

## **LEADING TRENDS OF AGRICULTURAL EDUCATION DEVELOPMENT IN THE 19<sup>TH</sup> – AT THE BEGINNING OF THE 20<sup>TH</sup> CENTURY**

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### **INTRODUCTION**

During the period of Ukrainian entry into the pan-European educational space, for the cardinal renewal of education, it is necessary to take into account not only the realities and prospects of the socio-economic development of the country, the educational experience of the developed countries, but also its own historical path. It is a multifaceted analysis of the experience gained over the years of the historical development of higher agricultural education that will help predict the tendencies and prospects for its further development.

Higher agricultural education has a history that is inextricably linked to its political, economic, social and cultural life.

Agronomy is an ancient science about agriculture. However, its theoretical foundations were formed only in the second half of the nineteenth century, and only in the late nineteenth and early twentieth centuries was a process of formation of narrow-branch scientific disciplines. The value of science is measured by how much it benefits people. The development of agricultural science has always been closely linked to the needs of human society.

Particular interest is for the period of the nineteenth and early twentieth centuries, when under the influence of changes in the sociopolitical, socioeconomic and cultural life of the Russian Empire, which included a large part of the Ukrainian lands, there was an intensive development of the educational system, the organic component of which was agricultural also. Significant achievements in the field of agriculture during that period led to the formation and development of multi-level agricultural educational institutions: schools, classes, courses, colleges. In turn, lower and secondary education in this field contributed to the establishment of the first agrarian higher educational establishments and to increase the professional level of training of teachers of agricultural disciplines,

which positively affected the quality of activity of specialists of the agro-industrial complex of Ukraine.

Through the prism of the history of European universities, we can outline the process of development of science and education in Ukraine. First of all – these are the origins, prerequisites, patterns, and features of the initial period.

In this regard, it is important to summarize and study the problem of studying the historical and pedagogical values of the system of higher agrarian education of Ukraine in the nineteenth and early twentieth centuries.

## **1. Development of agronomic knowledge in the world (19<sup>th</sup> – the beginning of of the 20<sup>th</sup> century)**

The cultural rise and economic development of European countries have contributed to the dissemination of scientific agronomic knowledge. Ever since agriculture has become an important science, there has been a need to disseminate and improve this scientific knowledge.

In the second half of the nineteenth century, the theoretical direction of agricultural education, which provided teaching at universities, was widely developed. Many European universities have set up separate agricultural departments or separate institutes. Scientific and educational activities of the university agronomy departments contributed to the emergence of new professional educational institutions. However, despite the parallel existence of two trends in the development of professional agricultural education: a significant number of professional educational institutions and agrarian courses at universities – till the beginning of the twentieth century the final program of a planned development of the agrarian education system has not yet been drawn up in European countries<sup>1</sup>.

Earlier than in other European countries, the formation of agricultural education took place in Germany. The development of agricultural education at universities in Germany had two stages. The

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<sup>1</sup> Kostenko O. O. (2004) *Universytety XIX st. ta poshyrennia naukovykh ahronomichnykh znan u Yevropi* [XIX century universities and the dissemination of agronomic knowledge in Europe]. Proceedings of the *Materialy druhoho mizhrehionalnogo naukovo-praktychnoho seminaru molodykh vchenykh*, (Luhansk, serpen 27–28, 2004), Luhansk, pp. 32–36.

initial stage began in the first half of the eighteenth century. Then, along with the university sciences, a course in agriculture was introduced into the German School of Economics.

During the 18<sup>th</sup> century, similar departments have been created in almost all other universities in Germany. Agronomy courses have been taught at many German universities<sup>2</sup>.

The first attempts to introduce systematic special agricultural education were made by the creator of agricultural science A. Thaer, who was aware of the importance of professional education for the development of agricultural theory. Scientist opens agricultural school in Meglin (near Berlin) for persons belonging to the state of hereditary landowners.

As Professor Goltz noted in the History of German Agriculture, the estate at the Meglins Academy, under Thaer, he served not so much for students' practical classes as for demonstrative confirmation of agricultural knowledge and for the scientific experience. The most important practical institution at the Academy immediately obeyed the main task – the theoretical study of agriculture and the organization of scientific research in this field. The Prussian government, in his lifetime, appreciated the merits of A. Thaer, he was awarded the title of secret advisor. The Meglin School was given the title of Royal Agricultural Academy and also assigned to A. Thaer financial support and the professors' wages were paid to the state<sup>3</sup>.

