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## HISTORY OF CREATION OF THE MINING CRAFT FACULTY AT THE KATERYNOSLAV HIGHER TECHNICAL MINING SCHOOL (1900–1918)

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This year the Department of Underground Mining at the National Mining University (UMNMU) celebrated the 105th Anniversary of its foundation. From the point of view of the personnel employed, it is one of the leaders in our High School. 14 professors, 12 senior lecturers and 6 assistants are involved in the educational processes and the performance of research works. The Department houses a computer complex and a laboratory for physical and chemical fastening of breeds works. During its existence about twenty thousand graduates have completed education at the Faculty. Among them there were Prime ministers, Ministers of Coal Industry, top scientists and manufactures. All of them are true to the mining brotherhood, the National University and the Department of Underground Mining.

The Faculty of Mining Craft (nowadays UMNMU) has been founded simultaneously with the Katerynoslav Higher Mining Technical School. The faculty has given life to all the structures, laboratories and other faculties, which are specialized in mining at the National Mining University. The very leaders of mining, outstanding scientists worked at the faculty: O.M. Terpigorev, M.M. Protodiakonov, L.D. Sheviakov, I.S. Novosiltsev, K.I. Tatomir, S.B. Borisenko, J.E. Nekrasovsky, A.I. Zilberman and many others.

In the article we want to describe the creation and development of our Department. At that time it carried the name of the Faculty of Mining Craft (FMA).

In 1900, after the decision of the Council of the Katerynoslav Higher Mining Technical School, the FMA had been transferred from the Potiomkinsk Palace to the building of today's National Mining University. This moment denotes the date of UMNMU's foundation.

In the main building of the School a special class has been created, and professor Olexandr Mitrofanovich Terpigorev has been invited in 1900 to conduct lectures on Mining Craft. He had a three-year experience of engineering work in Donbass mines. The main

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subject, Mining Craft, was studied from his lithographic lectures and according to the book “Analysis of Development Systems of Coal Used in Mines of South Russia in Connection with Deposit Preparation for Extraction”. In this fundamental scientific work described were the methods and systems of coal seam development utilized in the Donetsk basin at the end of the 19th and the beginning of the 20th centuries. A comparative economic estimation of the extraction systems was done. The book also depicted the optimum conditions for application of each of them.



Olexandr Terpigorev

Olexandr Terpigorev described interesting technical parameters of application of cutting and shock coal cutters in the mines of Donbass. In the book it was spoken about the necessity to mechanize the heavy and labour-intensive operation of coal extraction. Professor Olexandr Terpigorev consistently promoted the progressive idea of mechanization of the heavy and dangerous work in mines. Having defended in April 1906 the dissertation, Olexandr Terpigorev had received an academic status of extraordinary professor at the Mining Craft Faculty, and in November of the same year the Academic Council appointed him as ordinary professor and charged him to head the FMA.

Teaching the subjects incorporated into the general discipline Mining Craft, Olexandr Terpigorev had to begin with solving organizational tasks: had to create a program of the discipline, with advanced programs of laboratory research and years of practice at mining enterprises. By the end of 1901 he had prepared and issued a set of lectures on the basic sections of Mining Craft. This discipline had consisted of three sections: “Development of Useful Minerals”, “Extraction” and “Drilling”. Lectures have been illustrated with original drawings.

In 1902–1904 lectures of Olexandr Terpigorev on ventilation, mine illumination, constructions and adaptations in coal mines were issued. Olexandr Terpigorev's regular and persistent work had yielded Manuals on all the basic sections of the Mining Craft. The publication in 1907 of the "Mine Fires and Struggle Against Them" had finished this huge work.

Olexandr Terpigorev attached great importance to practical work of students. The collected materials filled up educational classes and were widely used in educational process, in textbooks, drawing up of atlases and diploma works.

Constant interest in industrial experience, participation in commissions investigating large failures in mines has allowed him to write some articles on safety in mining. As a result a four-volume capital work "Description of Donetsk Basin" had been published. All members of the FMA participated in its creation.



The teacher and students of Faculty of Mining Art, 1916

In 1904 M.M. Protodiakonov (1874–1930) began the pedagogical and scientific activity as an assistant at the FMA. Having engaged himself in studying of influence of rock stress on mine support, he laboriously and consistently checked theoretical conclusions by experiments on models. These experiments had completely confirmed the validity of his theory. The results of his research were published in the book "Pressure of Rocks on Mining Support. The Theory of Mine Support" (1907). M.M. Protodiakonov had founded the scientific discipline of studying mining pressure and rock mass.

Students with great interest listened to his lectures. In 1908 M.M. Protodiakonov defended the dissertation on "Pressure of Rock on Mine Support". He had been appointed as extraordinary professor. In 1909 he had received a rank of ordinary professor of the FMA. At the same time he had organized the Class of Mining Craft № 2 (1908) and managed it till 1914. The basic purpose of this class was auxiliary study work that included general disciplines. M.M. Protodiakonov was a distinguished scientist who had brought a significant contribution to the development of mining.



