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From the History of Mining in Russia (K. Bogdanovich and G. Romanovsky-Founders of Petroleum Geology)

Vladimir G. Afanas'ev
Department of History, National University of Mineral Resources "Mining",
21st Line 2, Vasil'evsky Island, St. Petersburg, Russia

Abstract: The study describes the life and activities of outstanding Russian geologists of the late 19th to early 20th centuries, Karl I. Bogdanovich (1864-1947) and Gennadii D. Romanovsky (1830-1906). They shared a common background as they both were alumni and later full professors at the Mining Institute and their professional activity was inextricably linked to the first decades of the oil industry in Russia. The study pays much attention to how they developed their professional skills to become respected authorities in geological science as well as demanding and competent teachers at the Mining Institute. It stresses that they commanded great respect. For example, between 1914-1917, Bogdanovich led the Geological Committee of Russia (Geolkom), in 1918, he was elected first Dean of the Faculty of Geological Prospecting at the Mining Institute and did much to develop geology in Poland.

Key words: Russian geology, geological expeditions, Mining Institute, development, oil industry, well drilling

INTRODUCTION

Life and work of outstanding Russian geologists K.I. Bogdanovich and G.D. Romanovsky were given some reflection in special and historical literature. One small book about Bogdanovich is of the popular genre and contains no sources and hardly touches on his work in the Geological Committee, not to mention his teaching at the Mining Institute (Rezanov, 1976). Another short article refers to 17 sources including two in the Polish language and touches only on the scientist's contribution to the oil industry which limits the holistic approach to his personality. As to G.D. Romanovsky, we select several papers (Lisichkin, 1953; Matveichuk, 2010, 2014). They all describe his work in the oil industry and although they cite good factual material, they mention no sources or references. In general, the two scientists deserve a more close study based on archival documents and a deeper analysis of numerous works published by them.

MATERIALS AND METHODS

The basis for the article uses general scientific methods of historical research-comparison, generalization, abstraction. The combination of special methods is dominated by the comparative method which among other components focuses on generic and specific features of lives and works of the two prominent geologists.

The sources used may be divided into three groups: in the first place, archival documents, first introduced in scientific use from the fund of the Mining Institute (963) that is stored in the Central State Historical Archives of St. Petersburg (TSGIA SPb); second, some of the published mainly journal articles; third, interesting memoirs of the two academicians, regarding the teaching work of professor K.I. Bogdanovich.

RESULTS

In summary, we would like to reflect on what unites these people and leads to the conclusion about their significance. First, the fact that both graduated from and later became professors at the Mining Institute. Second, not only they had a common profession, geology but also they were closely related to the establishment and early development of the oil industry in Russia. And while K.I. Bogdanovich was one of the first professional petroleum geologists, the growth in this industry was not possible without continuous improvement of well drilling methods which was the main pursuit G.D. Romanovsky was actively engaged in much of his life. Third, they both were pioneers in their professional activities. Finally, both scientists had their disciples who successfully continued the work of their mentors. All this, taken together, enables a conclusion recognizing that they are outstanding Russian geologists.

DISCUSSION

Among the numerous talented students of the Mining Institute, who made their imprint on the history of geological science, a prominent place belongs to Karl I.

Bogdanovich (1864-1947). He was born to the family of a peace justice in the town of Lucyn in the Vitebsk Province November 29, 1864. In the early 70s of the 19th century, his father was transferred to serve in Central Russia during the judicial reform of Alexander II and in 1874, at the age of 10, his son entered a prestigious elementary military educational establishment "Nizhny Novgorod military gymnasium of Count Arakcheev". After his graduation July 4, 1881, he filed an application for admission to examinations in the Mining Institute and after he successfully passed them, he was enrolled in this educational institution.

It should be admitted that first time he had to think not only about his studies but also about his financial standing. The situation was largely complicated by the fact that the institute typically paid no scholarships to junior students while almost all senior students received scholarships. This practice can be explained as senior students incurred expenses related to their training, completion of term and degree works as well as by the fact that some of the students had to support their families. At the end of his first, May 13, 1882, Bogdanovich filed a petition addressed to the Director of the Institute. It noted that "having no financial aid from my parents, I have to find the means to live in permanent employment which could have a detrimental effect on my future academic success and I then dare to ask to petition the Board of Professors to allocate me a scholarship. I attach herewith the certificate of poverty" (TSGIA SPb F.963. Op.1. F.967. L.2). May 28, 1882, the Board awarded him a scholarship. It is noteworthy that the petition had a mark specifying that his grade point average amounts to 4.38.