The Prussian King Friedrich-Wilhelm III, by decree of July 1, 1805, tried to establish separate institutes for teaching agriculture at universities. At the universities, the departments of agronomy were attached to the physics and mathematics departments of the faculties of philosophy. The Meglin Academy remained for a long time the only agricultural school of Prussia. Following the Meglin Academy – the first higher agricultural school of “practical” type – other German

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<sup>2</sup> Krtsimovskiy R. (1927) *Razvitie osnovnykh printsipov nauki o sel'skom khozyaystve v Zapadnoy Evrope* [Development of the basic principles of agricultural science in Western Europe]. Moskva: Novyy agronom. (in Russian)

<sup>3</sup> Veshnyakov V. (1866) *Obzor sel'skokhozyaystvennykh uchrezhdeniy v Anglii, Frantsii, Bel'gii, Gollandii, Germanii i Italii* [Overview of agricultural institutions in England, France, Belgium, Holland, Germany and Italy]. Sankt-Peterburg. (in Russian)

agricultural academies were founded: in Hohenheim and Idstein (1818), in Schlesheim (1822), in Yen (1826), in Taranda – (1829), Elden – (1835), in Regenwald – (1842). In the 40-50s of the 19th century agronomic academies were established in Proskau (1847); in Poppelsdorf (1847); in Weeden (1851) and in Waldau (1858). Most of the academies were independent agricultural institutes not directly affiliated with universities.

In 1818, a well-known French agronomist Mathieu de Dombale opened a similar school in Rowle (department of Meurthe, France). The Meglinsk and Roville schools gave agricultural education an independent movement, which halted the development of this science at universities for a long time. Almost all the higher agricultural and educational establishments, subsequently established in Germany and France, were independent.

The teaching of agricultural sciences was not only the property of special educational institutions. Often it was part of the educational system of special technical or general higher European schools. Thus, the agricultural course was taught at some European universities, at special institutions as polytechnic institutes and industrial-craft schools.

An example of the theoretical stage in the development of agricultural education in Germany was the creation of appropriate educational institutions at universities. Thus, in 1835, at the Greifswald University, an agronomic academy was opened in the Elden estate<sup>4</sup>.

The institute's activity was based on the principle of close communication between the agricultural school and the university. The same principle that subsequently formed the basis of the activity of the talented Yu. Liebig. The Academy replaced the Faculty of Commerce for the university, its purpose was to train not only future masters but also officials. According to contemporaries, no higher education institution in Germany had fuller teaching of agricultural sciences.

Following the example of the Elden Academy at the University of Bonn in 1847, another higher specialized educational institution was opened – the Poppelsdorf Academy. Initially, all of her teaching aids

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<sup>4</sup> Meshcherskiy I. I. (1893) *Vysshee sel'skokhozyaystvennoe obrazovanie v Rossii i za granitsey* [Higher agricultural education in Russia and abroad]. Sankt-Peterburg. (in Russian)

were limited to the University of Bonn. In the future, the educational institution became completely independent<sup>5</sup>.

Apart from the agronomic academies, which were set up entirely on their own, as in Proskau and Waldau, or thanks to the agricultural activities of universities, as in Elden and Poppelsdorf, agricultural teaching continued at universities, such as Berlin and Galle.

The famous German scientist J. Liebig has severely criticized isolated agricultural schools. In his works: "Letters on Chemistry" (1855), "On the Impact of the Sciences on the Development of the Welfare of the Population" (1861), and "Chemistry in Addition to Agriculture and Plant Physiology" (1863), he openly opposed the isolated position of agricultural academies. Yes, he noted: "Open ... modeled on the (Meglin) agricultural academies have done ... more harm than good. Separated from general education centers, they closed access to science, while the natural sciences since the time of Teyler have made a huge success. There is no special chemistry, no special physics, no special botany for the rural people, and therefore the need for agricultural education would be best met if it had links with universities"<sup>6</sup>.

The combination of higher agricultural education with practical institutions in exemplary farms was considered futile by J. Liebig. The scientist justified his views that the highest theoretical training and practice should go separately and independently from each other. J. Liebig's criticism of the autonomy and seclusion of agricultural education led to another turn in the development of the agricultural school and contributed to the combination of university and special agronomic education.