M.M. Protodiakonov in Caucasus, 1903

In 1911 M.M. Protodiakonov had published the well-known textbook “Discipline of Mine Ventilation”. The value of this work was so great, that research on mine ventilation should be regarded as an independent direction in M.M. Protodiakonov's scientific creativity. For the book “Description of Donetsk Basin” he had wrote two huge chapters: “Mine Development” (1914) and “Support of Mine Workings” (1916).

He had huge problems with his health and in 1914 M.M. Protodiakonov had been compelled to leave the Institute and move to Tashkent where he took active participation in the creation of the Turkestan Public University (1918). There he managed to organize the Mining Department and became its dean.

M.M. Protodiakonov is the author of fundamental works on the theory of mining stress, methods of support calculation, and also popular manuals on mine ventilation. He has also published some interesting works on the problem of technical standardization in mining.

The professor (later Academician of the Ukrainian National Scientist Academy) Oleksander Dinnik (1876–1950) proposed lectures, which addressed the problems of control of mining pressure, both from the mechanical and mathematical point of view.



M.M. Protodiakonov with students, 1910



Commission on mining, 1912

An outstanding scientist, professor Mykola Lebedev, lectured on the geological disciplines and palaeontology. According to his students he was a “silent, a little bit closed and very serious person”.

The mineralogy was conducted by professor Leonid Ivanov (1877–1946), who had discovered a number of valuable minerals in Ukraine. The discipline of mining and plant mechanics was lectured by professor Michajlo Fedorov (1867–1945), since 1929 Academician of the Ukrainian National Scientist Academy, the author of classic works on mining mechanics.

Classes on applied mechanics, details of machines and steam engines had huge interest of the students. These subjects were taught by professor Jaroslav Grdina (1871–1931). He supervised the school’s machine hall. These disciplines were also conducted by professor Volodymyr Makovsky (1870–1941), the father of the theory of friction pulley elevating installations and a technique of dynamic calculation of steam engines.



Students on lecture, 1914

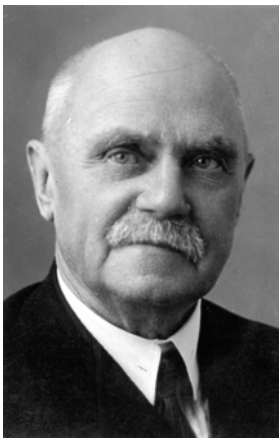
General and analytical chemistry (professors V.V. Kurilov and V.J. Burdakov), physics (professor K.I. Kotelov), mathematics (teacher V.E. Zagulin) and other disciplines were taught to the future mining engineers.

In 1902 V.O. Guskov (1869–1946) started to work at the FMA as an assistant. Before, he was engaged in engineering activity on designing mines and operation of coal mines in Donbass. He held lectures on drilling and enrichment of minerals. In 1903 V.O. Guskov had created and equipped the Class of Mechanical Enrichment of Minerals. It was the first in the country. In May 1909 V.O. Guskov had defended the dissertation. In September of the same year the professor of the FMA had elected him.



Teachers and students of Katerynoslav Mining Institute, 1914

In 1912 L.D. Sheviakov had completed the Katerynoslav Mining Institute. His mining teachers were professor O.M. Terpigorev and V.A. Guskov. Professor M.M. Protodikonov exerted big influence on the formation of his technical sights. Being a student, L.D. Sheviakov had shown brilliant abilities. His project on mining craft has been awarded with the Kulibin's Premium. Within one year L. Sheviakov worked as an engineer on gathering materials for the description of Donbass, in 1913 was enlisted as an assistant to the Faculty of Mining Craft, and in 1916 he was appointed to a senior lecturer.



V.A. Guskov



L.D. Sheviakov

Particular attention was paid to practical studies. After completing their first-year of study the students went on a 10–15-day trip to the mines of Donbass or mines of Kryvij Rih. In a railway car specially equipped for such excursions the student's group led by teachers arrived at the mines. During this time students got acquainted with underground work and mine constructions, collected information describing the seams and the methods used for their extraction. The collected materials were used in educational process. Teachers helped students to come into business contacts with the mine administration, communicate with workers, get answers to their most pressing questions, and get acquainted with recent achievements of coal mining technology.



