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AGRICULTURAL EXPERIMENTAL WORK AS A COMPONENT OF MODERN NATURAL SCIENCE AND CULTURE OF THE NATION: HISTORY OF FORMATION AND EVOLUTION OF CONCEPTS

Abstract. The purpose *of publication is to analyze the formation of domestic agricultural experimentation at the end of the 19th century as a component of modern natural science and culture of the nation.* ***The research methodology*** *is based on the principles of historicism, objectivity, application of historical and comparative, historical and systemic, analytical and synthetic, terminological, statistical methods, as well as methods of personalization and source studies and archival analysis of documents.* ***The Scientific Novelty.*** *The evolution of the concept of “agricultural research” has been highlighted, the contribution of prominent and lesser-known agricultural scientists in the development of agricultural research in the Russian Empire and the USSR (in particular, in the Ukrainian and Polish lands) at the end of the 20th century has been outlined.* ***The Conclusion.*** *It has been proved that agricultural research could not fully develop before the events of 1917 due to the lack of a sufficient number of qualified personnel, a significant lag of the obtained research results of domestic scientists from the real success of colleagues from abroad, the level of agricultural production. At the end of the 19th – the beginning of the 20th century there began to develop actively in matters of theory and methodology, another component of agricultural science as a separate branch of knowledge – agricultural economics. Agrarian research is treated as a deep and comprehensive study in specialized research institutions of agronomic, zoo-technical and other agricultural phenomena occurring in natural and specially created conditions, using appropriate methods and tools to develop rational ways and approaches to improve the cultural level of agriculture as well as the search of other means and ways to provide scientific and practical assistance to agricultural production in order to obtain as many as possible and the best quality of environmentally balanced agricultural products.*

Key words: *agricultural experimental work, agricultural scientists, agronomy, branch experimentation.*

СІЛЬСЬКОГОСПОДАРСЬКА ДОСЛІДНА СПРАВА ЯК КОМПОНЕНТ СУЧАСНОГО ПРИРОДОЗНАВСТВА І КУЛЬТУРИ НАЦІЇ: ІСТОРІЯ СТАНОВЛЕННЯ ТА ЕВОЛЮЦІЯ ПОНЯТЬ

Анотація. Метою статті *є аналіз становлення вітчизняного аграрного експериментаторства в кінці XIX ст. як складової сучасного природознавства і культури нації.* ***Методологія дослідження*** *грунтується на принципах історизму, об'єктивності, застосуванні історико-порівняльного, історико-системного, аналітико-синтетичного, термінологічнного, статистичного методів, а також методів персоналізації та джерелознавства й архівного аналізу документів.* ***Наукова новизна.*** *Висвітлено еволюцію поняття "сільськогосподарська дослідна справа", окреслено внесок видатних та менш відомих учених-аграріїв у розвиток сільськогосподарської дослідної справи на території Російської імперії та СРСР (зокрема, на українських і польських землях) у кінці XIX – XX ст.* ***Висновки.*** *Доведено, що сільськогосподарська дослідна справа не змогла повноцінно розвинутися до подій 1917 р. через відсутність достатньої кількості кваліфікованих кадрів, суттєве відставання отриманих дослідницьких результатів вітчизняних учених від реальних успіхів колег із-за кордону за рівнем продуктивності сільськогосподарської продукції, здебільшого практичний характер поставлених завдань тощо. Наприкінці XIX – на початку XX ст. як окрема галузь знань почала активно розвиватися у питаннях теорії та методології ще одна складова сільськогосподарської науки – сільськогосподарська економіка. Трактовано сільськогосподарську дослідну справу як глибоке та всебічне вивчення у спеціалізованих дослідницьких інституціях агрономічних, зоотехнічних та інших сільськогосподарських явищ, що відбуваються у природних і спеціально створених умовах, з використанням відповідних методик та інструментарію з метою відпрацювання раціональних шляхів і підходів до підвищення культурного рівня сільського господарства, а також пошуку інших засобів і способів надання науково-практичної допомоги аграрному виробництву з метою отримання якомога більшої кількості та кращої якості екологічно збалансованої сільськогосподарської продукції.*

Ключові слова: *сільськогосподарська дослідна справа, вчені-аграрії, агрономія, галузеве експериментаторство.*

The Problem Statement. Agriculture in Ukraine has historically continued to be the dominant sector of the country's economy. Its development has greatly influenced the formation of all components of Ukrainian society. According to many modern researchers, owing to the rural way of life, which has been practiced for centuries in modern Ukrainian lands, not only formed the national consciousness, but also preserved the national idea, despite the existence of various state systems and their influence within a common homeland. To this day, agriculture continues to be a guarantor of statehood and, consequently, stability through food security.

