Development of national system of pharmaceutical education in 1920–1930: Moscow medico-pharmaceutical combine

M.S. Sergeeva
I.M. Sechenov First Moscow Medical University, The Ministry of Health of the Russian Federation

To overcome the shortage of medicines at the beginning of the 20th century, a new system of pharmaceutical education was required, as a restructuring of pharmacy training could not meet the needs of the pharmaceutical industry. In 1920–1930, a new training concept, based on an integrated approach to the training of specialists for pharmacies and factory enterprises, was developed and approved. The difficulties that arose are related, on the one hand, to the need to take into account the specifics of industrial drug production, and on the other hand, with the need to create alternative forms of pharmacy apprenticeship education that would be able to provide pharmacies with middle-level and senior staff. The methods of organizing pharmaceutical education in 1920–1930, examined using the example of the Moscow Medical and Pharmaceutical Plant, served as the basis for the further unification of the pharmaceutical personnel training system.

Keywords: *pharmaceutical manufacturing, pharmaceutical education, pharmaceutical college, pharmaceutical institute, Medical and Pharmaceutical Plant*

The global economic crisis that developed during World War I brought to the fore the problem of drug supply to both the army and the civilian population. In Russia, the situation was exacerbated by the pharmaceutical industry's dependence on imported German raw materials, technologies and proprietary medicines. Under conditions of mass mobilization, with a lack of domestic raw materials and disorganization of domestic trade, the existing pharmacy network was unable to provide the necessary production volume of medicines. Another solution to the problem of a lack of medicines [1] was the establishment of local pharmaceutical production. Firstly, however, it shared the pharmacy network's problem of a deficit of medicinal raw materials, and secondly, there was a lack of technology, equipment and qualified personnel necessary for the development of the pharmaceutical industry. This has exacerbated by the disorganization of drug production.

In order to overcome this crisis, which began to arise during World War I and developed in the years of Soviet power, the interim government and later the Bolsheviks adopted a series of measures aimed at initially centralizing and later nationalizing all spheres of social and economic life, including the pharmaceutical industry. As a result of successive actions taken by the government in 1916-1917, the Moscow Military Industrial Committee defined a list of 306 essential medicines worth 30 million rubles. [2, p. 213]. In 1918-1919, all small, medium and large pharmaceutical companies, pharmacies, warehouses, laboratories and educational institutions were nationalized. In 1920, the number of unprofitable enterprises was reduced, and a concentration of forces was conducted, involving equipment and personnel for nine major pharmaceutical factories. A plan was created for the state distribution of raw materials and essential drugs between the newly equipped producers. In 1919-1920, research institutes were founded – the Chemical-Pharmaceutical Department at the Russian Institute of Applied Chemistry and the Scientific Research Chemical-Pharmaceutical Institute – whose tasks included the development and reproduction of the most important foreign drugs, research into medicinal and aromatic

plants, as well as providing all sorts of help to pharmaceutical companies. Thus, in the course of World War I and later the Civil War, the first steps were taken to establish a national pharmaceutical industry, which required the training of qualified personnel capable of satisfying the industry's requirements.

This article discusses the process of the creation in 1920-1930 of a new system of pharmaceutical education, part of which is Moscow Medical and Pharmaceutical Works (MMPW; founded in 1932 in a process of merging secondary schools – pharmaceutical and medical colleges), which became the basis for the creation of the Moscow Pharmaceutical Institute (MPI). The history of the educational institutions that were part of MMPW reflected all stages of pharmaceutical education reform, during which not only the traditional academic vocational training system of pharmaceutical personnel was destroyed, but a new system was also created. [3] Through an integrated approach to training specialists for pharmaceutical and plant production at MMPW, the problem of the industrial sector's needs was solved at pharmaceutical universities. The educational and methodological activities of the pharmacy faculty, created within MMPW in 1934 on the personal initiative of its leaders, was the basis for the pharmaceutical institutions' curriculum model approved in 1936 by the All-Union Committee on Higher Education of the Council of People's Commissars (CPC) of the USSR. [4] Thus, the criteria formulated for training employees at MMPW became the basis for the state policy of pharmaceutical education unification aimed at developing common standards and training programs.