As he did not apply for financial aid in the following years, it is possible to assume that given his successful academic performance, Karl received a scholarship in the subsequent years of study. But he was lucky as during his studies the institute's teaching personnel included two outstanding geologists: A.P. Karpinsky, who was President of the Academy of Sciences of the USSR from 1917-1936 and I.V. Mushketov who supervision the geological practice that Bogdanovich had after his 3rd year. In addition, after his 4th year, he had a similar training in the Urals under the supervision of another prominent geologist, Academician F.N. Chernyshev which made it possible for Bogdanovich to master the skills of field geological surveys.

With his studies and first steps in practical activities guided by the most talented geologists, K.I. Bogdanovich as his fellow student V.A. Obruchev, an outstanding geologist and academician in the future, specialized in geology and became major experts in the field. I.A. Rezanov, a well-known geologist and popularizer of geological science, wrote: I had to conduct research in many mountainous areas of our country. And almost every time, reading works on the area new to me, I revealed that the first scientist who compiled a detailed geological description of the area, was K.I. Bogdanovich. He was the first to study the geological structure of the Turkmen-Khorasan Mountains on the border between Turkmenia and Iran. He was the author of the first major study into geology and mineral resources of Northern Tibet and the Tien Shan. Bogdanovich first explored Kamchatka volcanoes and made the first geological description of the coast of the Sea of Okhotsk as well as the Chukotka and Liaodong Peninsulas. He was one of the first scientists to research into the geology of the Kazakh steppes and Southern Siberia, the Eastern Caucasus and Ciscaucasia (Rezanov, 1976).

This appreciation is not surprising, since Karl I. Bogdanovich worked in many geological expeditions immediately after the graduation from the Mining Institute in 1886. For example, in 1892, in connection with the planned construction of the Trans-Siberian Railway, he headed the Central Siberian Geological Party of the Ministry of State Property and over 3 years surveyed a vast territory from the Ishim steppes to the foothills of the Eastern Sayan. In spring 1895, he was appointed head of the Okhotsk-Kamchatka Mining Expedition and almost 3 years conducted geological surveys of the coast of the Sea of Okhotsk, Kamchatka and Chukotka.

In June 1901, he became a staff geologist in the Geological Committee and the same year was sent on a business trip to the US to study works of American geologists mainly on prospecting and exploration of oil fields. On his way back to Russia, he visited oil fields in Romania. At home, Bogdanovich, along with teaching at the Mining Institute from 1903-1919 due to his election extraordinary professor at the Department of Ore Deposits Geology in January 1903, continued to actively participate in expeditions. For example, in 1905, he was closely involved in geological surveys of lead-zinc deposits in the territory of the Dabrowski coal basin in Poland. They were a continuation of the works initiated by a talented Polish geologist, a graduate of the Mining Institute, A.O. Michalski, who in 1882-1895 studied geology of Kielce, Radom, Lublin, Piotrkow, Siedlce Provinces and other areas of Poland.

In the middle of 1907, K.I. Bogdanovich together with mining engineer S.I. Czarnocki turned to geology of the Caucasus, to make sure that the development of oil production in the North Caucasus had a potential. Although, they did not have sufficient funds for large-scale studies, in the summer season they,

nevertheless, came to the conclusion based on the hand exploration drilling that oil production in the area of Maikop was prospective and stressed the need for deep drilling. Owing to the scientific validity of geological surveys carried out under his supervision, Bogdanovich was appointed a senior geologist of the Geological Committee in December 1907. Soon projections made by the specialist were fully confirmed. On August 30, 1909, from the well owned by Baku and Black Sea Petroleum Industry Association, near the Shirvanska Stanitsa, from a depth of 32 sazhens, a gusher hit which marked the beginning of intensive oil production in the Maikop district.

In May 1911, Bogdanovich was appointed ordinary professor of the Mining Institute and in the next academic year began to deliver Russia's first lecture course on petroleum geology. The course program was based on an integrated approach to the study of different areas in geological science and his wide experience of geological exploration. This course was first published in the Mining Institute lithographically and in 1921 as a monograph.