The Analysis of Recent Research and Publications. Available publications, as well as some definitions proposed by their authors, primarily to industry textbooks, manuals and various encyclopedias from the past, last century and the new millennium, differently interpret the concept of "agricultural research" both in terms of its origin and, respectively, and meaningful content.

In my opinion, the process of accumulation of knowledge about the place of branch research as a component of natural science and culture of the nation has passed certain stages of evolution. This is noted by leading scientists: A. Ya. Buka, V. R. Williams, V. V. Viner, A. A. Ivin, S. I. Danilov, B. K. Enken, S. P. Kulzhinsky, A. V. Lazursky, A. A. Nikonov, N. I. Pshenychny, B. N. Rozhestvensky, V. I. Sazanov, I. A. Stebut, S. K. Chaianov and other researchers of the history of agricultural science.

The purpose of the article – based on the author's interpretation of the concept of "agricultural research", set out in the three-volume "History of Agricultural Research in

Ukraine" (Verhunov, 2018a; Verhunov, 2018b; Verhunov, 2018c;), to trace the formation of agricultural experimentation at the end of the 19th century as a component of modern natural science and culture of the nation, to outline the contribution of prominent and less prominent agricultural scientists in the development of agricultural research in the Russian Empire and the USSR at the end of the 19th and 20th centuries.

The Results of the Research. The book "History of Agricultural Experimental Work in Ukraine", which consists of 3 parts, united by a common idea – a comprehensive study of the historical stages of development of agricultural experimental work and its management in Ukraine, is a multi-layered, poly-functional study. The work is extremely informative and may be of interest to a wide range of readers of both different ages and different occupations. The scientific novelty of the book is emphasized – at the empirical level – by the author's scrupulous identification and systematization of a significant array of historical facts; on the theoretical side – the author's view on the methodological foundations of the formation and evolution of agricultural experimental work in Ukraine.

The first part of the book is devoted to biographical portraits of 100 outstanding agricultural scientists and practitioners who made a significant contribution to the formation and development of agricultural experimental work in Ukraine (Verhunov, 2018). Among them there are also representatives of Polish nationality (M. N. Ochapovsky, I. E. Ovsinsky, B. St. Dobzhansky, S. A. Mokrzhetsky, V. S. Tyshkevich) and those who worked in Poland in the 19th – 20th centuries (P. V. Budrin, E. F. Votchal, V. V. Dokuchaev, etc.), in addition to purely cognitive, it has a powerful educational potential. After all, the rapid growth over several decades of public interest in historical and biographical research has become a hallmark of scientific discourse. In our opinion, it is a reflection of both the general rise of national patriotic consciousness among the general population, and the new spiritual and intellectual processes taking place among the scientific elite (Verhunov, 2018a).

The appeal to the activities of our predecessors, the history of their ideological searches, achievements, civil and scientific asceticism is evidence of the awakening of society from historical nihilism, the desire of people to reassess values, restore lost ties with centuries of experience, humanistic traditions and moral principles. In the biographies of agricultural scientists, a modern Ukrainian is looking for the spiritual support necessary to establish him as an individual and a citizen, a conscious builder of his own destiny and the destiny of the country.

The fact that over the past two decades in the domestic socio-humanitarian science, the "impersonal" schematism was replaced and firmly established by the view of the past precisely through the human dimension, in particular through the prism of biographics, it is not without reason that it the most fully corresponds to the spirit of our time, is filled with humanistic potential, which is in demand nowadays. Therefore, appealing to the creative generative heritage of 100 domestic agrarian scientists and organizers of branch experimentation, who glorified Ukrainian and Polish lands in the world in word and deed, is quite justified and appropriate. This can be safely called "the restoration of the historical memory of the people", which was marked by the return from oblivion of many names of researchers and practitioners of the agricultural sector.