After the speech delivered by J. Liebig in 1861 at the opening of the Munich Academy of Agricultural Sciences, the process of opening agricultural institutes at the university accelerated.

For example, at the opening of the Prussian Agricultural Academy in Waldau, the Saxon Central Agricultural Society appealed to the government to organize the teaching of agriculture at the Galle University, which resulted in the opening of the Department of Agriculture, where he

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<sup>5</sup> Veshnyakov V. (1866) *Obzor sel'skokhozyaystvennykh uchrezhdeniy v Anglii, Frantsii, Bel'gii, Gollandii, Germanii i Italii* [Overview of agricultural institutions in England, France, Belgium, Holland, Germany and Italy]. Sankt-Peterburg. (in Russian)

<sup>6</sup> Krtsimovskiy R. (1927) *Razvitiye osnovnykh printsipov nauki o sel'skom khozyaystve v Zapadnoy Evrope* [Development of the basic principles of agricultural science in Western Europe]. Moskva: Novyy agronom. (in Russian)

was appointed professor in 1863. Thus, in 1862, the full course of agricultural sciences was initiated at the University of Halle<sup>7</sup>.

Subsequently, assessing the 25-year activity of this department, A. Ye. Zaykevych wrote: “The teaching of agronomic sciences at the Gallic University not only subsided but achieved a brilliant development”<sup>8</sup>. The department of agriculture has been expanded with the opening of several extra-curricular courses and associate professorates for teaching special agronomic disciplines. In the 9 years after the opening of the University of Gallen, he was the first in the number of students in agricultural schools in Germany.

The example of the Gallic University was taken over by other universities and opened agricultural institutes, namely: Leipzig (1869), Hesse (1871), Göttingen (1872), Kiel (1873), Kennigsberg (1876), Braslav (1881). All this gave rise to the formation of agricultural science at the universities of Germany, which helped to establish a solid foundation for the further development of agrarian science and research<sup>9</sup>.

There was a development of agricultural education, as well as with it in other European countries.

In the 50s of the 19<sup>th</sup> century, agricultural education has also developed in Austria. In this country, the higher agricultural institutions belonged to the Altenburg Institute in Hungary. Teaching agriculture was part of the program of the technical department of the Vienna Polytechnic Institute. Agricultural departments were established at the universities of Linz, Graz, Klagenfurt.

The issue of agronomic education was considered in the National Assembly of France, which ensured the adoption in 1848 of the law on agronomic education. Three degrees of agricultural education institutions were introduced. For the first time in university practice at

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<sup>7</sup> Lebedintsev A. A., Shchusev S. V. (1894) *Ustroystvo i deyatel'nost' opytnoy sel'skokhozyaystvennoy stantsii v «Galle»* [The design and operation of the experimental agricultural station in Galle]. Vol. 4, pp. 12–28.

<sup>8</sup> Zaykevich A. E. (1891) *Agronomiya kak nauka vobshche i universitetskaya v chastnosti* [Agronomy as a science in general and university in particular]. Khar'kov: Tip. V. Biryukova. (in Ukrainian)

<sup>9</sup> Veshnyakov V. (1866) *Obzor sel'skokhozyaystvennykh uchrezhdeniy v Anglii, Frantsii, Bel'gii, Gollandii, Germanii i Italii* [Overview of agricultural institutions in England, France, Belgium, Holland, Germany and Italy]. Sankt-Peterburg. (in Russian)

the Versailles National Agronomy Institute (1849–1852), it was suggested that the best graduates be sent abroad to improve their knowledge in order to further secure the institution with teachers.

In Belgium, since 1849, the government has considered the development of an agricultural education system. The issue was discussed in the chambers of the Belgian Parliament, which provided for an increase in public funds for agronomic education.

In Italy, in 1862, the Ministry of Agriculture hosted the following educational institutions: the Agricultural and Forest School in Turin, the Agricultural Institute in Cachin (near Florence), the Agricultural and Veterinary School in Pisa, the Agricultural Institute in Parma, the agronomic departments in the technical departments of the Technical Institute, Placentsk and Florentine<sup>10</sup>.

In addition, under the Ministry of Education, courses in agriculture at Turin, Naples, Bologna, Modena, Perugia, Palermo, Messina, Katan, Ferrara, Urbino, Macerata, and Cameroon. The agricultural course was taught mainly for students of engineering and borderland. But with the publication in the second half of the 60s in the 19th century, in Italy, the law on public education in agriculture was withdrawn from the programs of the university course (with the exception of the University of Turin).