In 1918, the government faced a difficult task. To work on the new pharmaceutical production, technicians were needed – engineers, chemists, technologists, possessing the skills needed for working with more complex and modern industrial equipment. However, the special importance of the pharmaceutical industry, which was closely connected to the medical sphere, required specialists with medical knowledge, allowing them to estimate the effect of drugs on the human body. The pharmaceutical community that existed at the time – represented by masters of pharmacy, pharmacists, students of pharmaceutical courses, apothecary assistants and apothecary students without pharmaceutical education[1], but with a lot of practical experience – did not possess the necessary technical skills. Vocational and academic training of pharmacists, based on sequential learning in pharmacies and medical faculties, did not prepare professionals for work in manufacturing, so it became clear that radical changes needed to be made to the old educational traditions.

Pharmaceutical production orientated to address specific medical needs required reform of pharmaceutical education not only for the People's Commissariat of Education (PCE), which managed the nationalization of all higher education institutions, but also the People's Commissariat of Health (PCH) of RSFSR. A scientific pharmaceutical commission that was set up as part of it (1918), consisting of representatives of the higher education institutions involved in the preparation of pharmacists, the Research Chemical-Pharmaceutical Institute, as well as trade unions of pharmaceutical workers, prepared a draft proposal for a fundamentally new system of pharmaceutical education. For the first time independent educational institutions, which were not dependent on the pharmacy and medical faculties, provided two stages of training for pharmacists. Pharmacy schools and various training courses for junior technical staff of pharmaceutical plants, as well as employees of pharmacies, were meant to become the center of secondary education[2]. Higher education – the training of managers and engineers to work in the pharmaceutical industry – was to be provided by independent chemical-pharmaceutical faculties or departments of physics and mathematics faculty on the basis of similar rights[3].

The practical implementation of this project began in 1919 with the creation of higher education institutions – the Petrograd Chemical

[1] The apothecary students were recruited from those who had graduated from two to six years of state study at men's or women's gymnasiums, progymnasiums, Orthodox theological seminaries, real, commercial or women's schools and cadet corps.

[2] Central Archives of the City of Moscow (hereinafter – CACM) f. 3133 St. 2. d. 31. p. 9.

[3] State Archive of the Russian Federation (hereinafter – SARF) f. 482. A o. 25. d. 6. p. 86-88, 92-94.

and Pharmaceutical Institute, the chemical-pharmaceutical department at the Second Moscow State University (formerly University for Women) and the University of Perm. However, in conditions of economic disruption and a lack of funds, the new schools could not compete with pharmacist training courses at medical schools, which had functioned since the 19th century. [3] This was due not only to the lack of necessary technical equipment, laboratory equipment, textbooks and teaching staff, but also due to the students' difficulties in learning the curriculum. The admission rules for universities, which allowed everyone to study regardless of whether they possessed secondary education, contributed to an increased number of students. A lack of sufficient basic knowledge in turn led to mass dropouts of students. Thus, of the 91 students enrolled in 1919-1920 at the Petrograd Chemical-Pharmaceutical Institute, none completed their training. The PCH's need for pharmacists with higher qualifications according to preliminary estimates for 1923 amounted to 867 people. [5] Thus, in the early years of their existence, the chemical and pharmaceutical institutions of higher education, in principle, could not provide factories with the specialists they needed, let alone replace the traditional system of education.

This required a comprehensive approach to the reorganization of pharmaceutical education. Firstly, it was necessary to expand the network of higher education institutions. In 1921, pharmacy faculties were opened in Kharkov, Kiev, Odessa and Tbilisi. All pharmaceutical universities were transferred to the category of technical schools which, on the one hand, confirmed the priorities of the state in the development of the pharmaceutical industry, and on the other hand, positioned the content of the educational process closer to the requirements of production and solidified the material and technical base of high schools. The role of pharmacies in these circumstances was to sell factory-produced medicines and in connection with this its employees did not require higher education.

Secondly, entrance and graduate exams were introduced. In 1921, admission requirements were formulated, according to which people with a general education could enroll at pharmaceutical universities, as well as pharmacists not younger than 16 years old, who passed an entrance test. To increase the level of general education special training courses (the so-called zero-semester) were organized at many universities.

