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EDUCATIONAL AND SCIENTIFIC ACTIVITY OF PUBLIC SCIENTIFIC AND TECHNICAL ASSOCIATIONS OF INDUSTRIAL REGIONS OF UKRAINE IN THE MINING AND METALLIC INDUSTRY (END OF XIX – BEGINNING OF THE TWENTIETH CENTURY)

Based on the found archival materials and historiographical sources, the educational and scientific activity of public scientific and technical associations of industrial regions of Ukraine at the end of the nineteenth and early twentieth centuries was investigated. in the mining and metallurgical industry (on the example of Kharkiv and Katerynoslav branches of the Russian Technical Society). The topic of priority issues of theoretical and practical research of members of the studied societies, for comprehensive thorough study of which special commissions, was created. The activities of the standing commissions on technical education, in which the main place, the task of disseminating scientific and technical knowledge and the discovery of schools and courses for workers of leading regional industries: mining and metallurgical was analyzed. In accordance with the goal and found informative sources, the principles and methods of research were defined, the theoretical and methodological basis of which formed general scientific principles: objectivity, historicism, authenticity, representativeness, etc. The reproduction of the object of study against the background of natural historical processes was carried out using general scientific logical methods, in particular analysis and synthesis. The problem-chronological method was applied, which allowed to distinguish certain problems and consider them in the chronological sequence of historical events. Scientific novelty is that the educational and scientific activity of scientific and technical societies in the mining and metallurgical industry has not been the subject of research to this day. Despite the existence in modern domestic historiography of scientific works on various aspects of the formation and development of technical education, the author emphasized the activity of public scientific and technical associations on the specified issue and with a sectoral accent.

The conducted research made it possible to conclude that the activity of engineering and scientific societies of industrial regions of Ukraine in the field of mining and metallurgical sciences was systematic purposeful, which resulted in a number of problems of mining and metallurgical industries: evaluation of useful properties and capacity of plants; development of specifications for metallurgical products, etc. Most of these endeavors and research were initiated by scientific and technical societies of industrial regions of Ukraine. The educational and scientific activity of RTT departments in the mining and metallurgical industry was of great importance for the formation of the professional composition and educational level of workers of industrial regions of Ukraine at the end of the nineteenth and early twentieth centuries.

Key words: *Kharkiv, history of science and technology, metallurgy, technical education, local history, Kharkiv technological institute, scientific and technical associations, railway transport, history of everyday life, biography.*

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ОСВІТНЬО-НАУКОВА ДІЯЛЬНІСТЬ ГРОМАДСЬКИХ НАУКОВО-ТЕХНІЧНИХ ОБ'ЄДНАНЬ ПРОМИСЛОВИХ РЕГІОНІВ УКРАЇНИ У ГІРНИЧО-МЕТАЛУРГІЙНІЙ ГАЛУЗІ (КІНЕЦЬ XIX – ПОЧАТОК XX СТ.)

Спираючись на віднайдені архівні матеріали та історіографічні джерела досліджено освітню і наукову діяльність громадських науково-технічних об'єднань промислових регіонів України у кінці XIX – на початку XX ст. у гірничо-металургійній галузі (на прикладі Харківського і Катеринославського відділень Російського технічного товариства). З'ясовано тематику пріоритетних питань теоретичних і практичних досліджень членів досліджуваних товариств, для всебічного ґрунтовного вивчення яких створювались спеціальні комісії.

Проаналізовано діяльність Постійних комісій з технічної освіти, в діяльності яких основне місце посідало завдання розповсюдження науково-технічних знань і відкриття шкіл та курсів для робітників провідних регіональних галузей виробництва: гірничій і металургійній. У відповідності до поставленої мети та віднайдених інформативних джерел було визначено принципи і методи дослідження, теоретико-методологічну основу якого сформували загальнонаукові принципи: об'єктивності, історизму, достовірності, репрезентативності й т. ін.. Відтворення об'єкта дослідження на тлі закономірних історичних процесів здійснювалося з використанням загальнонаукових логічних методів, зокрема аналізу та синтезу. Застосовано проблемно-хронологічний метод, який дозволив виокремити певні проблеми і розглянути їх у хронологічній послідовності історичних подій. Наукова новизна полягає у тому, що освітньо-наукова діяльність науково-технічних товариств у гірничо-металургійній галузі до сьогодні не була предметом дослідження. Не дивлячись на існування в сучасній вітчизняній історіографії наукових праць щодо різних аспектів становлення і розвитку технічної освіти, автором зроблено наголос на діяльності громадських науково-технічних об'єднань з означеного питання причому з галузевим акцентом.