Geological practice in Crimea, 1901

Here is how L. Sheviakov describes his stay at “Central” mine. He had written about his impressions in two articles “Under the ground”, published in “Mayak” magazine and in the book “On the Sea and on the Ground. Geographical Stories”. It had in detail described descent to the working horizon, travel along the main drift. From here the students together with professor O. Terpigorev on all fours in a narrow tunnel had made the way to the face. “It is fast — wrote Sheviakov — we have crept up to people naked to the waist with brawny bodies which have turned black from the dust who with terrible force struck heavy picks into a seam of coal [...]. The Worker brought a pick above his shoulder so the back end of it almost struck on his naked back and promptly, with all strength rendered its strong impact [...]”. The gloomy picture of miner's work had made strong impression on the students. “It was really «a black empire» — with bitterness exclaimed Sheviakov — everywhere is black, both from above, and from below, and all is impregnated with a black thin dust. It becomes black here and the person. And only to think, that these people because of a piece of bread which they eat tomorrow find today new strength to go down into the underground chasm on hard labour, the whole 12 hours of work here daily. Work in a black dirt, in an atmosphere filled with poisonous dust, under threat of gas explosion, a rockfall, a fire, flooding, slow daily destruction by heavy and harmful work”.





L. Sheviakov, M. Fedorov and L. Dinnik, 1914

Between the first and second year of study a 30-day survey practice for the students of both mining and factory branches, and a practice in departure mines or factories (10–15 days) were carried out. After the second-year of study students were separately sent on 30-day practices in mines and ore mines. Between the third and the fourth-year of study students for 45 days worked at mining enterprises, collecting material for course and diploma projects, and also made geological excursion to Crimea or to Caucasus (15–20 days). At the end of the fourth-year of study students carried out their diploma projects, which had consisted of three parts: general mine design project, designing of extraction systems and technical-electric chapter.

Practical training of students in mines had yielded brilliant results from the first releases the mining engineers who had received degree at the KHMTS were willingly accepted by the mining enterprises of the country and “[...] by many were regarded above other engineers, in view of their higher practical preparation. By virtue of this the oldest mining institute (Petersburg) also has introduced summer’s obligatory practice for their students”.

1912 had been marked in the life of the Katerynoslav Highest Mining Technical School as the year of being officially recognized as equal in value and rights with its higher educational institution equivalent — the Petersburg Mining Institute. On July 1, 1912 the Katerynoslav Highest Mining Technical School has been transformed into the Katerynoslav Mining Institute.

In 1914 on behalf of the assembly a special commission develops projects of curricula for geological branches of the mining faculty. The aspiration of teachers to lecture material agreeing with the existing scientific and technological level of state-of-the-art has increased the inflow of students.

The process of reforming the technical school was accompanied by rough enough performances of students. This process began in the beginning of 1911 and proceeded right to the beginning of the revolution (1917).



Professor's apartments, 1912

The Commission who had created the new curricula, started work in the mining institute from 1916. The idea to create new branches has been proposed together with development of special subjects and with significant reduction of auxiliary sciences.

The Katerynoslav Mining Institute (KMI) was the most popular technical higher educational institution in Ukraine. The maximum number of people applying to study at the KMI before the revolution was almost 2500 (1915). And less than 250 people could be accepted. More than 10 people for one place made a competition. For comparison in 1914, 1250 persons had submitted applications to the Institute, and less than 250 were accepted; in 1913 more than 1500 persons applied, and hardly more than 200 studied. Until 1913 the number wishing to study had been 500 people, and the number of students did not exceed 200.

The number of students completing the high school essentially differed from those beginning to study. The number of qualified miners in 1912 was 41 people (the total number of graduates — 49). The following years these numbers were, respectively: 1913 — 29 (39); 1914 — 36 (49); 1915 — 44 (58).

Educational process in the KMI did not stop at the beginning of the First World War and was carried out during the revolution. Mobilization and events of that difficult time have led to essential decrease in the number of miners who completed this higher educational institution. In years it was as follows: 1916 — 40 graduates of mining (the total number of graduates — 48); 1917 — 34 (51); 1918 — 13 (23); 1919 — 13 (17); 1920 — 4 (9); 1921 — 8 (12).

Rapid development of the mining industry was an incitement to create on the Katerynoslav territory a higher education institution the Katerynoslav Higher Mining Technical School and its core of the Faculty of Mining Craft. All activity of a mining institute depends on the condition of the industry and here it had been directed at preparation of highly skilled staff. All advanced development of that time was incorporated into the educational process.

From the moment of its formation the Faculty of Mining Craft became the leading institution in the field of preparation of mining specialists, and its graduates were willingly accepted by the mining enterprises of the country.

The Faculty has given life to many faculties, all the faculties and laboratories of the mining structure of the Dnipropetrovsk mining institute (today the National mining university).

In creation of the Faculty took part the leaders of mining and science O. Terpigorev, M.M. Protodiakonov, L.D. Sheviakov, V.O. Guskov, G.E. Evreinov and many others. They have established the bases of technology of extraction of minerals, of their enrichment and processing. They have developed unique methods of defining the parameters of mining stress in the rocks mass.

#### REFERENCES

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