Thirdly, as an alternative to pharmacy apprenticeship, pharmaceutical middle schools were established. One of the first such schools was established in 1920 on the initiative of the trade union of pharmacists at the First Moscow State University (formerly the Imperial Moscow University). The training course for ordinary pharmacy employees was designed to run for two years and included theoretical (lectures) training in a number of disciplines (botany, Latin, mathematics, pharmaceutics, physics, inorganic, organic and pharmaceutical chemistry, pharmacology, pharmacognosy and social studies) as well as the development of practical skills. For this, the school created a chemical laboratory, botanical and pharmacognostic laboratory and an industrial practice pharmacy. [6, p. 19] However, the new system failed to achieve continuity between secondary and higher education institutions. Secondary schools, which were aimed at an accelerated preparation of junior technical and pharmacy staff, were unable to provide their graduates with a sufficient level of training to continue their education at university. In this regard, at the 1st All-Union Conference on Pharmaceutical Education, held in 1924, special attention was paid not only to organizational issues in pharmaceutical education in general, but also to the curricula, programs and teaching methods in pharmaceutical schools in particular. In place of the lecture system of teaching, recognized as "unproductive and not meeting student requirements," a "group-laboratory system" was introduced that involved theoretical lessons with demonstrations, laboratory work and lectures "in the form of interviews with students" in small groups. [6, p. 20–21] Curricula developed by the Moscow School of Pharmacy and approved by Main Department of Professional Education were adopted in all secondary schools of pharmacy as mandatory. Their graduates were granted the right enroll in

first year courses at pharmaceutical universities without the need for entrance examinations. [6, p. 18]

Fourthly, a number of decisions by the CPC and Main Department of Professional Education in 1921 led to the banning of the practice of pharmacy apprenticeship, provisional courses were closed at universities' medical faculties, and the old pharmaceutical ranks (chemist's assistant, pharmacist, master of pharmacy) were abolished. Thus, in 1921, the professional academic system for pharmaceutical education, which had been developed in the 19th century, officially ceased to exist.

However, as of October 1, 1923, in 4,633 pharmacies and pharmaceutical warehouses in the RSFSR there were 5,523 unskilled workers acting as pharmacists, among 7,046 skilled workers. [5]. This in turn required the knowledge base and titles of all the representatives of the domestic pharmaceutical community to be unified. "In view of the complete consistency of the challenges facing the pharmaceutical industry across the whole of the union, and to eliminate differences in qualifications, rights and obligations of pharmaceutical workers in the pharmaceutical education system should be completely unified throughout the USSR," said I.I. Levinshtein in a report on the principles, fundamentals and prospects for pharmaceutical education (at the 1st Union Conference in 1924). [7, c. 35]

Periodic nine-month courses were opened at pharmaceutical schools, where all the employees of pharmacies "with many years of qualified work experience but without ... special theoretical education," or who had received pharmacy apprenticeship under the previous system, were required to undergo theoretical training on general and special disciplines. [8, p. 4] It was assumed that the temporary courses would exist until the end of 1925, however, the continuous tightening of quality requirements for pharmacy- and factory-produced medicines, as well as the level of training of pharmacy employees led to the periodic courses receiving a permanent status and they were reorganized into professional development courses for pharmacists. So, periodic professional development courses at the Moscow School of Pharmacy (from 1925 it became a college) were reorganized in 1929-1930 into courses for the professional development of Moscow Health Department pharmacists. Sixty to 70 cadets where trained annually. [9, c. 4–5] Professional development courses were opened at pharmaceutical universities for pharmaceutical factories' and laboratories' managers and technical staff who had previously received exclusively chemical studies education. The objectives of these courses included the teaching of additional special biological and pharmaceutical knowledge necessary for the improvement of the old and the search for new drugs. [6, p. 25]

The development of pharmaceutical education in the NEP years was restrained by a lack of funds. The path of strict austerity and denationalization was intended to see educational institutions, as well as some industrial enterprises, become cost accounting, self-financing and self-sufficient. Moscow School of Pharmacy was no exception. In 1925, it received the status of a college, it was separated off from Moscow State University and moved to a self-financing status. In 1927, the college moved from the Moscow State University building on Strastnaya Square (at the corner of 35 Tverskoi Boulevard) into a four-story building on Nikitsky Boulevard,[4] where it was forced to rent out part of the premises for different training courses.[5] [10, p. 152] Thus, in 1927-1928 there were four district retraining courses for junior medical staff at the pharmaceutical college. In the same building there were numerous training courses for nurses. In 1929, the Medsantrud