Having proved himself to be a knowledgeable researcher of the subsurface, Bogdanovich became a deputy director of the Geological Committee in 1913. After the head of this only geological scientific institution in the country, Academician Feodosii N. Chernyshev (1856-1914) suddenly died January 2, 1914, Karl I. Bogdanovich, on the presentation of Academician Aleksandr P. Karpinsky was appointed its director February 24 and led Geolkom until 1917. As head of Russia's leading organization for the subsurface study, in the conditions of the First World War that broke out in this period, Bogdanovich improved its work to expand the mineral exploration. According to the plan developed by him, the Geolkom was reorganized and divided into three departments the Geological Map, Applied Geology, each of which included several workshops as well as the Museum. With the personnel of geologists expanded to up to 50 people, this contributed to a more intensive and qualitative development of prospecting.

As to Bogdanovich himself, he not only explored various regions of the country but also studied different disciplines of geological science. For example, Bogdanovich made a notable contribution to the development of seismology, volcanology, hydrogeology, tectonics and was the author of the first course book on ore deposits published in the Russian language in 1903. Particular attention should be given to his great interest in the problems of petroleum geology, on which he published a number of articles.

As already noted, Bogdanovich successfully combined geological surveys and teaching. What was his image that was remembered by his numerous students? The answer is found in memoirs of a famous geologist, Academician P.I. Stepanov, who was a student at the institute between 1899 and 1907. After the death of I.V. Mushketov, a mining engineer, K.I. Bogdanovich was elected a professor at the Geology Department. We, geology students, knew this name. We were looking forward to attending lectures of the new professor. And here at last, with a crowded room, he finally gave his first lecture. A man small in stature appeared on the rostrum with grayish closely cropped hear and a neat beard, lean, nervous, like a coiled spring. There was no hint of the effectiveness that was typical of I.V. Mushketov's lectures. With a smooth, quiet voice, K.I. Bogdanovich began to present his lecture and everyone could see at once that he was very tense. All this was disappointing to the audience and with each new lecture the room started emptying. In the end, only a small group of geology students remained. But we, geologists, immediately appreciated informative lectures of K.I. Bogdanovich, although devoid of oratorical adornments. We heard a thoroughly worked out course, with lots of new facts, with all the new things that could be yielded from books in Russia and abroad. K.I. Bogdanovich brought the whole packs of new books to his lectures. We listened to all the lectures by K.I. Bogdanovich which became a solid foundation of our geological knowledge.

And here is a description by another well-known geologist, Academician D.V. Nalivkin, revealing how Bogdanovich gave an examination: at an exam, Karl Ivanovich thoroughly asked many theory questions and sometimes praised: "Good, good" but he suddenly asked a secondary question that I did not hear anything about. I had to say: "I don't know". He looked at me seriously: "You probably want to get A?" I answered: "Surely!" "Well, then, come next time, a geologist must have a sound knowledge of geology". He gave examinations once a week. All the week I sat and drilled geology. My friend, Nikolay Grigorevich Kassin... advised me with a patronizing look: "Take care not to forget the map, you should know it by heart, otherwise Karl will not give you a pass". I answered: "I know it well" and went to the exam. The theory went well, Karl Ivanovich was pleased. "Well, let's see how well you know the map". He asked each and every possibly thing regarding the map; it was a geological map of European Russia, the only one that existed at the time. I answered to all his question. He says: "Good, good" and suddenly he shows some color spot in the middle of a huge yellow space of the Caspian depression: "What is this?" I had no words as I missed the tiny spot. And Karl Ivanovich explains: "Mountain Chapchachi, an extremely interesting place, still

unexplored" and then he looked at me: "You'll have to come again: a geologist must know the map perfectly, for it is the main work for him". So, I had to come for the third time (Nalivkin, 1981).

Bogdanovich greeted the February revolution, like most Russian scientific intelligentsia, with great hope for the future. In April, the Provisional Government adopted a new Regulation on the Geological Committee, according to which its director was now elected by members of a collegial body-the Presence office. But Bogdanovich, who was previously the Geolkom Director, refused to participate in the elections and gave his desire to do much research and teaching work as a reason. As to the Bolshevik ascension to power, the event evoked mixed feelings in him. However, in 1918, he became the first dean of the Faculty of Geological Prospecting but held the office only a short time.