Проведене дослідження дало можливість зробити висновок, що діяльність інженерно-наукових товариств промислових регіонів України в галузі гірничо-металургійних наук носила систематичний цілеспрямований характер, внаслідок якої було вирішено низку проблем гірничо-металургійних галузей виробництва: оцінка корисних властивостей і потужностей покладів донецького мінерального палива; розробка технічних умов на металургійну продукцію тощо. Більшість із названих починань і досліджень були ініційовані саме науково-технічними товариствами промислових регіонів України. Освітньо-наукова діяльність відділень РТТ у гірничо-металургійній галузі мала велике значення для формування професійного складу та освітнього рівня робітників промислових регіонів України в кінці XIX – на початку XX ст.

Ключові слова: *Харків, історія науки і техніки, металургія, технічна освіта, краєзнавство, Харківський технологічний інститут, науково-технічні об'єднання, залізничний транспорт, історія повсякденності, біографістика.*

Problem statement. The development of technology, industry, transport in the post-reform period caused a shortage of educated workers in general and specialists with technical education, in particular. These processes were most active in industrialized regions of Ukraine. Industrial production required the same extent both the introduction of the latest scientific developments and competent workers with different levels of education. Therefore, an urgent problem was the need to increase the overall literacy of the population as a whole. This question was particularly painful about workers involved in different industries, since increasing the level of their technical education often encountered the lack of literacy at all. And this despite the fact that on average literacy in the working environment was dominated by the average level of literacy of the population in the country. Table 1 presents data on the literacy of workers of the European part of the Russian Empire, taken from the materials of the All-Russian census in 1897 (1). Data on workers involved in the mining, metalworking, material processing, transport industries that were most characteristic of the industrial region under study.

The calculations show that at the end of the nineteenth century, the weighted average percentage of competent workers (men) by types of work presented in the table did not exceed 58%. So, on average, about half of the workers were illiterate, not to mention women, where the percentage of literate was much smaller. Therefore, at the end of the nineteenth century, even primary education was a difficult problem for the Russian Empire.

The issues of education, as well as the introduction of scientific and technical discoveries, were so relevant that they were taken care of not only by public institutions, but also by individuals, public and public and scientific organizations.

Analysis of recent research and publications. The subject of vocational education is not at all new. There are a number of works, whose authors, in particular, thoroughly studied the pedagogical aspects of managing the systems of training of skilled workers in Ukraine, the place and importance of vocational education in the educational system of the Russian Empire, the formation of domestic craft education in the studied period (Likarchuk, 1999; Nahrybelnyi,

Table 1

Literacy of workers by selected types of classes in the region under study*

Type of classes	The total number of workers			From them competent		Percentage of competent, %	
	Men	Women	Total	Men	Women	Men	Women
Mining and mineral mining	2254099	384079	2638178	1308645	109233	58	28,44
Metal smelting	36944	1570	38514	14484	215	39,2	13,7
Metal processing	311123	5242	316665	207945	1689	66,83	32,22
Railway	128223	11402	139625	81714	1628	63,72	14,28

**Selection by industry and percentage calculation by the author*

2011; Sytniakivska, 2009). The educational and scientific activity of scientific and technical societies in the mining and metallurgical industry has not been the subject of research to this day. It should be noted that some aspects of the problem raised are covered in the author's monograph (Kushlakova, 2016).

The purpose of our article is to study the educational and scientific activity of public scientific and technical associations of industrial regions of Ukraine in the mining and metallurgical industry (on the example of Kharkiv and Katerynoslav departments of the Russian Technical Society).

Presentation of the basic material of the study. The territorial location of the studied societies was one of the main factors that the vast majority of studies of members of scientific and technical associations were aimed at solving the problems of the most developed industries in the region-mining and metallurgical.