[4] The 4-story tenement building at 13 Nikitsky Boulevard was built in 1910 by architect K. Kaizer for the Society for the Dissemination of Practical Knowledge Among Educated Women. From 1910 it housed the E.N. Dyulu private gymnasium for women. Until 1929 the premises were also rented by the 1st Moskvoshvey Professional Technical School for temporary medical courses: No. 3, professional development courses for maternal and infant health nurses (40 people), No. 1, professional development for wartime nurses (40 people), No. 1, night school for nurse-nannies (80 people), No. 2, evening medical school and professional development courses for junior staff, as well as professional development courses for nurses.

[5] *TSAGM*. Annotation to f. 3132. o. 1. p. 1-3.

Union's Gubotdel Medical Engineering College[6] under the guidance of A.G. Vengerov (1927-1931), moved to the same address. [11, p. 189] In the 1930s, the Moscow Scientific-Pharmaceutical Association was located there.

The transition to self-sufficiency worsened the situation for teaching staff, who ended up deprived as a result of the abolition of academic degrees and titles (1918), the benefits of which were not only scientific, but also social and economic. Hourly rates were cut as were wages, the level of which in the early 1920s was three times below the subsistence level [12, p. 120-122] which, on the one hand, led to difficulties with recruiting teachers for the departments and on the other hand, led to to the development of the practice of moonlighting. Teachers were forced to simultaneously work in several schools. Thus, the dentist Vengerov in the second half of the 1920s combined the posts of director and teacher of the Medsantrud Union's Gubotdel Medical Engineering College with a teaching position in the dental department of the State Preventive Medical College. [13]. Thus, the NEP years saw contradictory trends in the development of pharmaceutical education. Partial denationalization and the attraction of private capital contributed to the development of the pharmaceutical industry, updating its production equipment and technology. As a result the demands on staff were increased. The solution to this problem was a set of measures aimed at the widespread introduction of a new system of pharmaceutical education. However, the deterioration of the material compensation for teachers, as well as a deterioration in the logistical and educational equipment for the educational process, minimized the effectiveness of training. The decline in the quality of general education, which was observed in the 1920s, played a major role in this.

The specialization of higher and secondary educational pharmaceutical institutions led to the division of the "chemical-pharmaceutical" business and the "pharmacy" business. Creating a network of high schools focused exclusively on training for specialists for factories, led to shortages of pharmaceutical personnel with higher education in pharmacies and "overproduction in these universities." [14, p. 19] According to Professor A.N. Reformatsky, from 1928-1932 pharmaceutical universities planned to prepare more than 1,000 pharmaceutical workers, which far exceeded the needs of the chemical-pharmaceutical industry. At the same time, pharmacies were "part of pharmaceutical production" and "in need of highly skilled managers and employees." [16, p. 557] The expanded network of pharmacies (hospital, self-sufficient and rural) required not only "ordinary employees," but also "organizers and leaders of pharmaceutical business, supervisors and inspectors of pharmacy activities," and "employees for analytical laboratories," which only higher education institutions could prepare. [16, p. 469]

The role of higher education institutions in the training process for the entire pharmaceutical industry was discussed at the All-Russia Pharmaceutical Meeting in 1926 and in the pages of professional publications. [14–18] The CPC Decree from August 2, 1928, which canceled the production orientation of the chemical-pharmaceutical faculties of Leningrad and Perm state universities, was issued to ensure pharmacies received highly qualified workers, on the one hand. The main focus of these departments became analytical pharmacy and phyto-pharmaceutical activities. [14, p. 20] On the other hand, there was a proposal to reorganize pharmaceutical technical universities' specialization, the goal being to prepare "assistants, supervisors, pharmacist workers and others, including pharmacy managers," as well as "pharmacist-analysts for analytical and galenic laboratories, pharmacy management, laboratories for the mass production of standardized dosage formulas and pharmacy warehouses." [19] In January 1930, the program was approved by the

