

THE ESTABLISHMENT OF THE NATIONWIDE CONCEPT OF AGRICULTURAL RESEARCH AFFAIRS IN THE CONTEXT OF THE ACTIVITIES OF THE HORY-HORETSKI AGRICULTURAL INSTITUTE

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Abstract: The practice of organizing research at the Hory-Horetsky Agricultural Institute of Mogilev Province has received national recognition as an example of the first steps of sectoral research on a long-term basis in a domestic institution of higher agricultural education. The study of this issue is local and of general scientific importance, taking into account the direct impact of this agricultural free trade exercise on the development of sectoral research in Ukrainian lands. Using the method of historical reconstruction, the interconnected history of the two first institutions of higher agricultural education of the Russian Empire was restored, the Institute of Agriculture and Forestry in Marymont and the Hory-Horetsky Agricultural Institute. In the conditions of rigidity of the centralized system of public administration, the experience of the functioning of the only agricultural institute in Marymont in 1816–1840 affected the organization of the educational institution in Horki. The interconnected history of the two oldest agricultural Higher Education Institutions is presented in the same direction as forming the national system of higher agricultural education. For the first time, a comparative analysis is made for the constituent documents of the Hory-Horetski Agricultural School from 1836 and the Institute of Agriculture and Forestry in Marymont from 1840 to reflect in them the objectives of the field research. It is shown that the Regulations on the Hory-Horetski Agricultural School of 1836 defined the directions of experimental work in much more detail than the Statute of the Institute of Agriculture and Forestry in Marymont of 1840.

Keywords: Agricultural research, Hory-Horetsky Agricultural Institute, Marymont Institute of Agriculture and Forestry, Research field, Research zootechnical station.

1 Introduction

The chronology of the work covers the period from 1836 to 1864. The lower limit is determined by establishing the Hori-Horetsky Agricultural School in Orsha County, Mogilev Province, in 1836. The upper limit is due to the closure of the Polish uprising in 1863 and its inclusion in the Horki St. Petersburg Agricultural Institute in 1864. At the same time, the modernization of the Russian Empire, initiated by the abolition of serfdom in 1861, led to a new economic and sociocultural reality and significantly influenced scientific and educational processes and the development of research in the empire.

Historiography of the topic includes a range of works, the authors of which from different angles considered both the policy of the Russian government on agricultural education and some aspects of the emergence of research. Among the scientific works of the pre-Soviet period, there are the works of M. V. Ponomarev [35], I. I. Meshchersky [28], S. V. Rozhdestvensky [46]. The historiography of the Soviet period includes the works of prominent representatives of the research work Wiener [63–66] and M. M. Pelekhov [33], whose conclusions on the initiation of branch research at the school in Horki at the same time determine the methodological principles of the study. The history of the Hory-Horetsky Agricultural Institute and the Institute of Agriculture and Forestry in Marymont is fully covered in the works of S. G. Tsitovich [59] and J. D. Fursenko [11]. Opponents of the chronology of higher agricultural education, these researchers have introduced important factual material into scientific circulation and raised the history of agricultural institutes in Horki and Marymont to the level of independent scientific problems. Peculiarities of formation of scientific and organizational bases of agricultural research in Ukraine in the second half of the 19th century – at the beginning of the 21st century were studied by NAAN Academician V. A. Vergunov [63]. He also presented the author's periodization of the history of higher agricultural education [62]. In the post-Soviet space, the complete history of agricultural research institutions is presented in the works of researcher Elina. In particular, the researcher considered some issues of the formation of professional training in agriculture [10]. Essential aspects of the origin of research in Horki are covered in the

works of Belarusian historians – a collective monograph edited by Gusakov [20] and scientific articles [25, 34, 47, 48, 58, 60].

The source base of the publication consists of printed and archival documents. Important printed sources include orders on the organization of an agricultural school in Gorki, presented in the “Complete Collection of Laws of the Russian Empire” [12, 13, 14, 16, 62, 66]. These documents provide an opportunity to trace both the legal aspects of the formation of the educational institution and the formation of the foundations of scientific research. In addition, much factual material on the development of higher education and research is contained in documentary collections published by the relevant Ministry [2, 31]; printed reviews of the Imperial Moscow Society of Agriculture (from now on – IMSA) [20] and the Free Economic Society (from now on – IFES) [9]. The “Agricultural Gazette” reflects the initial history of the formation of scientific and organizational foundations of research in the Hori-Horetsky educational institution is reflected in the “Agricultural Gazette”. Its publication was initiated by the Department of Agriculture under the Ministry of Finance in 1834, and during 1838–1905 and 1913–1917, it was published as a publication of the Ministry of State Property / Ministry of Agriculture and State Property. An important source of research is the “Agricultural Journal” – a printed edition of the IMSA, which was published in 1821–1840. An alphabetical index of articles published in the “Journal of the Ministry of State Property” in 1841–1856 is given by the editor of this magazine Zablocki-Desyatovsky [2].

Of fundamental importance for our research are the “Reports...” on the activities of the institution in Gorki and the scientific tests carried out there. During 1842–1846, three Reports were published in the Ministry of State Property Journal. They were also published in separate editions to acquaint agricultural producers with the activities of the Higher Education Institution [7]. During 1852–1857, the reporting information was submitted by the “Notes of the Hory-Horetsky Agricultural Institute” [45]. In addition, important sources of intelligence are the printed works of scientists whose research was a breakthrough in the history of research – M. Pavlov [32], B. Cellinsky [8, 9], V. Krause [23], O. Bazhanov [4, 5], E. Rego [37–41], F. Zhebenko [68], V. Wiener [63–66], M. Pelekhov [33], and others.

The task of comparative analysis of the development process of the Institute in Marymont and the educational institution in Gorki led to recourse to the statutory documents of the Polish educational institution. These documents are stored in the State Archives of the Kharkiv region (from now on – SAKR).

2 Materials and Methods

The methodological basis of the work is the principles of historicism, objectivity, systematic scientific analysis, and synthesis. The principle of historicism allows studying the genesis and evolution of research as a process that has developed over time in a set of historical relationships and interdependencies. The principle of objectivity allows analyzing the development of industry research in the aggregate of the full range of specific historical circumstances, highlighting the potential of research for the domestic economy.

General scientific and unique historical methods are used in work. The study of printed and archival sources led to the use of analysis, synthesis, generalization, classification, and systematization methods.

3 Results and Discussion

Hory-Horetsky Agricultural Institute occupies a special place in the history of domestic research. The first Russian research field was born in this institution. Namely, this region undoubtedly belongs not only to the formal but also the ideological

superiority in reforming the agriculture of the empire on a scientific basis and the creation of a domestic agronomic school and domestic research [25, p. 1]. This is where the first Russian specialists in agronomy and branch research came from, among whom Professor Stebut (1833–1923), who led the research field in Horki from 1854 to 1864 and is known as the founder of the system of higher agricultural education and organizer of a vast network of research institutions in Russia in 1894–1904 [67, p. 7]. Professors of the institute, together with students, conducted extensive research – the so-called agronomic travel; in 1844–1862, there were 17 of them [20, p. 47]. In particular, these trips extended to the Ukrainian provinces – Kyiv, Chernihiv, Poltava, Kharkiv, Ekaterinoslav, Tavriya, Kherson, etc., which had their unique soil and climatic features [61, p. 34].

The educational institution in Horki was opened as a result of the activities of a Special Committee for the Improvement of Agriculture in Russia to disseminate theoretical knowledge and train a particular group of specialists who were to engage in the science of advanced agriculture [43, p. 1; 16, p. 1140]. The head of the Committee, Count Mordvinov, proposed the creation of five agricultural schools in the empire in different soil and climatic conditions. It was planned to open schools with experimental plowing in educational districts, which corresponded to the division of Russia into agricultural strips, namely: in the St. Petersburg educational district – for the northern strip; at Moscow – for the middle lane; at Kyiv and Kharkiv – for the south; in Belarus – for the west; at Kazan – for the eastern strip. At the same time, it was envisaged to create an agricultural institute in the center of the middle agricultural strip, near Moscow, as an institution of higher branch training [59, p. 40]. Mordvinov's project was the first government plan to create a higher agricultural education system. However, the Minister of Finance Kankrin, given the country's financial condition, considered it possible to create only one agricultural school in the upper and lower ranks. The educational institution was founded on state lands in Horki, Mogilev province, although the possibility of opening it in one of the state estates of Chernihiv or Kyiv provinces was equally discussed. Authors of the "Report on the Hory-Horetskaya Agricultural School for 1842" [43, p. 6–8], as well as modern researchers Tsytovykh, Sharshunov, Tsyganov, and Livshits, noted that the barren, sandy, waterless, and wooded lands of the Mogilev province needed much more attention in terms of creating an improved economy, while in the Kyiv province the demand for exemplary farms on infertile soils was not so great [59, p. 45, 17, p. 56]. In addition, the University of Kyiv had a department of technology, agriculture, forestry, and architecture, on which the government had high hopes for the dissemination of agronomic knowledge [12, p. 98–103].