Personological portraits of agricultural scientists (A. G. Alesho, V. G. Bazhaev, Count A. A. Bobrinsky, S. M. Bogdanov, D. G. Vilensky, E. F. Votchal, D. A. Jovani, A. I. Dushechkin, B. K. Enken, A. E. Zaikevich, M. V. Zubets, A. V. Kvasnitsky, V. V. Kolkunov, Prince A. S. Kudashev, G. G. Makhov, I. E. Ovsinsky, K. I. Osmak, P. D. Pshenichny, B. N. Rozhestvensky, V. I. Sazanov, P. R. Slezkin, P. V. Spesivtsev, K. I. Tarkhov, V. E. Tairov,

P. F. Tushkan, S. L. Frankfurt, K. G. Schindler, A. A. Yanata and the others) (Verhunov, 2020 a; Verhunov, 2020b; Verhunov, 2021) allow us to paint a picture of the personal contribution of each of them to the evolution of agricultural science. Portraits of scientists have an original compositional solution and are characterized by textual specifics.

For the dominant majority of the figures of scientists and organizers of sectoral science considered in the monograph, the object of research was agricultural plants and soil for its needs. However, portrait essays about A. F. Bondarenko, F. F. Eisner, M. F. Ivanov, A. V. Kvasnitsky, N. A. Kravchenko, F. K. Pochernyaev, P. D. Pshenichny, I. V. Smirnov, V. P. Ustyantsev, as well as Baron F. E. Falz-Fein are a tribute to the outstanding achievements and discoveries of these figures of domestic agricultural science of the last century in the field of animal husbandry, who glorified the country on a global scale.

Nowadays it is no secret to anyone that during the Soviet period, for various reasons, mainly political, the contribution of the best representatives of the Ukrainian nation to the formation and development of sectoral scientific thought as a component of culture and natural science was unreasonably reduced. Therefore, in our opinion, another important aspect implemented in the study is the issue of self-determination of the Ukrainians. This three-volume book helps to get closer to solving the problem of identity – not only scientific, but first of all – spiritual, ideological, perhaps even civilizational, because it "fits" experimentation in the vastness of the then Russian Empire and the USSR into the European scientific space. And today, when Ukraine has chosen for itself a European landmark as a direction of movement and is actively implementing European integration processes, this is extremely important.

The study is attributed to the genre of intellectual history, because in it, in addition to the fact that there is a clear tendency towards anthropologization and human-centrism, there is a noticeable appeal to the socio-cultural component of history in its natural, natural for the Ukrainian nation, aspiration – the agrarian plane. In our opinion, the book will help to better understand the essence of the peasant nature of the Ukrainian nation with a powerful potential not only to cultivate the land, but also to conduct fundamental research on it, which surprised both the domestic and the world community. In particular, the 2nd part of the three-volume book outlines the evolutionary progress of agricultural experimental work in Ukraine as an organization and branch of knowledge in the context of concepts definition and state policy, on the basis of which original directions of scientific research were subsequently generated, agrarian scientific schools recognized today were formed (Verhunov, 2018b).

The book is devoted to the problem of self-organization of the scientific community of agricultural scientists. The study implemented, among other things, a network communication model to display corporate communications. Along with this, network analysis actualizes the anthropological component of historiography, the focus of which is not the "impersonal", depersonalized history of ideas or scientific institutions, but the subject of the process of cognition, the bearer of ideas and the organizer of science.

The third part of the three-volume book accumulates archival documents and generating materials that cover events which conceptually and organizationally contribute to the emergence and further development of the sectoral experimental work (Verhunov, 2018c).

The book is an example of a micro-historical analysis of the activities of the scientific and intellectual environment. It is well known that historical research carried out from the perspective of "micro-history", as a rule, contributes to the solution of important problems of "history of everyday life", "intellectual history", "humanizes" the historical process. In our opinion, the methodological possibilities of the "intellectual community" concept have been

implemented, and the status identity of the agricultural scientist has been designated. The advantage of the three-volume book is the author's appeal to the search for self-identification of agricultural scientists, the determination of biohistoriographic research in the Ukrainian scientific field. The book is characterized by a clear tendency to anthropologization of historical and scientific knowledge, when at the center of any scientific achievements is, first of all, a person, an individual. Within the framework of the modern anthropological approach, the problem of scientific centres in the history of science (professional communities, scientific communications, research teams) is brought to the fore, which, in fact, provides for the reconstruction of intra-scientific communications. Interpersonal communications are the most true part of a reflective layer of science. Such a problematic emphasis made it possible to reproduce the intellectual space on the pages of the three-volume book as a kind of "network of communication" for specialists in agricultural science.