In 1919, a new phase began in Bogdanovich's life and activity. It was connected with the fact that the end of the First World War and the collapse of the Russian Empire gave birth to a number of new independent states, Poland was among them. A Pole by birth, he, like many of his compatriots, hurried home where his relatives lived and he had his historical roots. In July 1919, he left Russia and at first worked as a director of an oil company. After the 1920 Soviet-Polish war and the subsequent signing of the peace treaty in March 1921, under which Poland received Western Ukraine and Western Belorussia, the situation in Poland stabilized. At this time Bogdanovich started to combine teaching and research activities as he did in Russia. Since 1921, Professor Bogdanovich headed the Department of Applied Geology at the Crakow Mining Academy and led it over 15 years. While teaching almost all geological disciplines at the academy, he found time not only to explore geology of various regions in Poland but also to be engaged in studying oil fields in Austria and Romania.

His scientific achievements of the time should necessarily include the fact that in 1927 he published a detailed monograph on the mineral resources of Poland which summarizes the geological materials on all ore deposits of the state. In 1933, he became one of the most active delegates at the World Geological Congress in Washington. In 1938 despite being 73, Bogdanovich became the head of the Polish State Geological Institute which was established a year earlier. The institute coordinated and organized the entire geological activity in the country.

With the onset of World War II and the occupation of Poland by Germany, all scientific works of Bogdanovich were interrupted. Moreover, despite his advanced age, he was subjected to repression at the end of the war due to his anti-fascist position. In 1944, immediately after the liberation of Warsaw, Karl Bogdanovich at the age of 80 again led the State Geological Institute. But at this period his scientific activity did not last long as he died on June 5, 1947 in Warsaw, slightly before the age of 83. The memory of this outstanding geologist is cherished not only in Russia and Poland where he was elected a member of the Polish Academy of Sciences and was the founder of the Polish Geographical Society but also in other countries. It should be noted that he was a member of scientific societies in France, Holland and Czechoslovakia.

Another outstanding geologist was a professor of the Mining Institute, Gennadii D. Romanovsky (1830-1906). His father Danilo, born 1780, joined the army as an apprentice doctor in the age of 9. In 1801, he graduated from the Medical and Surgical Academy and was promoted to field doctor. He was well known and respected in the Southern Urals where he worked for >20 years, first on at mining factories owned by merchant Knauf and after 1806, he was in charge of hospitals at the Zlatoust works. He achieved prominence thanks to his unselfishness and constant willingness to provide all possible help to all in need despite the wide range of duties and a relatively small salary of 2,000 rubles a year. It was only natural that he tried to ensure that all his four sons became mining specialists. To this end, he petitioned for their subsequent admission to the Mining Institute. January 12, 1833, the Department of Mining and Salt Affairs informed in the Mining Cadet Corps that December 10, 1832, the Board of the Finance Ministry made a decision that sons of the field doctor of the court counselor, Romanovsky, who served at the Zlatoust works, Nikolai, Aleksandr, Konstantin and Gennadii-should be admitted in the Mining Corps in full public care, subject to availability of open positions on reaching by them the age of 10 (TSGIA SPb. F.963. Op.1. F.6643. L.1). May 31, 1833, the department informed the Committee of the Mining Institute that the mining director of the Zlatoust works reported to the department that of the sons of the already late Romanovsky, Nikolai reached the age of 11 and Aleksandr of 10 and petitioned it to place them in the Mining Institute "due to the abject poverty of the mother" (Ibid. L.2). October 12, 1834, they were enrolled in the institute but the next day during the interview it became clear that they had studied neither foreign languages nor Russian grammar. There were serious gaps in the knowledge of other subjects and for this reason they were placed in the first grade (Ibid. L.6).

Similar stories were revealed when Corps officials tested Konstantin August 18, 1837 and Gennadii August 11, 1842. As a result they, like older brothers, were