Under the institution's organization, five filwarks were separated from the Hori-Horetsky state estate – Horetsky, Ivanivsky, Puplovsky, Nikodymovsky, and Natalinsky with a total area of 1,250 acres, including 1,022 acres of arable land and 228 acres of meadows and pastures [64, p. 11].

The Hory-Horetsky Agricultural School was founded by the Decree of Nicholas I of May 6 (April 24) 1836 and was inaugurated as part of the first and second categories on August 27, 1840. According to § 3 "Regulations on the Hory-Horetsky Agricultural School" from May 6 (April 24) 1836 in the first (junior or lower) category for three years studied "agricultural students" (state and landlord peasants), who had to obtain sufficient theoretical and practical knowledge to perform work on special plans to improve rural economy and maintaining the achieved level of perfection. In the second category, the curricula were aimed at training practical agronomists who are able to manage large estates and implement improved farming in their programs [55, p. 436]. The school taught people from different provinces of the empire [7, p. 2–3]. In the "Regulation" of 1836, probably for the first time at the level of state documents, agricultural science was defined as agronomy, which was to be studied by second-graders (§ 22) [55, p. 438].

According to the "Additional Resolution to the Regulations on the Hory-Horetsky Agricultural School" of February 29, 1842,

the second category was reorganized into a higher one, equated to an independent agricultural higher educational institution [21]. According to the general "Regulations" of June 9 (May 28) 1841 on the establishment of training farms, which were created "in order to spread improvements in all sectors of the economy as an example of exemplary farming and practical training of farmers" [56, p. 407], in 1844 an educational farm with a four-year term of study was established at the educational institution in Horki. It was created for the practical training of state and landlord peasants of the western and southern provinces of the empire, namely: Mogilev, Vitebsk, Minsk, Grodno, Kaunas, Vilnius, Pskov, Smolensk, as well as three Ukrainian – Kyiv, Podolsk, and Volyn [68, p. 9–10]. Also, the training farm was to provide all frillworks belonging to the Hory-Horetsky Agricultural School with skilled labor in the conditions of the state village reform carried out since 1839 by the Minister of State Property P. D. Kiselyov (1837–1856) and the transfer of state peasants from the serfdom of the meal [45, p. 9–10].

According to the "Regulations on the Hory-Horetsky Agricultural Institute and the Agricultural School and Training Farm available at it" of July 12 (June 30), 1848, the higher category of the Hory-Horetskyi Agricultural School was reorganized into the Hory-Horetskyi Agricultural Institute, while the lower category – in the Agricultural School [16, p. 455].

In the literature, the Hory-Horetsky Agricultural Institute is often called the first free agricultural farm in the Russian Empire. Such a contradictory statement not only devalues the experience of the Institute of Agriculture and Forestry in Marymont but also eliminates the multi-vector process of forming the domestic system of higher agricultural education [15, p. 21]. The Horki Higher Education Institution was the first to be subordinated to the Russian Ministry of State Property. In contrast, the Marymont Institute was subordinated to the Government Commissions of the Administrative Council of the Kingdom of Poland under the Statutes of 1820 and 1835 and under the new Statute in 1840. It was subordinated to the Russian Ministry of Education [14, p. 111].

The discussion about the ordinal place of the Hory-Horetsky Agricultural Institute in the history of domestic agricultural education to some extent continued during the twentieth century. Its results are eloquently reflected in Tsitovich's monograph (1960), in which the author presents the history of the Hory-Horetsky institution as the first higher agricultural school in the Russian Empire. In a correspondence dispute with the director of the Kharkiv Agricultural Institute Dokuchaev, Academician Sokolovsky, the author of the monograph categorically expressed the opinion that the Marymont Institute "by nationality, purpose, the composition of students and teachers should be recognized by the Polish Agricultural High School" [59, p. 21]. At the beginning of the 19th century, higher education was at the stage of its organizational design. Therefore, the standards of higher branch training of the middle of the twentieth century should not be extended to the first educational institutions. Researchers of the second half of the 19th century did not give the question of the "priority" of the formation of agrarian Higher Education Institution in the empire of any fundamental importance. For example, M. V. Ponomarev (1888) [35], I. I. Meshchersky (1893) [28], S. V. Rozhdestvensky (1902) [46], and others mostly reveal the principles of state policy on education and briefly present the history of educational institutions. However, a member of IFES Ponomarev in his work from 1888 noted the chronological superiority of the Institute in Marymont over Hori-Horetsky educational institution, taking as a starting point the history of the Marymont Institute as a higher education institution in 1840, and Hory-Horetsky – in 1848 [35, p. 89–92].

At the beginning of the 21st century, this problem has not lost significance. In particular, this issue is relevant in the monograph of L.L. Bilan and S.O. Bilan (2011) [7, p. 76, 103]; work of Academician of NAAS Vergunov [62, p. 42–43]; articles by Elina (2012) [10], etc. Given the existence of existing contradictions, we consider it appropriate to clarify some aspects

of this more than century-old discussion using the method of historical reconstruction.

The Hory-Horetsky Agricultural School of the first and second grades was opened on August 27, 1840. In the summer of 1841, it was visited by the Minister of State Property Kiselyov. A similar educational institution with higher and lower (rural) ranks existed in the Kingdom of Poland in Marymont. Kiselyov visited here in 1838, shortly after his appointment as minister. Then a well-known ideologue of agricultural education, translator of "Fundamentals of Rational Agriculture" A.-D. Teyer, one of the founders and secretary in 1833–1879 of the IMSA, S. O. Maslov also authored publications from 1827 in the Agricultural Journal devoted to the institute in Poland: "On the Agronomic Institute in Marymont near Warsaw" and "On the establishment of a rural school for poor children at the Marymont Institute" [26, p. 169]. These works are evidence of communication between S. O. Maslov and the head of the institution in Marymont in 1819–1833, Professor E. B. Flat. Their scientific works "On Threshing Machines" and "Historical Report on the Marymont Agronomic Institute near Warsaw" were published in 1830 in the same "Agricultural Journal" [26, p. 214], and Maslov's awareness of the development of the institute in Poland for a long time.

The Academic Committee of the Ministry of State Property and the Ministry of Labor and Social Policy also included the director of the Institute of Agriculture and Forestry in Marymont in 1835–1853, a student of Teyer Professor Ochapovsky. His scientific works were published in the "Agricultural Journal" ("Classification of Soils", 1824) and "Journal for Shepherds" ("Experience of washing wool", 1840) – printed publications of the Ministry of Agriculture and Food [26, p. 186, 228]. M. M. Ochapovsky is a talented industry experimenter and project developer of the Agronomic Institute with higher and lower schools in Vilno [42, p. 227–228] and draft Statutes of the Institute in Marymont from 1835 and 1840 [17, 18]. These high-ranking officials were like-minded in agricultural education and sectoral experimentation and directly involved in the implementation of state programs for the development of improved agriculture in the empire. Therefore, it seems to us well-founded thesis of historian Fursenko (even though he did not provide arguments to confirm this hypothesis) that 20 years of experience at the Marymont Institute in Poland significantly influenced the formation of scientific and organizational foundations of Hory-Horetsky Agricultural School [11, p. 15].