The structure of the book emphasizes the originality of the compositional solution, the organic nature of various aspects of the consideration of the main core line – the institutional process of agricultural experimental work formation in Ukraine at the end of the 19th – the beginning of the 20th centuries as a component of modern natural science and culture of the nation.

Thus, agricultural experimental work is divided into two fundamental components: 1) branch of knowledge ("a set of information and methods for studying agricultural phenomena"); 2) organization ("a set of institutions and activities with the ultimate goal of improving agricultural technology") (Nedokuchaev, 1929, p. 13).

We owe the appearance of the first, first of all, to the success of agro-chemistry science, starting from the second half of the 18th century, and, especially, to the approval of morphological and genetic soil science as a doctrine, which, owing to V. V. Dokuchaev, after defending his doctoral dissertation on December 10, 1883 (Dolotov, 1983, pp. 133–136) and the publication of his book "Russian Chernozem", finally transferred agricultural experimental work from the category of applied to the fundamental field of knowledge. Together with the evolutionary theory of Darwin (1859) and the law of geographical zoning by V. I. Kovalevsky (1884), genetic soil science became the theoretical and methodological foundation for conducting agricultural experimental work (Verhunov, 2019, p. 14).

As for the agricultural experimental work as an organization, we trace its emergence from the opening of the first permanent state experimental institution – the Poltava experimental field, which began its activities in November of 1884 (Verhunov, 2014, pp. 17–19). The formation and development of sectoral experience as a field of knowledge and especially organizations are obliged, first of all, to the initiatives of "social patrons" (Elina, 1995, pp. 48–52) and local creative associations. Their joint efforts, multiplied by the Manifesto of 19.02.1861 of Alexander II "On the Most Merciful Granting to Serfs of the Rights of the State of Free Rural Inhabitants and the Arrangement of their Life" and the appearance, as a result of his Decree of 1.04.1864, in 33 provinces of European Russia zemstvos, contributed formation in the country of a full-fledged agricultural industry with significant export opportunities in the 1890s. As a result, everything comprehensively contributed to the adoption on May 28, 1901 by the Decree of Nicholas II of the first legislative act "Regulations on Agricultural Experimental Institutions" (Polozhenie, 1901, pp. 546–547), regulating, and most importantly, budgetary incentives to engage in agricultural experimentation. Thus, once again proving that any initiative has the right to be a public matter if it is guarded by the state: 1) legislatively, 2) budgetary and 3) regulatory.

Having borrowed the best world experience and drafts of the foundations of structuring the country for research purposes, V. V. Dokuchaev (1892), P. A. Kostychev (1895),

V. G. Rotmistrov (1898), V. V. Viner (1908, 1912), brilliant scientist, extraordinary academician of the Imperial St.-Petersburg Academy of Sciences V. I. Vernadsky (1863 – 1945), implemented a national model for conducting sectoral experimentation with a coordinating body – the Agricultural Scientific Committee of Ukraine (nowadays – the National Academy of Agrarian Sciences of Ukraine) (CSAAAU, f. 1061, d. 1, c. 32, p. 202), becoming its first leader (from 11/16/1918) (CSAAAU, f. 1061, d. 1, c. 32, p. 216). Thus, the outstanding thinker, the founder of the doctrine of the biosphere and noosphere, to a certain extent, brought to life the thesis expressed by him in the article "The Ukrainian Question and Russian Society" back in 1916, that "the Ukrainian intelligentsia expects from Russia the full recognition of the rights to national cultural self-determination, those the right to free national work in the sphere of school, science, literature, public life... Since the Ukrainian movement is organic and feeds on the roots of people's life, it will never go out" (Chepak, 2020, p. 5). It is not for nothing that academic agrarian experimentation has been successfully functioning in Ukraine for more than a century (Verhunov, 2017, pp. 13–15).