enrolled in the first cadet grade (Ibid. L..9, 34). Although, the brothers had poor knowledge of general disciplines, it did not prevent them from further successfully studying a variety of mining sciences at the institute. All of them, in the end, successfully completed the education. The first brother who graduated from the institution March 23, 1842 was Aleksandr. He had the position of an office clerk. The document of his education, signed March 31, 1842 by Lieutenant Colonel G.P. Gel'mersen, a class inspector at the time and later director of the institute and academician, noted that excellent marks were given to Aleksandr for his knowledge of Law of God, Russian Language Arts, General Statistics, Botany, Zoology, Russian History, Drawing, Sketching and General Geography. Aleksandr received the "very good" grades in Algebra, Geometry, Trigonometry, Analytic and Descriptive Geometry, Oryctology, Russian Geography, General History and Penmanship. He obtained "good" knowledge of arithmetic, bookkeeping, a brief military course and "mediocre" one of German and French (Ibid. L.16). Interestingly, this document contained only one discipline that was related to the mining. The main result of the brothers' studies was that after taking a complete academic course which included a number of specialized disciplines, they later received diplomas of Mining Engineers-Nikolai in 1846, Konstantin in 1847 and Gennadii in 1851.

After graduation, each of them continued to work in the Southern Urals and proved to be not only knowledgeable experts but also people of great erudition. For example, Konstantin focused on identification of minerals and ores using blowpipe which had not been customary among geologists. He summarized his observations and conclusions in the book "Table for Identification of Minerals and Ores Using Blowpipe" published in 1863. Konstantin was the administrator of the Miass factory and until his death in 1867 the mining director of the Bogoslovsk smelter in the Perm Province. He also found time for archaeological research and studied numerous burial mounds which greatly expanded the knowledge of the historical past of the Western Urals.

The most well-known brother among the four was Gennadii, who after graduation was hopeful that he would also be sent to his native Urals. However, instead, he had to carry out geological exploration in the Tula, Ryazan, Kaluga and Moscow provinces for 2 years, to establish sustainable water supply of drinking water for provincial and uyezd towns. Since, these operations were related to the drilling of wells, Romanovsky introduced a number of technical innovations to do the job. This was caused by the use of imperfect drill bits purchased abroad which after a short use grew blunt and their restoration was costly. To address this drawback, he first in Russia used a drill bore with a new design which included insert blades. Another novelty offered by the talented innovator was that in 1859 when sinking through hard rock near Podolsk, Moscow Province, he was the first engineer in the country to use the steam engine, becoming the founder of the domestic mechanical drilling school. The method he proposed soon became widespread in Russia. He also put forward new ideas when he was assigned a task to drill an artesian well in St. Petersburg in 1864. This time not only he accomplished the project but also criticized outdated technology of drilling wooden rods made using the method of French engineer kind.

After he was appreciated for his practical activities and scientific articles on innovative approaches to drilling, published in "Gornyi Zhurnal" (Mining Journal), Romanovsky became the first Russian mining engineer to be sent in 1865 on a mission to the North American United States to "study the geology oil fields, methods of exploration and production". On his way there he had the closest look at the mining methods used in the UK and France as French mining engineers were considered to be leading authorities in the area of drilling. During his stay in France, Romanovsky carefully collected all known information on drilling techniques and technology and went into all details which greatly helped him his further work.

During his 6 months stay in the US, he concentrated on the study of the American experience using the example of oil fields development in Pennsylvania and personally participated in the drilling of oil wells near Parkersburg. His report published in "Gornyi Zhurnal" in 1866 presented sound reasoning why exploration, production and refining of oil or "mineral oil" in the US terminology of the time "generate significant annual revenue to both the government and private individuals." He urged that it be necessary to leverage the US experience by stimulating competition in the oil business and "prohibiting monopolies from interfering in the oil extraction by Russian subjects". He wrote that under these conditions "the Russian industry could rapidly develop and bring benefits to both the government and population" (Matveichuk, 2010).

The 3 years later, after returning from the foreign trip, Romanovsky continued to survey the oil-bearing capacity of the Volga Region to become Russia's first specialist who concluded on the uniqueness and excellent potential of oil fields in the Volga-Ural Province. In the future, many years later, Romanovsky's hypothesis was confirmed in the works of Academician I.M. Gubkin which resulted in the accelerated development of an industrial area called "Second Baku" in the 30s of the 20th century.

After that Romanovsky led a busy and affluent life-teaching activities at the Mining Institute and numerous trips to study in depth the natural wealth of different regions in Russia, especially in Central Asia which he undertook from 1874-1878. In 1881, he was bestowed the highest decoration of the Imperial Russian Geographical Society, the Konstantin medal for his geological surveys of this region.