Studying in one educational institution of representatives of different social groups was recognized as the optimal training model for the agricultural industry by government officials and by recognized representatives of agronomic science. Thus, a professor at Moscow University and the first head of the Agricultural School at the IMSA M. G. Pavlov, in a paper from 1838, submitted a plan to open near Moscow's own Agricultural School with higher and lower levels, with a research field and training farm [32, p. 4–7]. In turn, shortly before the official opening of the Hory-Horetsky Agricultural School on August 27 (15), 1840, the Marymont Agronomic Institute was reorganized following the "Regulations on the Institute of Agriculture and Forestry" of March 26 (14) approved by Emperor Nicholas I. 1840 [27]. By this Regulation, a new Statute was approved on September 12 (August 31), 1840, according to which the division of the Institute in Marymont into higher and lower (rural) schools was preserved (Article 1) [42, p. 2].

A comparison of the founding Regulations of the Hory-Horetsky Agricultural School from 1836 and the Institute of Agriculture and Forestry in Marymont from 1840 concludes that educational institutions had the exact purpose of the activity in the agricultural specialty in higher education levels. It consisted of training experienced agronomists to manage large estates and conduct advanced farming according to self-arranged plans. However, this does not mean that the statutory documents were identical. Thus, the lower (rural) school of the Marymont Institute under the Statute of 1840 (§ 4) provided training for the

"lower class of farmers: settlers, village wardens, shepherds, shepherds, distillers, gardeners, etc." [42, p. 2] Instead, in the first (junior) category of the Hory-Horetska school according to the Statute of 1836 (§ 3) trained people with "sufficient theoretical and practical knowledge" to implement the plan of improved agriculture [53, p. 436].

After the catastrophic famine of 1833, the problems of agricultural education were constantly under the scrutiny of the central government [34, p. 64–65]. Given the rigidity of the centralized system of public administration, one cannot even assume that the experience of the only agricultural institute in the Russian Empire in 1816–1840 remained unclaimed under the circumstances of the establishment of a similar institution in the Mogilev province.

Communication between the leaders of the first agricultural Higher Education Institution continued. After the reform of the highest level of the Hory-Horetsky Agricultural School in 1848, the director of the Marymont Institute, Professor Ochapovsky, was elected a member of the Academic Committee of the Hory-Horetsky Agricultural Institute. Ten years later, on December 29, 1857, a new Statute of the Institute in Marymont was approved, developed on the Statute of the Hory-Horetsky Agricultural Institute model of June 30, 1848 [13, p. 22].

There is some evidence to suggest a possible rotation of personnel between the first branch of the Free Economic Zone in the empire. Ukrainian historian S. L. Belova provides information about the invitation to the position of manager of the Crimea estate Karasan belonged to the Rajewski family, "Professor of the Warsaw Agronomic Institute, Yu. Zhebenko, whose practical knowledge of agriculture, forestry, distilling, and beekeeping had no analogs" [68]. In her work, the researcher did not give a chronology of Zhebenko's stay in Warsaw, which can be explained by the general lack of information about the activities of Professor Zhebenko (1825–after 1894). A Pole of ethnic origin, Yuriy (Florian) Yuriyovych graduated from the Hory-Horetsky Institute in 1850, and in 1853 he was appointed professor of this institution [32, p. 172]. In 1862 he published one of the first works on geobotanical zoning of forests of the Russian Empire "On forests and forestry in Russia" [68]. He was released in 1864 from the Hory-Horetsky Institute and exiled to the Perm province [29, p. 14].

"Regulations on the Hory-Horetsky Agricultural School" of 1836 contains a fairly meaningful program for the organization of good farming under the general title "On the arrangement of exemplary plowing" (Chapter V, § 55–67) [55, p. 441–443]. In order to widely demonstrate improved agriculture and certain branches of agriculture, it was planned to create an exemplary large farm, in which "various experiments of a special kind" were to be carried out (§ 55). However, "special experiments" provide for the creation of a research field directly at the school. This research field was to research the cultivation of beets, tobacco, corn, turnips, various breeds of bread, and various industrial dyeing plants – in general, crops growing more in the south, to "introduce them as successful in the neighborhood" (§ 60). The "special experiments" program at the Hory-Horetsky School of Agriculture defined the areas of experimental fieldwork in much more detail than the Statute of 1840 of the Institute of Agriculture and Forestry in Marymont, which contained only a concise report on observations and experiments in agriculture and forestry, which were to be made public for public review" (Article 5) [14, p. 111].

Hory-Horetska Agricultural School was the first educational institution in the empire, in which in 1836 government regulations – at the level of "Zemlerobskaya Gazeta", published by the Department of Agriculture at the Ministry of Finance – regulated in detail industry experimentation [1, p. 361–363]. In fact, the publication in the newspaper duplicated the norms of the "Regulations on the Hory-Horetsky Agricultural School" of May 6 (April 24) 1836 on "special experiments". Together, these documents initiated the institutionalization of research in the school.

At the initial stage of existence of the Hory-Horetskaya agricultural school and research field, their activity was significantly influenced by German agronomic culture due to ethnic origin and education of the administration and teachers of the institution [66, p. 26]. Almost the entire administration and professorship of the agricultural school in Gorki and the head of the research field by ethnic origin belonged to the Baltic Germans. Among them – the director of the School of Agriculture in 1840–1841, Doctor of Philosophy F. F. Stender. For the second year after the opening of the school in Horki, he was fired from the position of director for financial abuse [59, p. 57, 72]. From 1841 to 1842, Colonel Gingling (or Ganglik) was the acting director; in 1837–1838, he was an inspector of students at the University of Kyiv [51]. As a director, he was held in a criminal case for embezzlement [59, p. 72]. In 1842–1843, a retired lieutenant, O. A. Della-Garde, a native of Sweden, held director position. For unsatisfactory work in the conditions of reorganization of the second category of the Agricultural School into a higher one, he was removed from office. From 1844 to 1849, the director was an official of the Ministry of State Property, a lawyer by education Peiker (1809–1894). In 1846 he studied the development of agricultural branches and the state of agricultural Higher Education Institution in Germany. In the conditions of reorganization of the higher category of the school into the M. I. Peiker Institute, he was dismissed from his post in 1849. Little information has been preserved about the first directors of the Free Economic Zone. Still, the available facts show that the “problem of invited foreign specialists” peculiar to all the first Russian Higher Education Institution did not escape the Hory-Horetsky Agricultural School. In addition, the first leaders of the agricultural school had no professional education.

Foreigners were the central part of the teaching staff at the initial stage of the institution's existence. Since 1841, Cellinsky (1812–1886) and Michelson (1812–1887) have worked at the Agricultural School. Graduates of the University of Dorpat in 1834 studied agriculture at the Altkusthof Institute at public expense from 1835 to 1837, and then from 1837 to 1839 at the Tarand Academy of Agriculture in Saxony. Cellinsky's defense in 1841 at the University of Dorpat for his master's dissertation “Analysis of the new main tax cadastre in Saxony” reflected the agro-economic direction of his research interests. Russian researchers note that Cellinsky was the second master after Usov, who defended his dissertation on agricultural sciences in the Russian Empire [46, p. 36]. However, this conclusion is not objective because the researchers disregarded the dissertation on soil science, which was defended in 1812 at the Imperial University of Vilnius M. M. Ochapovsky and which in 1819 was published under the title “Principles of Agronomy, or Earth Science”.

Cellinsky worked in Horki from 1841 to 1864. At the turning points of history, he acted as the director of the institute: in the conditions of the reform of 1859–1860 and during the liquidation of the educational institution in 1863–1864. The most significant work of the scientist is “A Guide to Teaching Agriculture in Theological Seminars”. Initially, the work of B. A. Cellinsky was published in parts, and in 1860 it was published in a separate edition [24]. It was created for seminarians and went far beyond their training and was the first practical guide to agriculture for both the agricultural school and agronomists. However, contemporaries of Cellinsky were more critical of his “Guide”, as evidenced by a review of an anonymous author in “Trudy” of IFES from 1863. The textbook was criticized primarily for lack of attention to agricultural economics and agricultural mechanics and insufficient coverage of the theory of mineral nutrition of plants [8]. Interestingly, in the same year, 1863, Cellinsky's response to Puzanov's work “On Agriculture and Animal Husbandry in Russia” was published, in which a comparative analysis of the agricultural economy of the chernozem zone of Russia (together with the Kyiv province) and Western European countries was presented – England, France, Belgium, and Germany. Made by Cellinsky, it shows the deep involvement of the scientist in the specifics of the Western European agricultural economy. At the same time,

this paper outlines the methodological principles of scientific research. Rebutting M. M. Puzanov's thesis about the unsuitability of the achievements of European science for domestic conditions, Cellinsky generalized that the basic principles of science cannot be ethnographic, national, territorial or other distinctive nature, because “science in this concerning the complete cosmopolitan” [7, p. 141].