Owing to the historic decision of the Verkhovna Rada of Ukraine No. 2287-VIII dated February 8, 2018, which adopted as the evidence base the results of many years of research by the author (Verhunov, 2018c, pp. 28–32), NAAS, despite the Decree of the Council of People's Commissars of the Ukrainian SSR "On the Organization of the All-Ukrainian Academy of Agricultural Sciences" No. 13/707 dated May 22, 1931 (Pro orghanizaciju, pp. 389–390), celebrated its centennial anniversary at the state level (100 rokiv, 2018, p. 65), thereby realizing to a certain extent a similar desire of individual Russian historians regarding the RAAS, who consider it the forerunner of the Scientific Committee of the Ministry of State Property, founded in 1837 (Goncharov, 2015, pp. 60–64), and not only VASKhNIL, created by the decree of the Council of People's Commissars of the USSR on June 25, 1929 (Ob organizatcii, 1929).

Thus, let's return to the origins of domestic agricultural experimental work. Based on our own long-term research, we believe that a number of factors became the prerequisites for its emergence: 1) private initiative on the part of "social patrons" during the 17th – 19th centuries; 2) the consequences of the agrarian reform of 1861; 3) numerous droughts of the 17th – 19th centuries; 4) the introduction of the French education system since 1803 and the approval of its own branch; 5) expansion of industrial production of agricultural products, especially from the second half of the 19th century; 6) the educational activities of the zemstvos established since 1864 in 33 provinces of European Russia; 7) holding special congresses of figures in the scientific and educational sphere; 8) representative activities of creative associations; 9) the "visual" activities of the church on rational farming in the 10th – 19th centuries; 10) development of sugar beet production since 1802; 11) the formation and development of a system of familiarization with new technologies through exhibitions and competitions with the support of the state since the 1820's; 12) deployment of large-scale land reclamation since 1872; 13) the transfer of domestic agriculture for export in the 70's – 80's 19th century; 14) development of the bibliography of agricultural literature; 15) approval of statistics as a science (Verhunov, 2018b).

The appearance of the first definitions of the concept of "agricultural experimental business" in the domestic branch scientific discourse dates back to the 80s of the 19th century and then actively continued until the end of the 90s of the 20th century, when the organizational search for the structuring of science was actually completed. Branch experimentation was worked out by state methods, first of all, in 1884 – 1931 – from the experimental field to the

station, and then through their regional and regional construction, ended with the emergence of regional stations and the creation of an industry academy. In our opinion, during this period, the fundamental principles of conducting agricultural experimental work in Ukraine were worked out:

a) performance of special studies on the material and technical basis of permanent institutions (laboratory, strong point (farm), experimental field, experimental farm, experimental station, scientific experimental station, experimental plant or workshop, experimental design bureau, scientific research institute, etc.);

b) these studies are carried out in accordance with the methods (instructions, regulations) developed and approved by the responsible collegiate body;

c) the relevant body determined by the manager of budgetary funds is responsible for its coordination;

d) priorities for conducting experiments under the state order.

The last component has the right to be discussed, but if during the last years of the tsarist era the sectoral experimental work was 75% dependent on the state budget, and everything else was funded by the so-called "social patrons", then especially during the Soviet period, owing to the decree of V. I. Lenin of February 8, 1919 "On the Acceptance of all Agricultural Experimental Institutions at the Expense of the State", everything came under the control and financial capabilities of the country. It is interesting that this happened back during the years of the civil war and less than two years after the issuance of another decree of the All-Russian Central Executive Committee and the Council of People's Commissars of the RSFSR "On the Destruction of Estates and Civil Ranks" dated November 10 (23), 1917, in fact eliminated the existence of modern signs of scientificity in the form of academic titles and scientific degrees.

Confirmation of what was said about the fourth component in the author's understanding of agricultural experimental work as such is the conclusion of one of the founders of domestic sectoral experimentation as an organization V. V. Viner: "The history of the first two decades shows that in Russia, as in Western Europe, the emergence of owes, first of all, to private initiative, which then met with support and development in the initiative of the public (agricultural societies) and only much later, from the mid-90s (the 19th century – Auth.) the state initiative was manifested". He adds that "... with the speech of the Ministry of Agriculture ... in the first year after its founding ... Professor of Forestry Institute (at that time he took the post of a director of the Department of Agriculture) P. A. Kostychev ... for the first time raised the issue of planned development of a network of experimental institutions...", which was "... proposed in 1895 in the discussion of the first session of the Agricultural Council, which was supposedly the first experience of the All-Russian Parliament ... to discuss special agricultural issues and legislative projects ... " (Viner, 1922, pp. 28–32).