In the activities of Katerynoslavsky (KD RTS) and Kharkiv (KhD RTS) departments on the agenda were one of the first to develop mineral deposits of Donbass and study their properties. The RTS, which originated earlier than other engineering and scientific associations in the region, was the first to begin the study of the wealth of the Donetsk basin at the end of the nineteenth century. During this period, issues related to the assessment of the quality of domestic coal and its advantages over foreign ones, as well as the volume and capabilities of production and use for industrial and domestic purposes, were relevant at the state level. To find out the first of these issues under the Ministry of Roads, a special commission was created under the chairmanship of a secret advisor to engineer V. V. Salov. The Kharkiv RTS department performed on its part on the initiative to conduct a comprehensive study of Donetsk coal independent Conducting a collective study that resulted in the formation of a special commission «... under the pre-Evigration of Gorlov ... From the 17 people, which is assigned to the reconstruction of the instruction ... Myneral fuel all Russian missions.

Among the members of the Communications, the faces were chosen: Gg. Gorlov, Avdakov, Chirikov, Sheterman, A. Kravtsov, G. Kravtsov, Taskin, Peshkovsky, Danilov, Ragozinsky, Flee, Mevius, Alexevsky, Krzhkovsky, Davydov, Ketrits, Retchitsky» (Zapiski HO IRTO, 1881). The activity of the said commission was intensified only under the chairmanship of MS Avdakov, which during the year developed a number of both theoretical and practical issues.

Explanation about the practical part of the measures planned by the commission found the implementation in the report of M. S. Avdakov «a number of means of the method of mineral fuel on Russian jaundice», after which the directions of practical research were made after discussion, namely: 1) techniques of mineral fuel assessment; 2) testing of mineral fuel for metallurgical and gas production. Considering the low level of development of the latter in the southern region of the state, 3) was planned in the future) the arrangement of the «permanent staining station for the use of various species of Mineral fuel from Donetsk Basin» (Zapiski HO IRTO, 1881). Mykola Stepanovich Avdakov successfully combined his professional activity with scientific, technical and organizational and scientific and scientific-scientific department in the Kharkiv department of RTS. He was a well-known person among industrial entrepreneurs of the state, because no one understood the importance of timely solution of maturing problems of the mining and metallurgical industry. It was at his initiative that the proposal to create and arrange the research station for carrying out laboratory tests of mineral fuel and other minerals of Donbass was made.

In addition to coal (mineral fuel), the subject of research of Kharkiv scientists was other minerals of Donbass, as evidenced by the reports made at the meetings of the company, a large part of which can be found on the pages of «Notes of the KhD RTS»: «On the extraction of sulfur from gypsum» by M. M. Beketov; «Copper ores of the Donetsk Basein» A. D. Chirikov; «Crystallization of iron from concussions in bridges and machines» V. L. Kirpichov; «On coking in closed furnaces» A. I. Umansky and others. The research of the meters of IRTS on minerals, such as coal, iron and copper ores, was mostly theoretical in nature, because the testing was held only in laboratories. As noted above, in the area of the KhD IRTS activity, metallurgical production was at a fairly low level.

All the conditions for conducting theoretical and practical research in the mining and metallurgical industry had a Katerynoslav RTS department, which paid much attention to the development of coal production and safe conditions of mining, testing of materials (mostly iron, steel, cast iron) and the development of appropriate normal technical production. Given the importance of the studied technical problems of almost every specified issue, special commissions were formed. Thus, commissions on technical conditions for the supply of iron and steel were created (1902), for rail products (1903), on roofing iron (1911), for the production of rates for cast iron (1906) and others. The members of KD IRTS-well-known scientists from different branches of scientific knowledge, as well as practitioners, employees of industrial enterprises of the region-were involved in the commissions. The meetings of the company

were constantly reported by the results of the conducted research and discussed issues of metallurgical production and the production of normal technical conditions for metallurgical products, in particular the reports of: «Overview of several technical conditions for the supply of iron and steel and products from them established by French railways», «On one case of the speedy wear of the rails», «The project of technical conditions for the manufacture of rail pads and linings made of leaf iron, drawn up by the Commission for the RTS», «On the technical conditions for the production of steel rolls for railways», «On technical conditions for iron weld pipes For railways» and others. The relevance and relevance of the implemented Katerynoslav Studies is confirmed by the fact of financing the designated activity by entrepreneurial organizations, which is focused on the attention of A. F. Rodzevich-Belevich: «The department managed to involve these issues to the development of these issues [Vyprobovnia Metaliv-Normal Technical Moles-Author] of the South Russian Breeders, as well as find the necessary funds for experiments and the printing of the commission, which undoubtedly present a serious contribution to the field of technical testing of materials» (Rodzevich-Belevich, 1909: 400). Such a conclusion of the famous scientist was not groundless. In particular, the works of the commission on the development of specifications for rail products (its supply and acceptance) were referred to such institutions as the Russian Technical Society (in its railway department), the Ministry of Roads of Communication and the Bureau of Russian Advisory Congresses (Protokolyi zasedeniy, 1905). In such a long way, the draft technical conditions for rail products were drawn into the program of action of the congress of the engineers of the track service of the Russian railways (Proekt novyih usloviy, 1907). The high positive assessment of the draft KV RTT project by the congress and the materials of the commission on specifications were taken into account by government agencies when drawing up new technical conditions on this issue.