Practical agronomist, B. A. Michelson, managed the Hory-Horetskaya educational farm. He is also known as the head of the empire's first research field and the author of the first program of its activities. In the “Journal of the Ministry of State Property” published the works of the scientist: “Experiments of sowing winter bread with buckwheat” (1843, vol. IX, chapter IV, p. 154); “Means to improve livestock in the western provinces of central Russia” (1846, vol. XXI, chapter II, p. 105; 1847, vol. XXII, chapter II, p. 1); “Reasons for the unsatisfactory state of animal husbandry in the western provinces” (1847, vol. XXIV, chapter III, p. 2); “Means of preventing the infestation of the rot of potatoes from further spoilage to the time of its consumption for food or animal feed” (1848, vol. XXVII, chapter II, p. 186); “Artificial onion growing” (1848, vol. XXIX, chapter IV, p. 85) [2]. However, these works only partially reflect the directions of the research activities of the scientist.

An independent problem of our research is the history of the research field in Gorki. For the first time, Professor V.V. Wiener noted its importance in the history of domestic branch research (1872–1937). Recognizing for a long time the Poltava Research Field established in 1884 as the first domestic research institution, Wiener more than half a century after the transfer of the Hory-Horetsky Institute to St. Petersburg gave priority to the research field in Gorki, which was organized in 1840 [66, p. 26–27]. During his visit to the institution in 1841, the Minister of State Estates, Count Kiselyov, formulated a more specific program of the research field's activities in comparison with the Regulations on the Hory-Horetsky Agricultural School of May 6 (April 24), 1836. On 20 tenths of the land located along the Smolensk tract, it was planned: a) introduction of correct crop rotations; b) search for fertilizers for fertilizing different soils; c) the use of the most convenient agricultural implements. The research field has always been under the watchful eye of Minister Kiselyov, who visited the institution three times – in 1841, 1846, 1853 – and provided detailed instructions on the desired additions to the program of experiments [66, p. 26].

The Academic Committee approved the research program developed by Michelson of the Ministry in 1842. Almost unchanged, with some additions, it was carried out until 1860. After returning from a business trip, Junior Professor Stebut developed a project to reorganize the research field to a research station of the European type. Unfortunately, the implementation of these plans made it impossible to transfer the institute to St. Petersburg in 1864.

The scientific literature on the initial history of the research field in Gorki contains contradictory statements. Professor Wiener considered the date of creation of the research field to be 1840. On the other hand, an outstanding specialist in research in animal husbandry, Professor Pelekhov, emphasized that the research field began to function in 1842 [33, p. 80]. This conclusion was supported by historian Tsytyovych [59, p. 97]. Modern authors – Marchenko [25, p. 6], Trapkov and Skoromna [58, p. 216] – sometimes the organization of the research field in Gorki is also called 1842, and without analyzing the reasons for such a “double” chronology, its history is presented. In our opinion, this question is fundamental in the history of domestic industry research. After all, it was as a result of the approval of the research program of the research field in Horki in 1842 by the Academic Committee of the Ministry of State Property that it became a nationwide research branch institution.

The study of the “Report on the Hory-Horetsky Agricultural School for 1842” provides an opportunity to assess the multifaceted activities of the institution in Horki. “Report...” was published in the “Journal of the Ministry of State Property”

(1843, Part VIII, chapter II, p. 232) [2, p. 159] and simultaneously published in a separate collection. Given that the “Report... for 1842” for the first time presents a detailed analysis of the results of research work, there is a need to refer to the main provisions of this document. It consists of six sections (departments), in particular: the first is devoted to exemplary plowing (p. 11–36); the second – to the research field (pp. 36–80); the third – to the botanical garden (p. 80); the following – schools of shepherds, characteristics of filwarks, providing them with labor (p. 80–95) [7].

In 1842, nine experiments were conducted, seven of which were with fertilizers: 1) studied the effect of burnt gypsum, sulfuric acid, ash and slaked lime on the cultivation of red clover; (p. 37–38); 2) the influence of manure on rye cultivation was tested (pp. 38–40); 3) the effect of crushed alabaster, sulfuric acid, crushed raw bones, crushed bricks, etc. on spring wheat was studied (p. 40–43); 4) the effect of ash on barley was studied (p. 43–46); 5) the cultivation of winter rye sown after plowing spring buckwheat was studied (p. 46–47); 6) the influence on the cultivation of rye of chernozem, which was brought from the banks of the river Kopylka near the school and which contained many limestone inclusions (p. 47–52); 7) experiments were conducted with bush rye using different amounts of compost, ash, manure, lime, burnt clay, etc. (p. 52). Experiments with fertilizers were to compare the yield of plants sown with different fertilizers or to compare the unfertilized area with fertilized. The eighth experiment was conducted with feed for dairy cows, and the ninth – was with the study of potatoes. To understand the essence of the experiments from which the research work in Horki began, we present the results of the first experiment in 1842.

Table 1: Agricultural tests in frames of research works in Horki

1842 year	Red clover (The first experiment was conducted on the tithe, which in 1840 was sown with spring wheat with red clover and from which in 1841 two good mowings were obtained)			
Division of tithes into plots; (one tenth is equal to 3,200 square yards or 1.45 hectares)	Type of fertilizer	The amount of fertilizer	Costs (man/hour; horsepower)	Result (amount of green fodder obtained from the first mowing; none of the plots gave the second mowing)
Plot 1 (each plot is 800 square yards or about 0.36 hectares)	Crushed burnt gypsum	5 poods	One person / 45 minutes	89 poods
Plot 2	Sulfuric acid diluted with water in a ratio of 1:800	5 pounds of sulfuric acid and 100 buckets of water	Two people / 30 minutes; one horse	89 poods
Plot 3	Ash	13 poods 8 pounds	1/16 of the men's working day	80 poods
Plot 4	Slaked lime	9 poods 25 pounds	1/16 of the men's working day	79 poods

Compiled on the base of “Report on the Hory-Horetskaya Agricultural School for 1842”, 1843, p. 37–38.

The “Report...” for 1842 presents a method of conducting seven experiments with fertilizers to determine their results and economic effect. It was emphasized that the best harvest was obtained using imported chernozem, although this experiment in the first year of its implementation was the least profitable because the delivery of soil was expensive. It is concluded that the use of the area with imported chernozem was to justify itself in the following years [43, p. 51–52].

Early sowings of wheat, yarrow, peas, and vetch, as well as oats, barley, buckwheat, rye, potatoes, and various fodder crops, were

observed in the field for good plowing [43, p. 12–15]. In addition to the Belarusian plow and the usual harrow, different plows were used for the work – Smalevsky, Beyleysky, Schwerts, Pavlov, etc. The “Report...” characterizes the technical features of each agricultural tool [43, p. 17]. Today little is known about this technique, but at one time, the testing in Gorki reflected the European search for the best tools for agriculture. For example, in the work of Teyer’s “Description of the newest and most useful agricultural implements”, the central section of the work is devoted to the features of the Pitch Plow, with detailed drawings of its constituent parts [57].

The “Report...” from 1842 of the Hory-Horetskaya Agricultural School also provides information on research in animal husbandry. Selection work was significantly hampered by the unsatisfactory condition of livestock in the Mogilev province. There were almost no cattle; cattle died en masse from infectious diseases; sheep and pig breeding are poorly developed and represented by unproductive breeds; there was no horse breeding at all, which made the development of agriculture in general extremely difficult. In the short time from the opening of the school until 1842, hundreds of cattle were imported. In 1842, the herd of cattle at the school farms numbered 533 and was represented by breeds: Holmogorsk, imported from the St. Petersburg province; Fokhtlandian, originally from Livland (modern Latvia and Estonia); Lithuanian from the Vilna province; Ukrainian and simple breeds of local Belarusian cattle. So, 35 cows, 12 bulls, 247 heifers, 21 calves, and 62 oxen (377 in total) were brought to Gorki from the Ukrainian steppes. Despite the generally unsatisfactory characteristics of Ukrainian cattle presented in the Report, it was included in the selection work that constant mixing of animals in 8, 10, or even 12 generations are required to improve a large herd. Non-native breeds were poorly acclimatized. It was noted that the breeds of local cattle under proper care should quickly restore the lost characteristics.