In the UK, the organization of agricultural education was uneven in some parts of the kingdom. There was only one top-level agronomic institution in England directly in the Cirencester. It was founded on the initiative and at the expense of individuals until the end of the nineteenth century. did not use any financial resources from the government. There were no special education institutions in Scotland at all. But agronomic education subjects were taught at the University of Edinburgh and some other educational institutions. In Ireland, in contrast to England and Scotland in the mid-nineteenth century, there were numerous special educational institutions of the lower level<sup>11</sup>.

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<sup>10</sup> Fausek V. (1897) *Nekotorye nauchno-prikladnye uchrezhdeniya Ital'yanskogo ministerstva zemledeliya* [Some scientific and applied institutions of the Italian Ministry of Agriculture]. Sankt-Peterburg. (in Russian)

<sup>11</sup> Benzin V. M. (1913) *Organizatsiya sel'skokhozyaystvennogo obrazovaniya i opytogo dela v Severo-Amerikanskikh Soedinennykh shtatakh i ee perspektivy v Rossii* [Organization of Agricultural Education and Experimental Affairs in the North American States and its Prospects in Russia]. Tambov: Tip. Gubernskogo zemstva. (in Russian)

The idea of the need to combine higher education with scientific and practical training in the late nineteenth – early twentieth century has received support in all European countries. Model farms were everywhere replaced by research fields. Practical knowledge was gained through excursions to nearby advanced estates.

However, the scientific development of individual departments of the universities as part of a single national agricultural research. For example, according to the academician O. Sokolovskyi, in England in the 20s of the twentieth century, research institutes of agrarian direction were created at higher general educational establishments – universities, which were part of a single system of development of agrarian science. “The basis of the English scheme of agricultural research work was that each research institute developed a separate branch of agricultural science”<sup>12</sup>.

It is established that the first country where agriculture was recognized as a separate science was Germany. The success of German professional institutions was largely ensured by a high professional level of teaching staff. The Meglin Academy was bound by the success of renowned agricultural educator Teyer; Hohenheim Academy – Schwartz, Weckerlin, Pabst; Elden Academy – Schultz; Poppelsdorf – Garstein; Gallic Institute – Küne. All these are well-known agrarian scientists of the 19th century Germany. On the basis of their achievements in the field of agronomy, the first professors of domestic agricultural schools, including professors of Kharkiv University, subsequently built their programs.

## **2. The state of domestic agricultural education in the universities of Ukraine (second half of 19<sup>th</sup> – the beginning of the 20<sup>th</sup> century)**

During the 19th – early 20th centuries, the Kharkiv region, like other Ukrainian lands, was part of the Russian Empire. Accordingly, the history of agricultural schools in Ukraine is closely linked to the development of agricultural education in Russia. In the history of agricultural education in modern Ukraine, the second half of the nineteenth and early twentieth centuries is a particularly important

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<sup>12</sup> Sokolovskyi O. (1895) Z podorozhuvannia do Anhlii: (naukovi zvity) [From a trip to England: (scientific reports)]. B.m., b.r. pp. 109–119.



stage. During this period, the Ukrainian agricultural education achieved considerable success, gained valuable experience, which has not been studied for a long time and therefore underestimated<sup>13</sup>.

In the second half of the 19<sup>th</sup> century were two main types of higher education agricultural institutions in Russia:

1) special educational institutions and 2) departments of agriculture at universities, other higher educational establishments.

In the 60s of the 19<sup>th</sup> century, the first type in the Russian Empire belonged to only 4 higher educational establishments that provided professional agricultural education: St. Petersburg Forest Institute (founded in 1848 in Gorky, reorganized in 1864), Petrovsk Agricultural Academy (opened in 1865) near Moscow, Riga Polytechnic College with the Department of Agriculture (opened in 1861), and the Novo-Alexandria Institute of Agriculture and Forestry (reorganized in 1869). The former two were subordinated to the Ministry of State Property, the latter was subordinate to the Ministry of Public Education. The tasks of higher agricultural educational institutions were limited to the development of scientific questions of agriculture, the preparation of educated practitioners, able to conduct agricultural business in a qualified manner, to disseminate practical agronomic knowledge among the local population, to the training of teachers in various specialized agricultural disciplines for secondary schools<sup>14</sup>.