Let us also note the activities of another commission – the commission for the development of technical conditions for roofing iron. The practical results of this commission have been widespread in industrial production and in everyday life not only in the regions of the southern part of the Russian Empire, but also in other more remote industrial regions, in particular in Trans-baikal (Soobschenie, 1913).

With the outbreak of World War I, the issue of metallurgical production has become acute, which has contributed to the intensification of research in this field. In these conditions, at the beginning of 1917, the Katerynoslav department began its activity chemical and metallurgical department headed by PG Rubin. During the first year of activity, 4 meetings of the department were held, which discussed the issues of the current state of metalography in the factory business on the example of Bryansk, Nikopol, Mariupol and Kamensky Metallurgical Plants (report by M. M. Matveev), problems of Marthenian production, organization of repetitive courses (Zhurnal zasedaniy, 1917). The results of the studies conducted in the mining and metallurgical industries were tested at meetings of companies, the most important and relevant were recommended for printing. Along with the research work in the field of mining and metallurgical sciences a prominent place in the activities of KD RTS and KhD RTS were occupied by educational work. The studied societies aimed at promoting the development of technology and technical industry in the south of the Russian Empire. Among the main tasks that would contribute to achieving this goal, the task was: «Sodaity to the structure of technical schools» (Instruktsiya Harkovskomu otdeleniyu, 1882). What was planned to implement such enlightenment measures as reading public lectures on technical subjects, excursions, popularization of technical achievements through printing and distribution of periodicals, arrangement of technical library and museum, organization of industrial exhibitions and participation in them, etc. These issues were directly taken care of by the commissions for technical and craft education, created at the societies. Thus, the Commission on Technical and Cradial Education of the KhD RTS (1882) saw its main tasks in the following: promoting the opening of Sunday and evening classes and schools, distribution of technical literature among working layers of the population of Kharkiv province, analysis and consideration of programs and plans of training courses, which were implemented in schools and in schools. As we can see, the plans of the Commission on Technical Education have been given a significant place in the practical activity of the Kharkiv department, namely the opening of schools and classes for workers. To open a special department for technical education at the Katerynoslav department, the necessary preconditions were ripe in 1905. When it was decided in its activity «The main place ... to take the issue of the institution at the Yekaterinoslav branch of the RTS – a permanent commission on technical education and the opening of it for evening courses for timids» (Otchet o deyatelnosti otdeleniya, 1906).

In Kharkiv, a number of schools for workers of the Kharkiv RTS department are opened as a result of the decisions, and in Katerynoslav evening courses for

adults. Interestingly, the course form of organization of educational activity has become the main in the activity of the newly created standing committee on technical education at the KhD RTS.

Since 1905, with the support of entrepreneurs and breeders, Kharkiv Branch of IRTS opens a number of educational institutions: 2-class school at the Golubovsky mine (1905), school at the Pavlovsk mines of the Oleksiivsky Mining Society (1906), elementary school at KamyanskayaKamyana) (1908), evening courses for workers at the Donetsk-Yuriiv plant (1908), evening courses for workers at a 2-class school at Golubovsky mine (1913). As we can see, the RTS was a branched system of educational institutions, which consisted of elementary schools for workers (men and women) and children (boys and girls), lower schools, crafts and schools, which, along with general disciplines, taught special disciplines of mining and mining.

From the beginning, the Commission on Technical Education of the KhD RTS had a slightly different vector of activity, not aimed at creating schools, but at the opening of various courses: evening courses (EC) for adults (for workers of Katerynoslav factories); courses for pipeline workers; Courses for workers of the Dniprovsky (metallurgical) plant in the village Kamianske.