In 1842, three dairy cows of the Holmogorsk breed of the same age were selected to test green fodder for cattle breeding. Each cow was fed green rye for the first week; during the second – red clover; the third – plywood, and during the fourth – a mixture of vetch, barley, and oats. The amount of feed was determined depending on the weight of each animal. The results of the experiment showed: 1) from green rye cows lost weight and gave less milk; 2) red clover increased the weight of cows and milk hopes; 3) from plywood increased hopes, but lost weight; 4) a mixture of vetch, barley, and oats cows consumed worse than clover and plywood but gave more milk than when fed clover [43, p. 57–58]. The Report rightly points out that definitive conclusions about using all types of feed can only be made when the cows get used to it, which takes much more time.

Information on the following experiments was published in the “Journal of the Ministry of State Property” as part of the “Reports of the Hory-Horetskaya Agricultural School for 1843 (1845, vol. XIV, chapter II, p. 24, 103, 197; vol. XV, chapter II, p. 33); 1844 (1846, vol. XVIII, chapter II, p. 91, 179); 1845 (1846, vol. XIX, chapter II, p. 151; vol. XX, chapter I, p. 1; vol. II, p. 79); 1846 (1847, vol. XXIV, chapter II, p. 179; vol. XXV, chapter II, p. 19)” [2, p. 177–178].

Printed “Reports” for 1842–1846 provide an opportunity to explore the results of the first systematic and continuous experiments. For example, in 1842–1845, experiments were carried out to fertilize fields with manure. The first experiment was to apply manure in one plow to a double depth (five creams, or about 22 cm), while the second involved double plowing to a standard depth. Ultimately, the result was the same. In 1842 potatoes were tested. At that time, 14 varieties of potatoes were used for comparative experiments – whole and cut into pieces. That year the potatoes suffered from excessive moisture and cold summer (there were frosts in August), and therefore its harvest was very mediocre [34, p. 58–61]. In 1845, 38 varieties of potatoes were subject to study, including seven local types, 13 imported from Vienna, and another 18 sent by the Department of Agriculture. According to the experiment results, a report was

made on each of the 38 varieties of potatoes, indicating its name, tuber color, size and shape, eye position, taste, and yield. In 1846, Minister Kiselyov directed the research field program to conduct experiments on crop rotation and crop rotation. The first agricultural experiments were mainly mechanical, reflecting the development of agricultural science.

Curious situations also occurred in the activities of the research field. For example, the "Report..." for 1848 contains information about the "most accurate experiment", made at the request of the IMSA "on the transformation of oats into rye". The experiment was entrusted to V. A. Mikhelson. He did not believe in such transformations, Michelson, who honestly for two years recorded all the circumstances of this experiment [33, p. 81].

In the conditions of reorganization of the first category of the Agricultural School into the higher staff of the institution in 1843–1845, graduates of the University of Dorpat, adjunct professors: botanist E.F. Rego (1816–1892); chemist Schmidt (1817–1872); mathematician and specialist in agricultural mechanics Bolman (1805–1887); technologist and forester Knyupfer (n.d.) and livestock specialist Krause (n.d.–1867). The last two were also graduates of the Altkusthof Institute. The pedagogical staff also includes Razdolsky, a Moscow Medical and Surgical Academy graduate, organizer of the veterinary clinic in Gorki, a graduate of Kyiv University, and a specialist in economic statistics I. V. Azarevich. Teachers of this generation initiated research in certain areas of agriculture.

Planned work in the field of zootechnics was started in 1843 with the appointment of adjunct professor of animal husbandry V. I. Krause [33, p. 79–94]. The scientist developed a program of experiments on keeping, feeding, and caring for livestock, studying the effect of the nutritional value of feed on increasing milk yield. In March 1855, the "Proposals for Keeping and Feeding Institutional Cattle for Experimenting and Observing All Important Subjects for Animal Husbandry" developed by Professor Krause a year earlier were approved by the Academic Committee of the Ministry of State Property. These "Proposals...", according to Pelekhov, were, in fact, "the provisions of the Experimental Zootechnical Station and its concise program" [33, p. 90]. The program of experiments "was to apply to all uses of livestock", namely: general care in stalls and pastures; breeding work; feeding and rearing of young cattle; feeding adult animals with a comparison of feed nutrients; dairy farming (comparison of cows by milk yield, study of different milking techniques, etc.); study of the productivity of meat livestock depending on the methods of keeping and type of feeding; the use of livestock to perform various tasks and the impact of this factor on animal productivity, etc. [47, p. 91]. Shortly after the opening of the zootechnical research station, the publication of official research reports was suspended due to the suspension of the publication of the Notes of the Hory-Horetsky Agricultural Institute in 1857. However, archival documents allowed scholars to conclude the following experiments were conducted: 1) comparative analysis of local breeds of cattle with foreign breeds in terms of feed cost and efficiency; 2) study of the impact of improved feeding on milk yield in cows of different breeds (Aishir, Jutland, Belarus, etc.); 3) comparison of the nutritional value of clover with the nutritional value of meadow hay for feeding animals; 4) establishing the normal weight of newborn calves relative to the weight of calving cows; 5) study the importance of improved feeding for the development of the offspring; 6) the impact on the development of calves of the duration of feeding with calving milk of cows, etc. Despite the understandable incompleteness of research methods, we can conclude that the first state research zootechnical station in the country and in the higher agricultural education system, in particular, was established in Horki in 1855.

The beginning of research on dendrology and the introduction of woody plants is associated with the activities of botanist and breeder Rego. The scientist is to form a collection of plants of the Gorky Botanical Garden, founded in 1841. In 1847, under

the leadership of Rego, a "wood nursery" with a total area of 14.5 hectares was created, which was one of the main parts of the botanical garden and which in 1863 had about 900 species of shrubs [20, p. 62]. Agronomic trips of Rego in 1851 and 1853 were aimed at studying horticulture and botanical gardens of the central provinces of Russia, Ukraine (Chernihiv, Bessarabia, Kherson, Tavria, Ekaterinoslav, Poltava) and Mogilev province [47, p. 127]. The work of the scientist "On the damage and various diseases of fruit trees" (1852), devoted to the problems of phytopathology, was one of the first in this field [40]. The scientist claimed that the main cause of all diseases is improper care, the influence of weather and climatic factors, as well as various mechanical damage. Such a simplified list of causes of fruit tree diseases reflected the then level of development of phytopathology, microbiology, mycology, and other branches of biology. In the autumn of 1858, Rego established a seed depot at the Hory-Horetsky Agricultural Institute and training farm. His collection collected 800 samples of crops, including spring wheat – 56 varieties, winter rye – 20, oats – 33, peas – 26 varieties [20, p. 65]. The funds of NNSGB NAAS of Ukraine contain works by Rego: "Practical guidelines for growing garden vegetables, fruit trees and berry bushes" (1854) and "Guide to the study of horticulture and gardening" (in 3 hours; 1866) [39]. The last work was published in 1853, 1858, 1866, and 1871.

The beginning of experiments in the field of agricultural mechanization is connected with the activities of O.-N. Bolman and R. Knyupfer. In 1844, they tested the light plow, the inventor of which was the Poltava Cossack I. Stetsenko, and in 1845 tested the accelerated plowing by the method of I. Zenovich, using a plow with one (instead of two) horns, is covered with metal [34, p. 48].

The development of chemical and biochemical research is associated with the work of Associate Professor Schmidt. One of the first domestic chemists, he established a chemical laboratory in 1845 to research soils, fertilizers, and agricultural products. The scientist also conducted agrochemical studies to study the effect of gypsum on soil properties. In addition, he completed a biochemical analysis of samples of Chinese sugar cane grown in Gorki and Odesa and noble sugar cane developed on the island of Cuba and Guadeloupe. First, the obtained indicators agree with the current results on the determination of sugar in sugar cane stalks; secondly, scientists have concluded that it is inexpedient to grow this crop in a temperate zone to obtain sugar [20, p. 68–69]. K. D. Schmidt prepared and published "Fundamentals of Chemistry, in its application to agriculture and domestic life" [45, p. 29].