[6] From 1925 to 1928 the Medsantrud Union's Gubotdel Medical Engineering College was called the Vsemediko-santrud Union's Gubotdel Paramedics Engineering College. The health care workers' union was the initiator behind its creation and gave it its name – the provincial department of health union labor. It was located at the following address: Yauza Blvd., 16 Podkolokolny Lane. "The college was designed to provide the company paramedics with qualified school paramedics with all the rights of the latter with sufficient training for professional social and political activities among the workers." The college exclusively accepted company paramedics with five years of experience." A.G. Vengerov headed the technical school. He ran a course there on dental disease. [10, p. 454]

pharmaceutical section of the Training Council of the PCH USSR and in 1931 the creation of "training centers" began.[7] [20, p. 17] At that time the "training centers" were created as a result of unification under the consolidated leadership of secondary schools, each of which still maintained their legal status. Technical schools shared training laboratories, and their employees worked part-time in the centers. Thus, despite educational institutions' poor material and technical equipment, a lack of qualified teaching staff and teaching materials, unified colleges lifted the quality of students' training.

Pharmaceutical and medical colleges sharing the same building on Nikitsky Boulevard were combined in August 1932 to become the MMPW educational institution under the leadership of A.G. Vengerov and N.P. Sandansky-Orovchanats. The widespread previous account of the MMPW being created on the basis of three colleges – pharmaceutical, dental and paramedical – located on Nikitsky Boulevard, is without foundation. First mentioned in the "Report on the History of the Moscow Pharmaceutical Institute," compiled for its 15th anniversary,[8] and later repeated in articles by M.E. Bergolts, T.I. Toltsman, A.A. Novikova and a book by S.G. Sboeva,[21–24] it has not been confirmed by any sources. MMPW's official founding documents are considered lost. Analysis of the data presented in the All-Moscow address book for 1925-1931 and 1936 suggests that there was no dental college on Nikitsky Boulevard in those years. [20, p. 164] Data from the family tree of pharmacist A.P. Rogov, who worked from 1935-1940 as deputy director of studies at MMPW indicate that the composition of the center consisted of only: "a pharmaceutical institute, paramedics school, pharmacists school and a medical nursing course." [25]

References to a dental college as a part of the MMPW may be due to the fact that Vengerov, who was a dental specialist, taught dentistry simultaneously at the State Preventive Medical College (from 1936 – the Dental College), located at 50/2 Pyatnitskaya Ul. Thus, territorially the dental college was not included in the MMPW, and references to it, cited by several authors, are connected only with the teaching of Vengerov, who until 1936 combined teaching at the college with leadership of the training center.

During the forced construction of socialism during the first five-year plan, the almost catastrophic situation with pharmacist training became apparent. Increasing the number of students was difficult due to the lack of educational facilities, manuals and teaching staff, and a reduction in the length of study led to a constant revision of curricula and programs and increased the workload and duration of classes. [12, p. 145] To compensate for these consequences the government formulated the goal of converging theoretical training with work experience. [26] A policy of territorial zoning and transferring pharmaceutical universities into the PCH contributed to the even distribution of graduates between the country's pharmaceutical enterprises. To improve the skills of factory and pharmacy workers, and, consequently, quality and productivity, appropriate courses were created, as well as evening departments, which provided for training on the job. In 1931 a similar department was established at the Moscow Pharmaceutical College on the initiative of its director, V.I. Rimshevich. [20, p. 164] However, these measures were undertaken in conditions in which economic incentives were replaced by policy statements, and were not supported by the necessary financial aid.

The next step in "the transformation of pharmaceutical colleges into pharmaceutical universities" was the creation of pharmaceutical faculties. In January 1934, as a result of the efforts of Director Vengerov, the Deputy Head of the Academic Administrative Office A.P. Rogov and Professor A. V. Stepanov, paid courses for training higher level pharmacists were founded at the MMPW. In official documents they were called the Faculty of Pharmacy, as was documented by a letter sent to the Academic Secretary of the Pharmaceutical Committee at the Moscow Medfarmkombinat Faculty of Pharmacy, on March 23, 1936,[9] in which Rogov was appointed dean of the new faculty. In accordance with the policy of territorial zoning of universities, the faculty had local significance and was designed to train senior Moscow pharmacy employees on the

[7] SARF. F. 482. o. 25. d. 596. p. 25.

