of mines. However, the stratum of "nobles" in Barnaul was very

small, and enrolling students only from among them turned out to be unrealistic. Already in the summer of 1789, by order of the chief Kolyvan-Voskresensk plants, G.S. Kachka, the vocational school began to admit most talented graduates from mining plants schools, who belonged to various social classes.

In the first years, the vocational school had no orderly and well-defined curriculum. In fact, there were preparatory lessons in place. Much effort was made to improve the training performance in the district school of mines by the future academician at the St. Petersburg Academy of Sciences, V.V. Petrov, who was employed in 1788 on a two-year contract by the Barnaul noble vocational school to teach children of mining officers and nobles. Here he was a teacher of physics, mathematics, and Russian grammar and Latin, and at the same time, as instructed by the Cabinet authorities, he monitored the education process at the vocational school and the teaching procedures at the mining plant school for children of masters and soldiers. Modern authors emphasize the importance of the merits of V.V. Petrov: he introduced the class and lesson learning system to ensure students received solid and systematic knowledge; arranged a physics laboratory and equipped it instruments and devices he made himself; carried out educational excursions to mines and plants to enable students to get acquainted with mining operations in practice, as well as gather collections of minerals for educational exhibitions. According to Barnaul researchers, thanks to the efforts by V.V. Petrov and support from the chief of the Kolyvan-Voskresensk plants G.S. Kachka, the "noble vocational school" virtually became a non-estate establishment which admitted students based on their abilities rather than their origin. It is not accidental that since 1789 the vocational school became known as the mining vocational educational institution, and schools at mining and metallurgical plants sent there its most talented graduates regardless of the social and legal status of their parents. In 1790, V.V. Petrov returned to St. Petersburg where he worked as a teacher in metropolitan schools.

The Barnaul mining and metallurgical plant school and School of mines by the number of students, faculty staffing, availability of textbooks, stationery, visual aids, tools, organization of educational training, and above all by the content and organization of the educational process were considered as best in Siberia in the 18th century. The Barnaul School of Mines released well-trained mining specialists. The district quickly developed a good tradition of mine technical training. General subjects at the Barnaul school were taught by graduates of the Moscow University, and the district's best mining officers and geologists with a huge practical experience in prospecting and mining operations. The school of mines had a good professional library as well as mining and mineralogical museums.

Students at this school had their training in mines and were engaged in drawing geological (geognostic) maps. Subsequently, some of these maps were published in the first half of the 19th century.

Issues of geological mapping were addressed by a teacher of higher sciences for preparation of mining officers, I. Leube, and other specialists. When studied, the level of these maps shows a very competent approach to the organization of prospecting operations. The fact that mining plant schools and Barnaul School of Mines gave comprehensive geological knowledge, evidences good progress in opening many ore and stone deposits.

According to E.F. Burstein, the opportunities for becoming practically acquainted with mining were even higher in the Altai than those in St. Petersburg (Burstein, 2003: 103). The Petersburg School of Mines was unable to give practical knowledge and skills in the capital, far from the country's major mining centers – the Urals and the Altai. The Barnaul School of Mines taught metallurgy, mineralogy, geognosy, mining and assaying at a higher level. It was the first secondary technical educational institution in Siberia that trained specialists in mining production and geological prospecting. The best graduates of the Barnaul School were sent by the mining district administration to St. Petersburg to continue their studies, where they were admitted as senior students.

Training programs and terms at the Barnaul School of Mines were as close as possible to those at the St. Petersburg School of Mines, which played a great role in training geologists and other specialists to staff Altai mining enterprises (Grishaev, 2000: 82). It was founded in 1773 and opened for the following year. The projects of a school of mines both made use of proposals by M.F. Soymonov, I.M. Renovants and other prominent figures in mining, and benefited from the

experience of the Freiburg Mining Academy, which was a recognized standard among institutes in training mining and geological personnel in Western Europe.

Beginning in the 90s of the 18th century, the metropolitan School of Mines left several places for children of mining officers at the Kolyvan-Voskresensk plants. This tradition continued in the first third of the 19th century.

Much attention to training of professionals for mining and production operations was given by senior officials in the Cabinet of His Imperial Majesty. One document dated in the early 19th century mentioned that there was the annual allocation in the amount of 15 thousand rubles (CGIA SPb. F. 963. Op. 1. D. 131. L. 7), which went to the training of mining engineers in St. Petersburg and their visits to leading European centers of mining production business in Sweden, Germany, England, and Austria.

Such significant funding enabled the management of the Kolyvan-Voskresensk plants to send annually up to 10 young people of different age and educational level to the capital for studies. As a result the director asked the Barnaul authorities not to send new cadets in the near future because of the shortage of residential and educational buildings (CGIA SPb. F. 963. Op. 1. D. 131. L. 7).

By 1805, the St. Petersburg Mining Cadet Corps had 18 students assigned by the management of the Kolyvan-Voskresensk plants. As mentioned, the Cabinet allocated considerable sums on the education process and regularly requested performance reports. These documents, we should note, were compiled on the basis of information provided by Corps teachers.