In April 1849, the educated landowner Voyna-Kurinsky (1800–1868) was appointed head of the institute. Under his direction, the Notes of the Hory-Horetsky Agricultural Institute publication began, the first issue of which was published in 1852. Until then, materials on the school's activities and the results of research work were published in the Journal of the Ministry of State Property. In particular, in addition to the annual "Reports...", this magazine published articles: "Description of smallpox, which appeared on sheep in 1842 on the estate of Hory-Horetsky school and measures taken to stop this disease" (1843, vol. IX, chapter IV, p. 23); "Experiments carried out in the Hory-Horetsky school on artificial washing of merino wool by the method of Preiss" (1844, vol. X, chapter IV, p. 14); "Experiments with a huge clover, ryegrass and sorrel, carried out in the Hory-Horetskaya school" (1844, vol. XI, chapter IV, p. 106); "Observations of livestock diseases carried out at the Hory-Horetsky school" [adjunct professor] Razdolsky in 1843 and in 1846 (1847, vol. XXIII; XXV; 1848; vol. XXVIII); "Exhibition at the Hory-Horetsky Agricultural Institute" (1850, vol. XXXVII, dep. II, p. 141); "Experiments carried out at the Hory-Horetsky Agricultural Institute on the use of various kinds of braids [mowing experiments]" (1851, vol. XXXVIII, chapter II, p. 329); "Indigenous sheepfold at the Hory-Horetskaya educational farm" (1854, vol. LI, chapter II, p. 14); "Notes of the Hory-Horetsky Agricultural Institute", issued by the Department of Agriculture of the Ministry of State Property (1854, vol. XLIX, chapter III, p. 1), etc. [2, p. 47, 63, 155, 178, 184, 199].

According to the "Regulations on the Hory-Horetsky Agricultural Institute" of July 12 (June 30), 1848, the school received permission for free access to foreign publications and technical devices (§ 81) [54, p. 463]. However, the staffing of the institute library with the works of domestic scientists remained unsatisfactory, and articles in the "Agricultural Gazette" and "Journal of the Ministry of State Property" only slightly met the demand for scientific information on agronomy. The publication of the "Notes of the Hory-Horetsky Agricultural Institute" was to promote the exchange of scientific knowledge and inform domestic farmers at the level of European practice about the development of agricultural education and science. The first issue of "Notes" from 1852 provides information about the state of research work and research field for 1850–1851 [45]. "Notes..." was published until 1857 (six volumes during 1852–1857). According to printed and handwritten reports and the Notes of the Hory-Horetsky Agricultural Institute, the researchers restored not only the program but also the results of its implementation, as well as the reasons for including or removing specific research tasks from the program.

After the reorganization of the Hory-Horetsky Agricultural School into an institute, the teaching staff of the institute was replenished with ten new teachers educated at Russian universities, six of whom were graduates of the Hory-Horetsky Agricultural Institute, in particular, in 1851, agronomist and zootechnician Bazhanov graduated; in 1852, mechanic and architect Kozlovsky graduated; a graduate of 1853 is a native of Chernihiv agronomist Kossovich; graduate of 1850 is soil scientist Sovetov; in 1854, agronomist, specialist in industry research, public figure Stebut graduated. The new teaching staff of the institute replaced the German administration and German professors, who constituted the core of the institute's team at the beginning of its existence.

After graduating from the Hory-Horetsky Institute, O. M. Bazhanov taught agriculture at the Moscow Theological Seminary. In 1852, the Journal of Agriculture published his work on Young Cattle's Care (No. 10, 11; separate edition – 1853). In 1853, based on the materials of French and German works, Bazhanov compiled a textbook for seminarians, "Initial Fundamentals of Botany, or Lessons Containing: Anatomy, Physiology, and Classification of Plants" (in 2 volumes). He defended his master's dissertation on "On the cultivation of wheat with a description of varieties bred in Russia" in 1856 and received a silver medal for this work IMSA. On April 1, 1857, master Bazhanov was appointed director of the Butyr farm of the IMSA. At this time, this educational and practical farm was in decline and did not meet its purpose. Under the leadership of Bazhanov, farm buildings were renovated, crop rotations were introduced, the formation of a herd of breeding animals was initiated, a program of activities was approved, etc. [19, p. 19, 29, 35]. On behalf of the IMSA in 1858–1859, he developed a draft task "on useful systems of agriculture and other sectors of the economy in free labor in different parts of Russia" [19, p. 101, 228]. In 1860 he published "Experiments in Agriculture with Free-Lance Work: With 25 Politipas of Agricultural Tools and Machines" (second edition – 1861). In 1861–1862 he did internships in Germany, England, Belgium, France, and Switzerland, which resulted in the work What Can Be Borrowed from Foreigners in the Field of Agriculture (1863). This paper refutes the erroneous explanation of the reasons for Russia's economic backwardness by poor natural and climatic conditions [4]. In 1863–1864 he taught animal husbandry at the Hory-Horetsky Institute. He translated into the Russian work of the famous German scientist Baumeister's "On the Breeding, Keeping, and Use of Domestic Animals" (1865, 1867; second edition – 1874). In 1867 he published one of the first domestic manuals on animal husbandry, "Guide to cattle breeding, applied to Russia's climatic and agricultural conditions" [5]. In 1882–1883 he was the director of the New Alexandria Institute of Agriculture [18, p. 73].

Deep changes in the institute's development took place per the innovations of 1859. According to the proposal of the State Council approved by the emperor on December 20 (8), 1859,

"On the position of Hory-Horetsky Agricultural Institute and its existing Agricultural School" [66, p. 328–340] significantly reduced the number of general education and natural agronomic disciplines in favor of practical classes. During the discussion of the reform, Professor Cellinsky clearly distinguished between scientific and empirical research in terms of their ultimate goal in two areas: 1) those that should show how to get as much profit in a particular area; 2) those that, despite the high financial costs, is the most technically advanced. The scientist stressed the need for separate organization of these two types of practice to avoid confusion in the final results. In general, the reform of the Hory-Horetsky Institute according to the "Regulations" of 1859 had contradictory results: the reduction of theoretical and natural science training affected the decline of the quality of agricultural education.

4 Conclusion

Ukrainian branch research as an independent branch of scientific science originated in the system of higher agricultural education of the Russian Empire as a result of the complex action of various cultural and agricultural traditions, which were manifested in the first special higher agrarian schools. Established in 1840 at the Hory-Horetsky Agricultural School, the research field in 1842 received the status of a national institution for scientific field experimentation, the program of which was subject to approval by the Academic Committee of the Ministry of State Property. In 1855, the Scientific Committee approved the agenda of the zootechnical research station. Research institutions operated until the closure of the institute in 1864. Their activities are reflected in numerous reports published in the Ministry of State Property publications and "Notes of the Hory-Horetsky Agricultural Institute", published in 1852–1857.

Other results of experimental activities were published after the restoration institution as the Hory-Horetsky Agricultural Institute in 1919. The activities of the Hory-Horetsky Agricultural Institute went far beyond the Belarusian territories and were of national importance. The modern system of Ukrainian branch research has accumulated the historical experience of the functioning of the first research institutions at higher educational institutions of the Russian Empire.