The formation of the entire education system was mainly influenced by the German higher education system. Higher education institutions were organized according to the German type, where they preferred the scientific rather than the practical side of teaching. But university agronomic education in Russia has not received this development.

Changes in agricultural life and nation-wide economic reforms in Russia required the appropriate extension and deepening of special agricultural knowledge, the introduction of professional education in

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<sup>13</sup> Verhunov V. A. (2006) *Narysy istorii aharnoi nauky, osvity ta tekhniky* [Essays on the history of agricultural science, education and technology]. Kyiv: Aharna nauka. (in Ukrainian)

<sup>14</sup> Savel'ev A. Ya., Momot A. I., Khotenkov V. F. (1995) *Vysshie obrazovanie v Rossii: ocherk istorii do 1917 goda* [Higher Education in Russia: A History Outline Before 1917]. Moskva: NII VO. (in Russian)

the university course. At Moscow University, agricultural disciplines were taught following the example of European universities. In 1770–1777 the department of agriculture or agriculture was headed by M. I. Afonin, at the end of the 18<sup>th</sup> century – A. A. Antonskyi-Prokopovych. Agricultural Sciences at Moscow University for 20 years (1820–1840) were taught by M. G. Pavlov<sup>15</sup>.

The teaching of agriculture at universities, other higher education institutions was conducted directly by the departments of agriculture (later agronomy) or agricultural departments (institutes) were created. At the beginning of the nineteenth century, university teaching of agriculture was conducted within the limits of the rural economy along with other branches of chamber science, sometimes together with technology (University of Derpt), with mineralogy (according to the charter of the Russian universities in 1804).

The development of agricultural education at university departments was regulated by legislative acts adopted by the Ministry of Public Education. The level of educational work of the university largely depended on the state of the teaching and support base: libraries, laboratories, offices, museums, and their availability to the states.

According to the order of November 5, 1804, in Moscow, Kharkiv, Kazan universities agricultural sciences were united together. Separate departments were created, known as “mineralogy and agriculture.” These departments at the universities were equipped with appropriate offices and even laboratories and, of course, contributed to the development of agricultural science<sup>16</sup>.

The University Charter in 1863 reduced the teaching of agriculture to agronomic chemistry with the organization of relevant departments in the faculties of physics and mathematics. The charter of the universities in 1884, the departments of agrochemistry were replaced by the departments of agronomy, which included general and private agriculture, agrochemistry, teaching about systems of farming and crop rotation.

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<sup>15</sup> Nikonov A. A. (1995) Nauchnye uchrezhdeniya i uchebnye zavedeniya sel'skokhozyaystvennogo profilya [Scientific and agricultural educational institutions]. *Spiral' mnogovekovoy dramy: agrarnaya nauka i politika Rossii (XVIII – XX vv.)*. Moskva. pp. 112–120.

<sup>16</sup> Morachevskiy V. V. (1914) Rasprostranenie sel'skokhozyaystvennykh znaniy [Agricultural extension]. *Agronomicheskaya pomoshch' v Rossii*. Petrograd. pp. 259–345.

In the early twentieth century, a number of special agricultural educational establishments have already been established. However, the graduates of these educational institutions were not enough to solve the problems of scientific support of agricultural production, creation of research institutions. In 1908, the State Duma (representative legislative body in 1906–1917) indicated the need to increase the number of higher specialized educational establishments, to establish agronomic departments at universities and polytechnic institutes. It was suggested to consider the correspondence of study programs in higher educational institutions to the local economic conditions and agricultural needs of certain regions, in the center of which higher specialized educational establishments should be located as scientific, educational and methodical centers, that is, a plan was created for establishing a network of higher agricultural educational institutions in higher educational establishments: in each climate and economic region, eight new higher education institutions were to be opened, with two of them – in Ukrainian territories: in Katerynoslav and Odesa<sup>17</sup>.

In December 1910, the State Duma considered the question of establishing independent agronomic faculties at universities. At some Russian universities: Yurevsk, Kazan, Novorossiysk, and Kyiv – agronomic departments (faculties) were actually created with special agronomic laboratories where future agronomists studied. But these faculties were few in number, and they existed for a limited time<sup>18</sup>.