[8] TSAGM. f. 3132 o. 1. d. 110 p. 1.

[9] SARF. F. 482. about. 25. d. 1082. l. 43.

job. [21, p. 12] Classes were held in the evening from 7 pm to 11 pm. The training program was designed to be a four-year course, and enrollment of students took place two times a year. Only those specialists with secondary professional education and "more than three years of practical experience" were accepted.[10] Separate teaching staff were not provided for the faculty, and therefore the classes were conducted by teachers from the pharmaceutical college. The fees charged for tuition, as well as funds received from the renting out of MMPW's premises for different courses, provided the means for paying hourly rates to attract teachers from other educational institutions, among which were the preeminent former professor of the Faculty of Medicine of the First Moscow State University and the Faculty of Chemical and Pharmaceutical Second Moscow State University. [9, p. 5] Thus, the principle of continuity between secondary and higher education was first introduced in the work of MMPW. However, the case described is only one particular example emphasizing the systemic problems in the preparation of pharmaceutical personnel.

At the 16th All-Russian Congress of Soviets in 1935, "an almost complete lack of personnel with higher pharmaceutical education in pharmacies," as well as the low professional level of employees at pharmaceutical companies, was officially recognized as the cause of "pharmaceutical companies' backlog of work" and the "lack of numerous drugs in the country." [21, p. 12] According to the participants at the congress, overcoming the human resources crisis in the production and circulation of medicines was only possible through the creation of a unified system of higher pharmaceutical education. To do this, a 1936 CPC directive introduced the new titles of pharmacist and assistant pharmacist, and defined the areas of their professional activities.[11] The pharmacist, as a specialist with higher education, could hold the office of "pharmacy manager and other independent pharmaceutical positions in pharmacies, pharmacy and pharmaceutical institutions and enterprises." The exclusive right to train pharmacists was transferred to pharmaceutical institutes, for which a training program was established, designed as a four-year course, with a single commencement and completion date, academic forms of work (lectures, practical classes in laboratories and clinics, and manufacturing practice), enrollment and final exams as well as fixed requirements for mandatory general education. Thus, higher education institutions were unified, in the process of which the MMPW pharmacy department was reorganized into MPI (1936). The fact that the institute's first students graduated in two years after its opening (1938), confirmed that it inherited the traditions of the MMPW pharmacy faculty.[12]

Until 1940, the MPI, which consisted of 23 departments, was located in the same building as the MMPW. In 1935-1936, a 5th floor was added to the four-story building, which made it much easier to hold classes. However, despite the reconstruction of the building, classrooms were overcrowded with 40-50-year-old students from the pharmaceutical institute with 20-25 years of pharmacy experience together with 14-15-year-old students from pharmaceutical and medical schools. "In the corridors during breaks there was laughter, noise, sometimes you could see games of hide and seek, which reminded one of high school."[13] In 1937, all educational institutions, which were part of MMPW, moved from self funding to public funding and were transferred to the PCH USSR.[14] [26] From that moment, planned funding from the state budget began paying for salaries of teachers and students' scholarships, the purchase of laboratory equipment, reagents and teaching materials. In the same year, courses for pharmacists' professional development opened at the institute. [23, p. 64] The quality of training was improved by the strengthening of the material-technical base of universities, the construction of school buildings and laboratories, the introduction of a staff-salary system and an increase teachers' salaries, as well as the provision of high-school textbooks and the introduction of

[10] TSAGM. f. 3132 o. 1. d. 2. p. 1, 2.

[11] The CPC USSR and the Central Committee of the CPSU (b) directive "On the work of institutions of higher education and management of higher education" from 06.23.1936; CPC "On the training of nurses, dental and pharmaceutical personnel" from 09.08.1936. [21]

[12] TSAGM. f. 3132 o. 1. d. 110 p. 1.

[13] TSAGM. f. 3132 o. 1. d. 110 p.. 1; f. 3132. o. 1. d. 2. p. 1, 2.

[14] SARF. f. 482. o. 1. d. 747. p. 7.

stable curricula. In 1940, after the pharmaceutical and paramedical technical colleges moved, the institute remained the sole owner of the building on Nikitsky Boulevard, and as a result a unique institution ceased to exist – the MMPW.