Literature:

1. Agricultural school in the Mogilev province. (1863). *Agricultural newspaper*, 46, 361–363. Dated on 9 June, Tuesday.
2. *Alphabetical index of articles of the journal of the Ministry of State Property for sixteen years, from 1841 to 1856 inclusive*. (1858). Comp. by A. P. Zablotsky-Desyatovsky. St. Petersburg: Imp. Acad. Nauk.
3. Analysis of the essay by Mr. Puzanov. (1863). *On agriculture and cattle breeding in Russia*. Compiled by the professor of the Horygoretsky Agricultural Institute, B.A. Tselinsky. Thirty-second award of awards established by P.N. Demidov. June 5, 1863. St. Petersburg, 136–173.
4. Bazhanov, A.M. (1863). *What can be borrowed from foreigners in terms of agriculture?* Part 1: Essays on the German economy. St. Petersburg: Publishing House of F. Stellovsky.
5. Bazhanov, A.M. (1867). Guidelines for the breeding, keeping and consumption of cattle, applied to the climatic and agricultural conditions of Russia. *St. Petersburg: Edition of "Public Benefit" Society*, 2(4).
6. Belova, S. L. (2006). *Ch. IX. Sons of N. N. Raevsky. Jr. Raevsky and Crimea*. Simferopol: Business-Inform.
7. Bilan, L.L., & Bilan, S.O. (2011). *System of training of agricultural specialists in Ukraine (19th – early 20th centuries)*. Kyiv: Agrarian Education.
8. Cellinsky, B.A. (1860). *Guidelines for teaching agriculture in theological seminaries, compiled by a professor at the Horygoretsk Agricultural Institute*. St. Petersburg: Synod Publishing.
9. Cellinsky, B. (1863). Guidelines for teaching agriculture in theological seminaries, compiled by a professor at the Horygoretsky Agricultural Institute. *Proceedings of the Free*

- Economic Society*, 2(1). 24–30. St. Petersburg: Publishing House of “Public benefit” Society.
10. Elina, O. Yu. (2012). Scientific certification in the field of agriculture in Russia in the second half of the 19th - early 20th centuries. *Vavilov Journal of Genetics and Breeding*, 3, 592–604. Available at: <https://www.agriscience.ru/journal/2500-0462/2012/3/592-604> (date of entry: 11/06/2021).
11. Fursenko, I. D. (1968). *Order of the Red Banner of Labor: essays on history*. Kharkiv Agricultural Institute named after V. V. Dokuchaev. Kyiv: Harvest.
12. Holikova, O. M. (2021). Scientific and organizational principles of formation and development of agricultural research in the Imperial Kharkiv and Kiev universities (early nineteenth century – 1860's). History of science and biography: electron. *Science. Professional Publication - Interdepartmental Thematic Collection*, 2, 91–127. <http://inb.dnsgb.com.ua/2021-2/06.pdf>
13. Holikova, O. (2021). Influence of National Policy on the Establishment of Ukrainian Agricultural Research in the 18th–19th Centuries. *International Journal of Agricultural Extension, Special Issue (02)*, 57–71. Available at: <https://esciencepre ss.net/journals/index.php/IJAE/article/view/3962/1958>.
14. Holikova, O. (2021). Institute of Agriculture and Forestry in Marymont: European research and educational practices in the conditions of Russian centralism (1816–1861). *AD ALTA: Journal of Interdisciplinary Research*, 11(1), Special Issue XVIII, 108–115. Available at: http://www.magnanimitas.cz/A DALTA/110118/papers/A_18.pdf.
15. Holikova, O. M. (2020). Turns of the Skolskogospodarskoy slediyskoy in the system of higher education in Ukraine (the end of the 18th - the first half of the 19th century). *Bulletin of KhNU named after V. N. Karazin. Series “History of Ukraine. Ukrainian studies: historical and philosophical sciences”*, 31, 17–35. DOI: <https://doi.org/10.26565/2227-6505-2020-3>.
16. Holikova, O. (2021). Formalization of agricultural research: Activities of the imperial free economic society (second half of the 18th – first half of the 19th centuries). *Linguistics and Culture Review*. New York: *Publisher American Linguist Association*, 5(S4), 1137–1153. DOI: <https://doi.org/10.21744/lingcure.v5nS4>.
17. Holikova, E.M. (2021). *Organizer of agricultural education and branch scientific research, Professor M. N. Ochapovsky (1788–1854)*. Agriculture of Belarus through the prism of scientific research (19th - early 21st century): reports of the International Scientific Conference, Minsk, September 23, 2021. National Academy of Sciences of Belarus, Belarusian Agricultural Library. I. S. Lupinovich, Institute of History; Ed.: Yu. O. Karakulko [and others]. Minsk: Information Center of the Ministry of Finance, 224–233. Available at: <https://bel.by/images/Conference2021/Sbornik2021/Sbornik2021-224-233.pdf>.
18. Holikova, O. M., et al. (Eds.) (2011). *History of Kharkiv National Agrarian University named after V. V. Dokuchaev*. Kharkiv National Agrarian University named after V. V. Dokuchaev.
19. Gorbunov, N.P. (1870). *Historical review of the actions and works of the Imperial Moscow Society of Agriculture for the second twenty-fifth anniversary, compiled on behalf of the Society by Secretary N. P. Gorbunov: the first period from 1846–1860*. Moscow: Publishing House Gracheva & Co.
20. Gusakov, V.G. (Ed.). (2017). *History of agrarian science of Belarus (19th - beginning of 21st century). Part 1* Minsk: Belarusian Science.
21. *Highly approved regulation on the Hori-Horets Agricultural School*. (1836). Complete collection of laws of the Russian Empire. The second meeting. T. XI. The first branch in 1836. [No. 8739–9495]. St. Petersburg: Type. 2nd Branch of the Own EI Chancellery, 1837. No. 9097, 435–443.
22. *Highly approved regulation on the establishment of training farms*. (1841). Complete collection of laws of the Russian Empire. The second meeting. Volume XVI. The first department. 1841. [№ 14141–14986]. St. Petersburg: Publishing House of 2nd Branch of the Own EI Chancellery, 1842, No. 14585, 407–415.
23. Krause, V.I. (1852). *Extract from the report on agronomic travel in the Chernihiv province of the acting junior professor Krause with six students in 1850*. Notes of the Horygoretsk Agricultural Institute: published by the Department of Agriculture of the Ministry of State Property. Book 1. St. Petersburg: Type. Ministry of State Property.
24. Kuznetsov, I.A. (2018). *Essays on the history of agricultural economy in Russia: 19th - early 20th century*. Moscow: Delo Publishing House, RANEP, 2018
25. Marchenko, T.N. (2014). Formation of the Horygoretsk agricultural school as a higher agricultural educational institution (1840–1848). *MGIRO Bulletin*, 4, 1–11. Available at: <http://elib.bspu.by/handle/doc/3354>.
26. Maslov, S.A. (1846). *Historical review of the actions and works of the Imperial Moscow Society of Agriculture from the time of its foundation until 1846*. Moscow: University Publishing House.
27. *Materials on joining the institute of the Warsaw Forestry School*. (1940). Decree, letters, reports (October 9, 1838 - March 14, 1840). SAKR. F. 669., Op. 3., Od. Coll. 20., 1–9.
28. Meshchersky, I.I. (1893). *Higher agricultural education in Russia and abroad*. St. Petersburg: Publishing House of W. Kirschbaum, XXIV.
29. Milovidov, A. I. (1904). *Participation of the youth of the North-Western Territory in the rebellion of 1863 and the reform of local educational institutions caused by it (based on archival materials)*. Vilna: Publishing House Russian Initiative.
30. *On the Additional Resolution to the Regulations on the Hori-Horets Agricultural School*. (1842). Complete collection of laws of the Russian Empire. The second meeting. Volume XVII. The first branch in 1842. [No. 15188–16047]. St. Petersburg: Type. 2nd Branch of the Own EI Chancellery, 1843. № 15303, 96.
31. *Organizational plans of farms at agricultural educational institutions*. (1914). Issue 6: Organizational plan of the farm of the Horetsky educational agricultural farm (Horetsky and Chausky districts of the Mogilev province). G.U.Z. and Z., Dep. of Agriculture, compiled by P.I. Pankov, & I.S. Zotov. Petrograd: Publishing House of Imperator' School for the Deaf and Dumb, 1914.
32. Pavlov, M.G. (1838). *Agricultural school for the education of rural managers, land surveyors and clerks*. Moscow: Publishing House of S. Selivanovsky.
33. Pelekhov, N.N. (1927). *On the history of experimental agricultural business in Russia*. Notes of the Belarusian State Academy of Agriculture named after the October Revolution. Horki, BSSR: Academy Publishing House, 1927, 79–94.
34. Petrovets, V.R., & Klimenko, V.N. (2015). Scientific schools and innovative agro-engineering developments of BSAA scientists. *Vesci National Academy of Sciences of Belarus. Series of agricultural sciences. Minsk: Belaruskaya Navuka*, 3, 48–54.
35. Ponomarev, N.V. (1888). *Historical review of government measures for the development of agriculture in Russia from the beginning of the state to the present*. St. Petersburg: Publishing House of W. Kirschbaum, XXIV, 402.
36. Preface. (1852). *Notes of the Horygoretsk Agricultural Institute, published by the Department of Agriculture*. Book. First. St. Petersburg: Publishing House of the Ministry of State Property, 9–10.
37. Rego, E.F. (1866). *Guide to the study of horticulture and horticulture, comp. by adjunct prof. of Horygoretsk Agricultural Institute*. Ch. 1–3. 3rd ed., rev. and added. St. Petersburg: I. and A. Glazunov.
38. Rego, E.F. (1854). *Practical instruction for the cultivation of garden vegetables, fruit trees and berry bushes, comp. by adjunct prof. of Hrygorets Farmer Institute*. St. Petersburg: Publishing House of Korolev and Co., 2, 68, IV p.
39. Rego, E.F. (1866). *Guide to the study of gardening and horticulture*. Compiled by adjunct prof. of Horygoretsk Agricultural Institute. Ch. 1–3. 3rd ed., revised and added. St. Petersburg: Publishing House of I. and A. Glazunov.
40. Rego, E. F. (1852). *On damage and various diseases of fruit trees*. Notes of the Horygoretsk Agricultural Institute, published by the Department of Agriculture of the Ministry of State Property. Book first. St. Petersburg: Publishing House of the Ministry of State Property, 1852, 61–91.
41. Rego, E.F. (1854). *Practical instruction for the cultivation of garden vegetables, fruit trees and berry bushes*. Compiled by