Many prominent scientists worked at the departments of agriculture. For example, at Moscow University from 1894 to 1931 lectured D. N. Prianyshnykov. Since 1836, Professor S. M. Usov has taught agriculture, forestry, and accounting at St. Petersburg University. Later, Professor O. V. Sovietov, who was one of the first university agronomy teachers in Russia to create his own scientific school, worked at the reorganized department. In the process of teaching, the scientist involved the best students in experiments and observations in the field of agriculture. Subsequently, many of them devoted their lives to

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<sup>17</sup> Smintin V. A. (2000) *Istoriya Odes'kogo universitetu (1865–2000)* [History of Odessa University (1865–2000)]. Odesa: AstroPrint. (in Ukrainian)

<sup>18</sup> Bogdanov S. M. (1912) *Voprosy sel'skokhozyaystvennogo obrazovaniya v spetsial'noy dumskoy komissii* [Questions of agricultural education in a special Duma commission]. *Khozyaystvo*, no. 12, pp. 373–378.

scientific agronomy and worked in Ukraine. The most famous figure among his students and followers is V. P. Budrin<sup>19</sup>.

Thus, it should be noted that rational staging of agricultural education was important for Ukrainian lands. Agrarian production was in direct connection with professional education. The level of agrarian production depended on the wide branching of the network of educational institutions, the development of narrow sciences and the implementation of measures to spread agrarian knowledge among the general population. The teaching of agricultural disciplines, like the name of the department itself, was constantly changing, which depended on the tasks assigned to the university departments.

Professor of Agronomy at Kharkiv University A. Ye. Zaikevych, analyzing the introduction of an agronomic course in university education as a supplement to the natural sciences, wrote that at the time of his teaching, this science was “devoid of its main elements: observation and experience, due to the weak development of science in time”<sup>20</sup>. He explained the small scientific progress of agronomy in the first period of its development as a separate science.

According to the university statutes 1835, 1863, agricultural subjects were considered compulsory for all students in the natural science department. The task of teaching was to acquaint the students with the general principles of practical complement to the natural sciences: production and technical processing of agricultural products.

The unsatisfactory state of the science for teaching agricultural disciplines at universities, the need for their broader impact on local production, led many agrarian scientists to think of the creation of agronomic faculties or departments at universities in the German model.

The first to ask about the extension of the university course was Professor of Agronomy at Kharkiv University, V. A. Kochetov. At the 1st Moscow All-Russian Rural Congress in 1860, he proposed to extend the agronomic course to the establishment of departments at

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<sup>19</sup> Verhunov V. A., Kovalenko S. D. (2001) *Profesor Budrin Petro Vasylovykh (1857–1939): bibliografichnyi pokazhchyk naukovykh prats* [Professor Budrin Petr Vasilievich (1857–1939): bibliographic index of scientific papers]. Kyiv: Ahrarna nauka. (in Ukrainian)

<sup>20</sup> Zaykevich A. E. (1891) *Agronomiya kak nauka voobshche i universitetskaya v chastnosti* [Agronomy as a science in general and university in particular]. Khar'kov: Tip. V. Biryukova. (in Ukrainian)

universities, that is, for the first time the question of extending the university course in Russia was raised almost simultaneously with the approval of university agronomic education in German government circles.

Ten years later, at the 4<sup>th</sup> Congress of Naturalists and Physicians in Kyiv (1870) Professor of Agronomy at Novorossiysk University, D. N. Abashev submitted a project to expand the departments of agronomy, which was not only approved by the Faculty of Physics and Mathematics of this University, but was also approved at the Ministry of Public Education.

However, the statute in 1884 enshrined in the state of the university only one department of agronomic chemistry. This statute (1884), which was binding on all universities, introduced a new principle of teaching: for the purpose of greater specialization, the subjects of the university course were divided into general and special subjects. The former was compulsory for all students, the latter obligatory only for those who selected them as their specialty. Agronomic chemistry (or agronomy) belonged to the second group and together with technical chemistry formed a separate specialty.

Since then, agronomy has been regarded as an independent science. Some scientists, working on its definition, considering the nature of the object of her research, called this subject the biology and physiology of cultivated plants and animals. Thus, there was a process of differentiation of concepts: agriculture was attributed to industry, and the already existing university discipline providing scientific substantiation of agrarian production, in Russia was called agronomy<sup>21</sup>.