Overcoming the medicine crisis in 1920-1930 required a systematic approach based on solving complex problems in which the system of training of qualified personnel took a leading position. Solving the given tasks in the difficult socio-economic situation was only possible within the framework of a general policy of centralization of management and state planning, regulating not only the production and redistribution of products, but also the preparation and allocation of staff. The search for a systematic approach to training specialists to meet the needs of the pharmaceutical industry was accompanied by the abandonment of pharmacists' traditional training in pharmacies, the creation of secondary and higher professional educational institutions, the formation of continuity between them, as well as the development of permanent standardized curricula.

REFERENCES

1. *Fedotova A.A.* Pharmaceutical hunger and medicinal plants: Mobilization of the botanists during World War I. Sociology of Science & Technology. 2013. N. 1. P. 86–94.
2. *Katlinsky A.V., Lopatin P.V., Lindenbraten A.L.* Farmatsevticheskaya promyshlennost' i lekarstvennoe obespechenie. Zdravookhranenie v Rossii. XX vek (The pharmaceutical industry and drug supply. Health care in Russia. 20th century). Eds. Y.L. Shevchenko, V.I. Pokrovsky, O.P. Schepin [in Russian]. Moscow: GEOTAR-MED, 2001. P. 212–233.
3. *Sergeeva M.S.* O neobkhodimosti reformy farmatsevticheskogo obrazovaniya v kontse XIX v. (On the need to reform pharmaceutical education at the end of the 19th century.) [in Russian]. Chelovecheskiy kapital. 2013, N 4 (52). P. 117–121.
4. *Krasnyuk I.I., Sergeeva M.S.* Istoriya sozdaniya farmatsevticheskogo fakul'teta Pervogo Moskovskogo gosudarstvennogo meditsinskogo universiteta im. I.M. Sechenova (History of the Pharmacy Faculty at the I. M. Sechenov First Moscow State Medical University). Farmatsiya (Pharmacy.) [in Russian]. 2013, N 6. P. 46–52.
5. *Haimovich M.S.* Doklad Narkomzdrava. Sostoyanie i perspektivy farmatsevticheskogo dela i potrebnost' v kvalifitsirovannykh farmarabotnikakh (Report of the People's Commissariat for Health Care. Status and prospects of pharmaceutical business and the need for qualified pharmaceutical workers) [in Russian]. Chemical and Pharmaceutical Journal. 1925. N 10–12 (13–15). P. 35.
6. *Rezolyutsii* 1-go Vsesoyuznogo soveshchaniya po farmobrazovaniyu (Resolution of the 1st All-Union Conference on Pharmaceutical Education) [in Russian]. Pharmacy Bulletin. 1925. N 1–2. P. 10–33.
7. *Levinstein I.I.* Printsipy i osnovy farmobrazovaniya i ego perspektivy (Principles and foundations pharmaceutical education and its prospects) [in Russian]. Chemical and Pharmaceutical Journal. 1925. N 10–12 (13–15). P. 34–35.
8. *Zilberg I.G.* Voprosy farmatsevticheskogo obrazovaniya na III Vsesoyuznom soveshchanii TsB Aptechnoy Sektsii (Issues in pharmaceutical education at the Third All-Union Conference of the Central Bureau of Pharmacy Unit) [in Russian]. Chemical and Pharmaceutical Journal. 1924. N 2. P. 3–5.
9. *Zlotov S.* Na Nikitskom bul'vare, trinadtsat' (At 13 Nikitsky Boulevard) [in Russian]. Chemical and Pharmaceutical Journal. 1929. N 23. P. 4–6.
10. *Vsya Moskva*. Adresnaya i spravochnaya kniga na 1925 g. (All Moscow. Address and Directory Book for 1925) [in Russian]. Moscow: F.Y. Lavrov Publishing House MKKh, 1925. P. 73–75, 152, 454–456, 488, 502.
11. *Vsya Moskva*. Adresnaya i spravochnaya kniga na 1930 g. (All Moscow. Address and Directory Book for 1930) [in Russian]. Moscow: Mospoligraf, 1930. P. 168, 189, 195.
12. *Eregina N.T.* Vysshaya meditsinskaya shkola Rossii, 1917–1953 (Graduate Medical School of Russia, 1917–1953) [in Russian]. Yaroslavl: IPK Indigo, 2010. 640 p.
13. *Vsya Moskva*. Adresnaya i spravochnaya kniga na 1936 g. (All Moscow. Address and Directory Book for 1936) [in Russian]. Moscow: F. Y. Lavrov Publishing House MKKh, 1936. P. 485.
14. *Bilkis E.* Perspektivnyy plan Glavprofobra RSFSR po farmatsevticheskomu obrazovaniyu (Glavprofobra RSFSR's promising plan for pharmaceutical education) [in Russian]. Chemical and Pharmaceutical Journal. 1929. N 9–10. P. 19–21.
15. *Rostik B.* K voprosu o farmobrazovanii (On the issue of pharmaceutical education) [in Russian]. Pharmaceutical Journal. 1928. N 10. P. 557–559.
16. *Maidansky V.* Trebuetsya li dlya aptechnykh rabotnikov vysshee obrazovanie (po povodu odnoimennoy stat'i prof.