- adjunct prof. of Horygorets. Farmer Institute. St. Petersburg: Publishing House of Korolev and Co., [2], 68, IV p.
42. Regulations on the institute, approved on August 31, 1840 with an appendix (staff, estimate, study schedule).). SAKR. F. 669., Op. 3. Od. Bulletin. 21, 1–13.
43. *Report on the Horygorets Agricultural School for 1842.* (1843). St. Petersburg, Publishing House of the Ministry of State Property.
44. Report on the Horyhoretsk agricultural school for 1845. (1846). *Journal of the Ministry of State Property*, 7, 1–47.
45. Report for the past 1850-1851 academic year on the Institute and School. (1851). *Report on the state and activities of the Horygoretskaya Training Farm for 1850.* Notes of the Horygoretsk Agricultural Institute, published by the Department of Agriculture. Book First. St. Petersburg: Publishing House of the Ministry of State Property, 22–114.
46. Rozhdestvensky, S.V. (1902). *Historical review of the Ministry of Education: 1802-1902.* St. Petersburg: Ministry of public education, Vol. II.
47. Sachivko, T.V., & Gordeeva, A.P. (2016). Eduard Fedorovich Rego (on the occasion of his 200th birthday). *Bulletin of the Belarusian State Agricultural Academy*, 2, 125–128.
48. Sharshunov, V.A., & Kryuchkov, E.N. (2020). The role of mathematical education in the preparation of graduates of Horki educational institutions before the formation of the department of higher mathematics 1919. *Bulletin of the Belarusian State Agricultural Academy*, 1, 171–176.
49. Sharshunov, V.A., Tsyganov, A.R., & Livshits, V.M. (2004). Hori-Horetsky Agricultural Institute - the oldest higher agricultural educational institution in Belarus. *High School*, 3, 56–62.
50. The case of the service of the student inspector of Kyiv University. (1838). In Colonel F.F. (Eds.), dated on August 17, 1837 - April 20. *Russian State Historical Archives (RDIA)*, F. 733. Op. 69. Ref. 323, 1–75.
51. The case of the service of the student inspector of the Kiev University. (1838). Colonel F.F. (Eds.), dated on August 17, 1837, April 20, 1838. *Russian State Historical Archives (RDIA)*, F. 733. Op. 69. Ref. 323, 1–75.
52. *The charter (Regulations) of the Institute.* (1835). Approved on October. The Sovereign Archives of the Kharkiv Region (SAKR), F. 669. Op. 3. Od. zb. 16, 1–13.
53. *The charter of the Institute of Agriculture and Forestry in Marymont and the rural school attached to it.* (1857). Approved on December 29. Materials on its provision (letters, conclusions, etc.). SAKR, F. 669. Op. 3. Od. zb. 28, 1–43.
54. *The highest approved regulation on the Hory-Horetsky Agricultural Institute and the Agricultural School and the training farm attached to it.* (1849). Complete collection of laws of the Russian Empire. Section II, Vol. XXIII. Part I, [No. 21844–22685]. St. Petersburg: Publishing House of 2nd Department of the Own E. I. V. Chancellery, 1849. No. 22414, 455–463.
55. *The highest approved position on the Hory Horetsky Agricultural Institute and its Agricultural School and Training Farm. Complete collection of laws of the Russian Empire.* (1848). Section II, Vol. XXIII. Part I, [No. 21844–22685]. St. Petersburg: Publishing House of 2nd Branch of the Own EI Chancellery, 1849. No. 22414, 455–463.
56. *The highest approved Regulations on the Hory-Horetsky Agricultural Institute and the Agricultural School attached to it.* (1859). Complete Collection of Laws of the Russian Empire. Meeting second. Vol. XXXIV. Section II. December 8, 1859. [No. 34846–35302]. St. Petersburg: Type. 2nd Department of the Own E.I.V. Chancellery, 1861. No. 35220, 328–340.
57. Thayer, A.D. (1834). *Description of the latest and generally useful agricultural implements.* Ed. by A. Shiryayev. Moscow: University Publishing House, XXIV, 3–47.
58. Trapkov, S.I., & Skoronnaya, S.S. (2018). To the 170th anniversary of the opening of the Horygoretsk Agricultural Institute. *Bulletin of the Belarusian State Agricultural Academy*, 7, 215–219.
59. Tsitovich, S.G. (1960). *Horygoretsky Agricultural Institute – the first in Russia higher agricultural school (1836-1864).* Horki: Publishing House BSHA.
60. Tsyganov, A.R., Tsyganova, A.A., & Nemykina, O. (2010). Formation and development of forest science in Belarus (1842–1931). *Bulletin of the Belarusian State Agricultural Academy*, 2, 175–181.
61. Valashev, L.L. (1966). Ivan Alexandrovich Stebut (1833–1923). USSR Academy of Sciences. Moscow: Nauka, 169. [Scientific and biographical series].
62. Vergunov, V.A. (2015). *From Poharsky educational and exemplary economy to Hadiach agricultural station, or the history of the gift of merchant V.V. Boyko to Poltava Community (to the 150th anniversary of Poltava Society of Agriculture and 95th anniversary of Poltava State Agrarian Academy).* NNSGB NAAS, Vinnytsia: FOP Korzun D.Yu., Institute of bibliography Ser. “Agrarian science of Ukraine in persons, documents, bibliographies”, book 85, 112.
63. Vergunov, V.A. (2019). *Scientific-organizational planting of the functioning of a strong supportive research on the terens of Ukraine (the other half of the 19th century – the beginning of the 21st century).* The PhD Thesis in Historical Sciences: 07.00.07. Pereyaslav-Khmelnytsky.
64. Wiener, V.V. (1924). *Agricultural experience in the Western region. Proceedings of the Horetskaya Agricultural Experimental Station for 1921–1923.* Horki, Smolensk province: Typo-lithography of Agricultural Institute, 1–6.
65. Wiener, V.V. (1924). *Horetskaya agricultural experimental station in 1921–1923: general essay. Proceedings of the Horetskaya Agricultural Experimental Station for 1921–1923.* Horki, Smolensk province: Typo-lithography of Agricultural Institute, 7–11.
66. Wiener, V.V. (1922). *Agricultural experimental business: (A brief historical outline of the programs of Russian agricultural experimental institutions in 1840–1910): lectures given at courses on agricultural.* Experienced case at Petrov. Agricult. Acad. Moscow: Publishing House of the People's Commissariat of Agriculture “New Village”, 108.
67. Wiener, V.V. (1924). *A brief overview of the history of the Hory-Horetsky Agricultural Institute.* Notes of the Horecki Agricultural Institute. T.I. Horki, Smolensk province: Typo-lithography S.-H. Institute, 9–33.
68. Zhebenko, F.Yu. (1862). *About forests and forestry in Russia: (Senior member of the island, professor of forestry at the Horygorets Agricultural Institute).* St. Petersburg: Publishing House of “Public Benefit” Society.

Primary Paper Section: A

Secondary Paper Section: AB, AE, GA, JS