So agriculture as a discipline in the second half of the nineteenth century was called “agronomy”. Agricultural courses were also taught at universities and other educational institutions. However, in the pre-revolutionary period, the name of the scientific degrees: Master’s and Doctor’s degree of agriculture remained.

According to teachers of the late nineteenth century, agriculture as production depended on many factors, which they divided into two

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<sup>21</sup> Melnychuk D. O., Zubets M. V. (2005) *Stanovlennia i rozvytok ahrarnoi osvity ta nauky v Ukraini (z naidavnishykh chasiv do sohodennia)* [The formation and development of agricultural education and science in Ukraine (from ancient times to the present)]. Kyiv: NAU. (in Ukrainian)

types. The first group consisted of physical factors, which included soil, climate, cultivated plants, and animals. The second group was formed by “social” factors: labor, capital, exchange, and distribution<sup>22</sup>.

Considering the term “agricultural science”, Professor of Kyiv University S. M. Bohdanov pointed to its dependence on the phenomena of nature and economy. The latest, in his opinion, led to the division of agronomy into two major departments: the technique of agriculture, meaning the doctrine of physical processes in agriculture, and ... the agricultural economy or economy, meaning the doctrine of the economic side of agricultural production”<sup>23</sup>.

S. M. Bohdanov believed that agronomy was an applied science, so it had to have a limited field of study, that is, to study only those economic and natural phenomena that were characteristic in the practice of agriculture in a particular region, but at the same time could be used indefinitely research methods of various fundamental, including natural sciences.

Gradually, agrarian scientists came to understand that the nature of the main factors of production determines the nature of basic agronomic sciences. So, the cultivation of the soil, which significantly affects the yield, required knowledge of mineralogy with geology and geognosy. Climate change, the ability to adapt to the natural and climatic conditions of the region required knowledge of meteorology with climatology. The doctrine of cultivated agricultural plants was based on knowledge of botany and plant physiology. The doctrine of breeding domestic animals led to the knowledge of the basics of zoology with animal physiology. The general scientific principles of agriculture required a deep knowledge of physics and chemistry. The social factors that led to the economic nature of agricultural production required knowledge of polytechnic economics (economics) and statistics. This was a list of basic sciences of agronomic courses which at the end of the 19<sup>th</sup> century became or should be the subject of careful study at the university.

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<sup>22</sup> Sazanov V. I. (1962) *Sel'skokhozyaystvennoe opytное delo v rastenievodstve i ego metodika* [Agricultural Experiment in Crop Production and its Methodology]. Moskva: Sel'khozizdat. (in Russian)

<sup>23</sup> Bogdanov S. M. (1912) *Voprosy sel'skokhozyaystvennogo obrazovaniya v spetsial'noy dumskoy komissii* [Questions of agricultural education in a special Duma commission]. *Khozyaystvo*, no. 12, pp. 373–378.

The issue of university agronomy also occupied a special place in the agronomy section of the 12<sup>th</sup> Moscow Congress of Naturalists and Physicians, where reports were presented by A. N. Sabinin and D. N. Prianyshnykov. The resolutions of the congress stated: “To recognize the necessity and urgent increase of the centers of agronomic education”, including “through the organization of agronomic departments at universities and higher technical educational establishments”.

In addition, the importance of opening agronomic institutions in certain climatic regions of the country has become increasingly important. One of the first to support this was Professor of Novorossiysk University D. N. Abashev, who noted that for those who received a higher theoretical agricultural education, the importance of studying local economies. “Agricultural knowledge,” the scientist said in a report at the 4<sup>th</sup> Congress of Naturalists and Doctors in Kyiv, “is always ... local. For those who have received agricultural education in the north, after arriving in the south ... it takes a long time to learn ... completely new conditions ... Meanwhile, our two higher agricultural establishments are in the north”<sup>24</sup>.

In the future, this view was confirmed by Professor I. O. Shyrokykh, who, in denying D. N. Prianyshnykov at the 12th Congress of Naturalists and Doctors, said: “Agronomy has... another basic element: the process of agricultural production with an element is economy, so the development of agronomic departments at universities will respond favorably and at a special school, allowing it to give more resources to the master of studies”<sup>25</sup>.

The convenient geographical location of universities located in the Ukrainian lands, especially with regard to agricultural production, forced university professors of agriculture to recognize and uphold the idea that higher agronomic education should be given at universities and be territorially based.