N.A. Valyashko v N 6 «Farmatsevticheskogo zhurnala») [Do pharmacy workers need a higher education? (on the eponymous article by Professor N. A. Valyashko in Pharmaceutical Journal N. 6)] (in Russian). Pharmaceutical Journal. 1928. Vol. 8, N 9. P. 468–471.

17. *Levinstein I.I.* Iz istorii sovetskoy farmatsii (From the history of Soviet pharmacy). Iz istorii meditsiny (From the history of medicine) [in Russian]. 1969. Vol. 8. P. 74–86.
18. *Valyashko N.A.* Trebuetsya li dlya rabotnikov apteki vysshee obrazovanie (Do pharmacy workers need a higher education) [in Russian]. Pharmaceutical Journal. 1928. N 6. P. 328–330.
19. *Rymshevich V.* Podgotovka novykh kadrov farmatsevtov (Training of a new staff of pharmacists) [in Russian]. Chemical and Pharmaceutical Journal. 1930. N 3(99). P. 3.
20. *Vsya Moskva*. Adresnaya i spravochnaya kniga na 1931 g. (All Moscow. Address and Directory Book for 1931) [in Russian]. Moscow: Moscow Worker, 1931. P. 17, 164–173.
21. *Bergolts M.E.* O vysshem farmatsevticheskom obrazovanii (On higher pharmaceutical education) [in Russian]. Sovetskaya farmatsiya (Soviet pharmacy). 1935. N 5. P. 8–12.
22. *Toltsman T.I.* Farmatsevticheskoe obrazovanie v SSSR. Trudy 1-go Moskovskogo meditsinskogo instituta. T. 61 (Pharmaceutical education in the USSR. Proceedings of the First Moscow Medical Institute. Vol. 61) [in Russian]. Moscow, 1968. P. 12–15.
23. *Novikov A.A.* Iz istorii vysshego farmatsevticheskogo obrazovaniya v SSSR (From the history of higher pharmaceutical education in the USSR) [in Russian]. Farmatsiya. 1988. N 1. P. 60–64.
24. *Sboev S.G.* Letopis' farmatsii XX vek (Annals of 20th century pharmacy) [in Russian]. Moscow: VNOF, 2000. 304 p.
25. *Rogov Aleksandr Petrovich* (13.08.1878–1950) [electronic portal] (in Russian) URL: http://forum.svrt.ru/index.php?showtopic=4674
26. *Zdravookhranenie* v gody vosstanovleniya i sotsialisticheskoy rekonstruktsii narodnogo khozyaystva SSSR 1925–1940 gg. (Health care during the rebuilding and socialist reconstruction of the economy of the USSR 1925–1940). Sbornik dokumentov i materialov (A collection of documents and materials) [in Russian]. Moscow: Medicine, 1973. P. 251–256.

Received: 05.02.14

About the author

Sergeeva M.S. – PhD in Historical Science, Associate Professor of the Department of the History of Medicine, National History and Culturology, I.M. Sechenov First Moscow State Medical University.

E-mail: serma@list.ru

The name of the article for quotation: Development of national system of pharmaceutical education in 1920–1930: Moscow medico-pharmaceutical combine. Istoriâ mediciny. 2014. N4 (4). P. 18–27.