In 1805, of the Altai students the greatest successes were demonstrated by Mikhailo Fereferov who arrived in the capital for further studies only in 1804. Being a son of a dam master apprentice, dismissed from the service, he received training at the Barnaul School of Mines. In previous years, he studied German, arithmetic, algebra, geometry, trigonometry, history, geography, mineralogy, chemistry, and physics (CGIA SPb. F. 963. Op. 1. D. 597. L. 2). Apparently, he made a favorable impression on teachers at the Cadet Corps, who decided him suitable for the study of the German and French languages, mineralogy and chemistry (CGIA SPb. F. 963. Op. 1. D. 597. L. 2).

The note to the Cabinet, prepared in mid-1805, listed the subjects that were studied by Fereferov for a short time, which included oryctology, metallurgy, assaying and rhetoric. It also pointed out that he "studied ... with very good results, for which he was awarded the silver medal in the past year" (CGIA SPb. F. 963. Op. 1. D. 1008. L. 3).

Other students from the Kolyvan-Voskresensk plants, mentioned by this document, did not have any special achievements. But the very fact that it stressed the advances of an Altai student compared to others, suggests a high level of his training received in the Barnaul School.

Thus, at the turn of the 18th – 19th centuries, a continuity system in the educational space took shape, which combined the School of Mines in St. Petersburg and Barnaul and was aimed at training personnel for the mining industry. The Kolyvan-Voskresensky district developed a geologists training system which comprised training in elementary mining plant schools and secondary technical school of mines. The best graduates of the Barnaul School of Mines continued their studies in the St. Petersburg School of Mines and from there returned as highly qualified specialists.

In the mid-1830s, the personnel training system for the Altai mining and metallurgical industry was administered by the Ministry of Finance. It was connected with the transfer of the Altai crown assets under the control of the Department of Mining and Salt Affairs at the Ministry of Finance for an indefinite period (officially from 1830 to 1855). Many researchers link this period to positive trends in management. It can be fully seen in the educational sphere.

August 4, 1836, saw the Highest approval of the "Regulation on the educational establishments of Altai mining plants" (PSZ-II. T. XI. No 9456), which determined the principles for further development of the vocational education in the Altai. One of the highlights was the preservation of continuity between the mining plant school and the mining district school of mine.

The above document had a purely pragmatic sense outlining the policy of the Ministry of Finance, i.e. the plants and mines of the Altai mining district should employ qualified staff from the local population. To achieve this goal, a district school of mines was created in Barnaul, consisting of the plant practical department (was to train plant experts – chief smelters, assayers, etc.) and mining practical department (trained mine experts – mine foremen, etc.). At the same time private vocational schools were set up at all plants and mines, which were to prepare minor professional

personnel. After graduation, best students of the private schools had the opportunity to continue their training in one of the branches of the district school of mines.

The Regulation was made in the best bureaucratic tradition of Nicholas Russia, and therefore all aspects of the district and private vocational schools were appropriately reflected in it. For example, its first paragraphs already determined the approximate number of students. At the same time, Paragraph 4 specified that "this number is meant only to proportionally determine adequate means and facilities, and not to limit the enrollment of students who are admitted at the wish of parents or educators."

The regulatory and actual number of students was not the same in the coming years. Local authorities actively exercised the right granted to them to increase the enrollment. This, for example, is evidenced by the data below (see [Table 1](#)).

**Table 1.** The number of students in vocational schools of the Altai mining district, people

		Under the 1836 Regulation	According to the actual situation as of January 1861
At plants	Barnaul plant	250	627
	Pavlovsk plant	100	968
	Suzun plant	100	226
	Tomsk plant	100	163
	Lokot plant	150	299
	Gurievska plant	25	137
In mines	Zmeinogorsky mine including Semenovskaya and Cherepanovskaya schools	200	530
	Salairsky mine	100	630
	Zyryanovsky mine	100	165
	Riddersky mine	100	214
	Riddersky mine	25	33
	Belousovsky mine	25	202
	Nikolaevsky mine		
	In gold mines	No references	380
	At the Kolyvan grinding factory	No references	90
<b>TOTAL</b>		<b>1,275</b>	<b>4,664</b>

Source: Regulation on the educational establishments of Altai mining plants // Complete code of laws of the Russian empire. Ed. II. Vol. XI. No. 9456; Russian State Historic Archives. Folio 468. Inv. 21. File 172.

At the same time we should admit that the number of students constantly varied and depended on the time of year. In winter, it was slightly higher than in autumn, which was related to student engagement in support works at plants and mines. For example, from May 1 to September 1, 1861, there were 2,846 students in all schools, while from September 1 to January 1, 1862, only 2,679 students ([RGIA. F. 468. Op. 21. D. 172. L. 2](#)).

Not all people living in the Altai mining district could afford sending their children to a school of mines. The Regulation stipulated that this right was granted only to the lower ranks and workers at the mining department. Hence, the vocational education remained inaccessible for the Altai registered peasants who made up the vast majority of the local population.