The emergence of the state initiative for the development of branch science in the mid-90s of the 19th century was no accident. Back in 1892, the outstanding practitioner and agricultural scientist A. A. Izmailsky stated regarding agriculture or, in his opinion, the agricultural industry: "... in order to control any phenomenon, we must first of all study it. To study the agricultural industry, the basis of our well-being, we have not yet done anything" (Izmailsky, 1937, p. 72).

It is believed that Professor A. E. Zaikevych introduced the first methodology for conducting experiments into the domestic industry process by publishing the "Instructions for Experimental Fields" in the scientific report for 1892 "Proceedings of Experimental

Fields Organized in Some Private Farms of the Chernozem Zone of Russia". Although A. Filippovsky suggests that it was developed and applied in a simplified form in the preparation of earlier reports by A. E. Zaikevich to the Kharkiv Society of Agriculture, made by him based on the results on the experimental fields of 1881, 1882 and 1883, which were published in 1889 in Kharkiv (Filipovsky, 1928, p. 15).

Thus, the compilation of the first methods for conducting a field experiment in the modern sense regarding its filling at the beginning of the 80s of the 19th century along with the initiative of "social patrons" prompted the emergence of domestic agricultural experimental work as a component of modern natural science and culture of the nation.

The next generating stage in the formation of agricultural experimental business was the creation on October 28, 1884 of the first permanent state sectoral experimental institution – the Poltava experimental field (Verhunov, 2009, 22–24). Subsequently, the head of the sectoral experimental work of the RSFSR in the 20s of the last century, S. K. Chaianov notes this date as the time of the foundation of the agricultural experimental work in Russia, and the general approaches to his work, in his opinion, were outlined by the All-Russian Assembly of 1908 (Chaianov, 1928, p. 9). In this case, we are talking about the emergence of agricultural experimental work as an organization.

Together with the gradual filling of the three main components of agricultural experimental work as such, by the efforts of those responsible on the part of the state at the end of the 19th – the beginning of the 20th centuries there was a development of all regulatory documents, functions and concepts that accompany the process of organizing its maintenance.

As stated in the "Ukrainian Soviet Encyclopedia": "Historical experimental work is associated with the practice of agriculture and the development of scientific knowledge in agronomy" (Doslidna, 1961, p. 311). It is no coincidence that for quite a long time, especially at the end of the 19th century, during the years of its formation, they spoke of agricultural experimental work rather as agronomy. This is also confirmed by the authors of the fundamental publication "Essays on the History of Agronomy", published in Moscow in 2008: "... in Russia until the 19th century, agronomy was understood as the science of growing plants, breeding and keeping animals, and the economic foundations for organizing the processing of agricultural products". Nowadays, in their opinion, agronomy should be understood as a complex of agronomic sciences for growing plants, rational use of agricultural land, increasing soil fertility and crop yields, and its theoretical basis is biological sciences, soil science (Ivanov, 2008, pp. 3–5).

The analysis shows that all the mentioned domestic and foreign authors share one key approach, which argues for a fairly worthy existence at the end of the 19th century agronomy or agricultural science. By the way, its first definition in Russian historiography belongs to Professor M. G. Pavlov and dates back to 1837: "Agriculture as a science is an application to the natural sciences for breeding useful plants and animals in the aggregate" (Pavlov, 1837, p. 7). Professor A. E. Zaikevich formulated it even more clearly: "Agricultural science is the physiology and biology of cultivated organisms" (Zaikevich, 1893, pp. 20–21).

Approximately the same is said about agronomy by Professor P. R. Slezkin, recognizing it as "... partial biology or as the biology of cultivated plants". "In his opinion, agronomy is distinguished from crop production by the presence of two components: "scientific – the biology of cultivated plants and applied – the study of cultivation methods" (Slezkin, 1904, p. 4). Professor S. M. Bogdanov defined the subject of agronomy or agricultural science as "... the study of all phenomena of interest in agricultural terms" (Bogdanov, 1985).

A. G. Doyarenko, recognizing the task of agronomy as "...extraction and processing of organic matter due to solar energy... ", treats experimental work not only as its independent method, but gives it a formulation as an independent scientific discipline, which "...covers the natural-historical and economic aspects of human activities...", adding that "...both of these principles are equally represented both in the task and in the method" (Doiarenko, 1963, p. 175; Doiarenko, 1926, p. 18). Among the main scientific tasks of his time before agricultural experimental work as a branch of knowledge, the scientist singled out: 1) the study of the factors that form the yield of field crops; 2) questions of the influence of early fallow plowing and surface loosening of the soil; 3) seeding issues; 4) fertilization.