Since the early 80s and until his death, Romanovsky's attention was riveted to the study into various problems of ore and coal deposits and his findings were reflected in his numerous scientific publications. In 1884, he was elected an honorary member of the Imperial Mineralogical Society, where he, with his inherent conscientiousness, performed all the duties. The Society chairman, Academician A.P. Karpinsky, shortly after the demise of Romanovsky opened a meeting with the words "he attended our meetings with great pleasure, even in the time of the evolving hopeless disease with particular diligence he carried out all assignments of the Society that elected him a member of its Audit and Geological Commissions for many years and finally bequeathed his almost entire research library to the Society".

His authority and that of other distinguished scientists at the Mining Institute was recognized when May 22, 1899 Professors N.S. Kurnakov and L.I. Lutugin on behalf of a group of the institute faculty filed an application to the director of the educational institution. The document said that "they collected 5,900 rubles to establish at the Mining Institute four prizes named after former Institute professors-A.P. Karpinsky, G.D. Romanovsky, G.A. Time and P.V. Eremeev and to grant them for best student works on geology, higher mathematics, mine surveying, mining and mineralogy" (TSGIA SPb. F.963. Op.1. F.5651. L.1).

December 24, 1902, the Minister of Agriculture and State Property, to whom the Mining Institute was now subordinate, A.S. Ermolov, approved the following Provision for the four prizes named after former professors of the Mining Institute: Four prizes of the Former Institute professors have been established using interest on capital of 5,900 rubles collected by mining engineers and placed in The Treasury. The prizes shall be given from the interest on capital to students of the Mining Institute in the amount of one hundred rubles each and are awarded by the Board of the Institute once every 2 years for the best works on geology in the full scope of this science, mining and mineralogy and once every 3 years on mathematics and mine surveying. The Board of the Institute shall specify or approve topics selected by applicants to receive the prizes and shall determine the time of their submission. The Board of the Institute may, depending on the growth of the collected capital, establish new prizes for the same works or increase the amount of the prizes that are established (Ibid. L.9).

In summer 1901, the St. Petersburg scientific community widely celebrated the 50th anniversary of the vigorous activity undertaken by Romanovsky in mining. In connection with this event, the long form piece in the "Gornyi Zhurnal" quoted the hero of the celebration as saying that he was full of energy and plans on his promising cherished dream of "performing survey operations with deep drilling for oil in the basin of the Ukhta River, Arkhangelsk Province and in the Ferghana Valley where the sources of oil can be as abundant as in the Caucasus" (Kulibin, 1901).

In 1904, Romanovsky at the age of 74 as the leading expert was sent to Poland, to the Dabrowski basin to investigate at the site into the question of the widely spread practice of copper seam mining, that used roof caving with rockfill placement. In this trip, he accidentally fell and suffered a serious injury but brought the matter to the end. After returning from the trip December 19, 1904, he felt severe pain in the back which was caused by the fall. Despite intensive treatment, in March 1905, the disease intensified and passed to cancerous inflammation. Although, the scientist tried to keep up good spirits and showed great interest in life, April 22, 1906 he passed away.

N.P. Versilov, a mining engineer who knew G.D. Romanovsky, wrote: Gennadii Danilovich combined two activities in his life: the practical one as a drilling specialist, prospector and expert on ore deposits and the scientific one as a geology and paleontology professor and researcher... Gennadii Danilovich was in his time Russia's only drilling specialist and evolved, one might say, a school on the subject around himself. The school brought up many engineers who later proved themselves to be useful figures in drilling as well as in other fields of the mining service. After retiring from the professorship in 1896, Romanovsky entirely devoted himself to the work in the Mining Academic Committee. Most of the mining projects, rules for the use of mining technologies and instructions on mining operations ensuring life and health safety of workers were developed by the committee with the direct assistance of Gennadii Danilovich whose advice and guidance were essential as they were based on science and years of experience. At the same time Gennadii Danilovich always was an energetic and staunch defender of miners' interests. The harsh appearance of the highly-regarded professor hid infinite kindness and his courage and steadfastness... earned him sincere respect of all who had to meet with him. In particular, the respect was shown to him by his followers (Versilov, 1908).

CONCLUSION

In this study, we described the life and work of only two mining engineers of Polish descent. What unites them? Firstly, the fact that they were outstanding experts in the field of geology and enthusiastically passed profound knowledge and rich experience to their students. Second, their roots and part of life were associated with Poland. Finally, a proactive approach to life, integrity and commitment to benefit to their country.

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