The age of students, as defined by the Regulation, was between 8 and 13. After this age students left the school. The set of academic disciplines in private schools was standard in many respects and included the law of God, reading, writing, and arithmetic. Special disciplines were introduced in the curricula of the district school of mines. They, for example, included courses on practical record keeping and accounting, mining technical drawing, (Par. 34), mine surveying, geodesy, practical geognosy, rock art, metallurgical chemistry, assaying, metallurgy, etc. (§ 51). It should be noted that in the district school children of mining workers and officials were in unequal situations. This was reflected in the classes' schedule. The latter was to be taught among other things elementary German and French.

In the district school, theoretical training was combined with practical work, in which all the students were to take part. For example, the students at the plant department were to have training at the Barnaul silver plant in school hours and when on vacations they were to study the copper production at the Suzun plant and iron production at the Tomsk or Gurievsk plant. Those who studied at the mine department were sent from the second grade with the teacher to Zmeinogorsk where they passed a practical course under the supervision of a mining engineer at the personal control of the mine manager.

Further careers of the students evolved in different ways: the most gifted received further training at the district school and the St. Petersburg Mining Institute but the vast majority remained at their home mines and plants as a lower professional workforce.

## 5. Conclusion

Hence, in the early 19th century, Russia had a complete two-level system of technical educational establishments which were dedicated to training resources for the mining and metallurgical sectors. Its main feature was the focus on the development of practical skills so that its graduates could leverage them in production. Subsequently, the system was continuously improved using national and international experience.

## References

- [Burstein, 2003](#) – *Burstein E.F.* (2003). Shanginy – issledovateli Yuzhnoj Sibiri i Kazahskih stepej [The Shangins – researchers of Southern Siberia and the Kazakh steppes]. Moscow, Nauka Publ. [in Russian]
- [CGIA SPb](#) – Central'nyj gosudarstvennyj arhiv Sankt-Peterburga [Central State Historical Archives of St. Petersburg]
- [Goncharov et. al., 2003](#) – *Goncharov V.N. (Ed.), Kostenkov P.P. (Ed.)*. (2003). Enciklopediya obrazovaniya v Zapadnoj Sibiri [Encyclopedia of education in Western Siberia]. Vol. 1, Barnaul, "Altaiskii poligraficheskii kombinat" Publ. [in Russian]
- [Grishaev, 1999](#) – *Grishaev V.F.* (1999). Altajskie gornye inzhenery [Altai mining engineers]. Barnaul, "Altaiskii poligraficheskii kombinat" Publ. [in Russian]
- [Grishaev, 2000](#) – *Grishaev V.F.* (2000). Gornye inzhenery: Barnaul. Enciklopediya [Mining engineers: Barnaul. Encyclopedia], Barnaul. P. 82. [in Russian]
- [Konstantinova, 2010](#) – *Konstantinova T.A.* (2010). Istoriya gornogo obrazovaniya v Zabajkal'e [History of the mining education in Transbaikalia]. Novosibirsk. [in Russian]
- [Loransky, 1873](#) – *Loransky A.* (1873). Istoricheskij ocherk Gornogo instituta [A Historical Sketch of the Mining Institute]. St-Petersburg. [in Russian]
- [Mukaeva, 2008](#) – *Mukaeva, L.N.* (2008). Gorno-poiskovoe delo Kabineta na Altae v dosovetskoe vremya [Prospecting and mining operations of the Cabinet in the Altai in the pre-Soviet period]. Gorno-Altai. [in Russian]
- [Nechayev, 1956](#) – *Nechayev N.V.* (1956). Gornozavodskie shkoly Urala [Mining schools of the Urals]. Moscow, Nauka Publ. [in Russian]
- [Polnoye sobraniye zakonov..., 1830](#) – *Polnoye sobraniye zakonov Rossiyskoy imperii* [Complete Code of Laws of the Russian empire]. Code II. St. Petersburg, 1830. [in Russian]
- [RGIA](#) – Rossiiskii gosudarstvennyi istoricheskii arkhiv [Russian State Historical Archive].

[Rodionov, 2007](#) – *Rodionov A.M.* (2007). Kolyvan' kamnereznaya [Stone-cutting Kolyvan]. Barnaul, "Altaiskii poligraficheskii kombinat" Publ. [in Russian]

[Shaidurov, 2014](#) – *Shaidurov V.N.* (2014). Georgij Petrovich Gel'mersen: uchenyj, pedagog, administrator [Georgy Petrovich Gelmersen: scientist, educator, administrator]. *Izvestiya vuzov. Gornyj zhurnal*. № 3. pp. 114. 120. [in Russian]

[Shaidurov, 2015](#) – *Shaidurov V.N.* (2015). Evgraf Stepanovich Fedorov: uchenyj, pedagog, administrator [Evgraf Stepanovich Fedorov: scientist, educator, administrator]. *Zapiski Gornogo Instituta*. № 213. pp. 116-121. [in Russian]