Such work of standing commissions on technical education of RTS departments was relevant and archived, which is confirmed by the fact of financing their activities mainly at the expense of state subsidies and funds of breeders and factors who took care of the issues of education of their workers. As an example, we give facts about financing the activities of the 1st School of RTT, it should be stated that paid subsidies of different institutions came to the school ticket office twice a year and became the main source of financing of the school. So, as the first school of the IRTT first school shows for the 1907–1908 academic year, the following revenues were evidenced (see Table 2).

As we can see, the amount of subsidies was indeed quite significant, these donations in favor of the school were more than 84% of the total amount of revenues in general, and the expenses of the school per year were about 50% of the total amount (2 452.34 rubles). As for the number of students, it should be noted that 750 students were enrolled in the first month, and in the year their number increased to 872 people, with about 44% of them (329 and 387 listeners, respectively), the workers of the railway and metallurgical (Prilustra and Bergenheim) and the steam engine.

A similar situation was observed in Katerynoslav. Since 1906, the activities of the evening courses for adults have strengthened and have stability, which was largely facilitated by the material support of public and state organizations and industrial entrepreneurs, provincial and county zemstvos, city self -government, Catherine railway, Bryansky factories, tubular, and more. The budget of the courses in the first year of activity was 983 rubles, of which 81.4% of the total amount were the donation of the aforementioned organizations and enterprises, and 18.6% – the payment of trainees for training (Prazdnovanie 10-ti letnego yubileya, 1916).

It should also be noted that educational activities were conducted not only in the environment of workers. For the specialists of the engineering professions, virtually all the studied societies have organized repeating courses, and this is clear. Who, as an engineer, is aware of the active progress of technologi-

Table 2

Cash receipt to 1st school cash desk of KD RTS in 1907/1908 educ. year (ruble)
(Otchet o deyatelnosti 1-y shkoly HO IRTO, 1908)

Sources of financing	1907	1908
Subsidy of the Bergenheim Plant	25	-
Subsidy of the Congress of Mining Industries of Southern Russia	200	180
Subsidy of the City Committee of Care of Folk Temperance	500	450
SubsidyofRailwayManagement	200	-
Subsidy of the Alekseevsky Mining Society	100	90
Subsidy of Southern Railway Management	360	360
Southern Railway Management for Students	720	720
Total	2 105	1 800
	3 905	
Fee for the right of study	400,80	
Return for Tutorials	112,64	
P.Lukyanchenko	15	
Balance for1.01.1907 p.	206,90	
Total	4 640,34	

cal progress and the transience of the latest technical achievements, understands the tasks of the engineers of modernity, the importance of science and technology for the development of production, as well as the importance of scientific coverage of technical issues for working engineers, technicians, technologists, etc. Repeating courses on modern issues of science and technology were most successful at the Katerynoslav Department of IRTS (1909–1915).

Conclusions. The activity of engineering and scientific societies of industrial regions of Ukraine in the field of mining and metallurgical sciences was systematic purposeful. According to the results of the research at the meetings of the General Meeting, the members of the societies made their reports, which were then published on the pages of magazines. Some reports covered the important problems of a particular industry and caused the formation of special commissions or departments that consolidated the best specialists in their composition to solve the tasks. Thus, a number of problems of mining and metallurgical industries were solved: assessment of useful properties and capacity of deposits of Donetsk mineral fuel; development of specifications for metallurgical products, etc. Most of these endeavors and research were initiated by scientific and technical societies of industrial regions of Ukraine.

The educational activity of RTS departments was of great importance for the formation of professional composition and educational level of workers of industrial regions of Ukraine at the end of the nineteenth and early twentieth centuries:

a) Schools and courses were opened at the initiative and request of the workers of the enterprises or organizations themselves: Professional Society of Presidents of Kharkiv (2nd School), residents of the working district of Zhuravlivka (3rd school), courses for workers of the factories of the pipeline, Dniprovsky and others;

b) for the study period, about six thousand workers of different specialties and spheres of activity were received: workers of factories, railways and typography; employees of the office, depot and telegraph; Teachers, creepers, cashiers, etc.;

c) the level of education in the educational institutions of the IRTS departments was quite high and envisaged the receipt of general primary education, in general, and technical, in particular;

d) the quality of educational services provided was mostly higher than in similar educational institutions, as evidenced by the increase in the contingent of students.

The established sources of financing the activities of educational institutions of IRTSdepartments serve as a confirmation of their need and need for industrial regions of Ukraine (material and moral support from well-known entrepreneurs and breeders).

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