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<sup>24</sup> Savel'ev A. Ya., Momot A. I., Khotenkov V. F. (1995) *Vysshee obrazovanie v Rossii: ocherk istorii do 1917 goda* [Higher Education in Russia: A History Outline Before 1917]. Moskva: NII VO. (in Russian)

<sup>25</sup> Zaykevich A. E. (1892) *Agronomiya, kak nauka voobshche i universitetskaya v chastnosti* [Agronomy as a science in general and university in particular]. *Trudy vtorogo Kievskogo oblastnogo s'ezda* [Proceedings of the Second Kiev Regional Congress]. Kiev: Tip. P. Barskogo, pp. 34–68.

Thus, at the beginning of the twentieth century, the main tasks of the higher agricultural school were not only the acquisition of a certain cycle of scientific knowledge in the field of agriculture, the acquisition of certain skills of scientific research, but also acquaintance with some practical techniques and methods of agricultural technology in relation to local conditions. The question of extension of agricultural education at universities was raised, which, in turn, required the establishment of appropriate educational and support institutions.

With the approval of the university charter in 1835, a separate subject was introduced into the course of Russian universities – agriculture, which required the teaching of only a short encyclopedic course, which included information from various branches of agriculture. The charter of 1884 introduced the departments of agronomic chemistry (or agronomy). Since then, agronomy has been regarded as an independent science. However, the term “agronomy” included information from all branches of agricultural production and was essentially identified with the term “agriculture”<sup>26</sup>.

## CONCLUSIONS

Advanced scientists understood the importance and advocated the extension of the agricultural course at domestic universities, which should serve not only to improve the system of special agricultural education but also to help raise the level of domestic agricultural production.

According to staffing, the name of the department, the volume, and the content of agricultural subjects changed, which was approved by the statutes of Russian universities. However, up to the revolutionary events, there was always one agrarian department at the physics and mathematics faculties of the universities.

From the above, it is clear that one of the important factors for the establishment of vocational education institutions was the rapid development of a market economy when production needed educated workers in the agricultural sector. The temporary differences in the rapid rise of agriculture in different parts of Europe have led to a

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<sup>26</sup> Ferlyudin P. (1893) *Istoricheskoe obozrenie mer po vysshemu obrazovaniyu v Rossii* [Historical Review of Higher Education Measures in Russia]. Saratov: Akademiya nauk i universitety. (in Russian)



difference in the timing of national consolidation of national systems of special agricultural education.

European countries are characterized by the consolidation in the second half of the nineteenth century of a sustainable network of agricultural educational institutions. The agricultural faculties had European universities. In addition to university agronomy, there are separate specialized higher education institutions in European countries.

Favorable natural and geographical conditions, high fertility of land have historically determined the agrarian and economic character of the development of Ukrainian lands. At the same time, the issues of scientific support for agricultural production have always occupied an important place in the research work of the natural history departments of the first universities.

Universities opened in the Ukrainian territory of the Russian Empire in the pre-revolutionary period were part of the general education system. In the university course, all-Russian statutes enshrined the teaching of agricultural disciplines.

The training of agricultural specialists has gained the greatest development in the Ukrainian lands of Russia.

In the history of agricultural education development, the period of formation of domestic scientific and educational centers at universities was underestimated. However, in the second half of the nineteenth and early twentieth centuries, university departments achieved considerable success and gained valuable experience.

## **SUMMARY**

The article shows the formation of agricultural science at universities in Germany, which helped to establish a solid foundation for the further development of agrarian science and research.

The development of agricultural education, as well as science in other European countries, is also covered.

It was established that on the basis of scientific achievements in the field of agronomy of German agrarian scientists 19th century, the first professors of domestic agricultural schools, including professors of Kharkiv University, subsequently built their programs.

In the course of the research it was found out that in the countries of Europe during the period (the second half of the nineteenth century)

and in the Russian Empire (the beginning of the twentieth century) there were processes of state consolidation of the development of professional agricultural education and branch scientific centers of agrarian direction. Regional agricultural educational institutions included agronomic (agricultural) departments of universities.

Differentiation of concepts at domestic universities is shown, namely, that agriculture as a discipline in the second half of the nineteenth century was called agronomy, which was considered as an independent science. Higher agronomic education should be given at universities and be territorially based.

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