After analyzing the available, primarily leading encyclopedic publications, we come to the conclusion that nowadays agronomy can be considered as a complex of knowledge about agricultural plants. Although not so long ago, at the end of the 19th century and almost until the 20s of the 20th century, this concept in the Russian industry environment generally replaced the name "agriculture" or the science about it. This is partly confirmed by the "Russian Encyclopedia", published in 1911 in St.-Petersburg, stating that agronomy is an "agricultural science in general", which contains "phyto-technics (plant growing, agriculture), ... zoo-technics (animal husbandry) ... and ... agricultural technology" (Agronomiia, 1911, p. 92). And the "Great Soviet Encyclopedia" of 1972, emphasizing the significant development of this area of agriculture, writes that it "...is closely connected with the development of crop production, with the intensity of land use" (Lutcenko, 1972, p. 662).

Thus, at the end of the 19th century the separate existence of agricultural experimental work as a fundamental component of agrarian science was not discussed, since the entire accumulated mechanism for implementing the tasks set in its modern reception remained not fully processed. Although at this time they began to actively talk about the origins of adaptation to agricultural science or the agronomy of agricultural experience.

One of the luminaries of domestic branch science, Professor A. I. Stebut (1833 – 1923), the author of the book "Fundamentals of Field Culture and Measures for its Improvement in Russia", which was widely popular in his time, became the organizer of the First All-Russian Congress of Figures on Agricultural Experimental Business in St. Petersburg in 1901. It should be noted that the merit of Professor I. A. Stebut in holding the first national congress, which specialized in the format of the name "agricultural experimental work", was colossal in the development of domestic branch experimentation.

By the way, the well-known domestic scientist and methodologist of science A. G. Doiarenko noted the epoch-making nature of this meeting for the emergence of agricultural experimental work, because this "... was the first step towards streamlining experimental work in the country. This congress paved the way for the development of a regulation on experimental work. For the first time it was recognized as a state matter and included in the system of state events…" (Doiarenko, 1965, p. 63). However, in practice, agricultural experimental work became a state necessity only after the final establishment of the Soviet power on Ukrainian lands in 1920.

The evolutionary understanding of agricultural experimental work as a concept should be counted from the interpretation of V. I. Dahl, who considered experimentalism as "an unfounded teaching, showing what can be explained in practice", and dates back to 1881, that is, even before its formalized appearance. Although, in fairness, it should be noted that for the first time the definition of an experimental case in the understanding of V. I. Dahl was made by him back in 1865: "Experimental work, knowledge by experience, work of experience ...

conclusion (theory), and based on deeds ..." (Opytyvat, 1865, p. 1265). Somewhat earlier, in 1864, another encyclopedic edition of F. Toll claims that under the experience carried out one can see "... the action of the forces of nature, and from their observations to derive the laws of these forces ... which are acquired by true ways, and not by speculation and not a legend" (Tol, 1864, p. 1089).

In the preface to the collection of reference information from the experimental institutions of Russia "The Immediate Tasks of the Experimental Work" (1911), A. G. Doiarenko noted: "... Experimental work is going through in Russia ... a moment of serious historical significance, characterized by a sharp rise in interest in it from different angles and no less pronounced faith in the future of agronomic progress on the basis of experience. In addition, he makes an attempt to distinguish between the tasks of agronomy and agricultural experimental work through the definition of concepts: "Agronomy, which has an independent task – the extraction and processing of organic matter through solar energy and an independent method – experimental work – can be recognized as a more or less independent scientific discipline, covering the natural-historical and economic aspects of human activities, while both of these principles are equally represented both in the task and in the method" (Opytyvat, 1881, pp. 688–689). Thus, for the first time an attempt was made to define the concept of "agricultural experimental work" in relation to domestic agronomy. In addition, it is clearly stated that sectoral experience is a fundamental component of agricultural science.

The Conclusion. We highlight some of reasons why the concept of "agricultural experimental work" and its functioning as an exclusively state request could not fully develop before the events of 1917:

1) the lack of a sufficient number of specially trained qualified personnel significantly hampered the further evolution of all three components of industry experience;

2) a rather significant backlog of the research results obtained by domestic scientists from the real successes of colleagues from abroad in terms of the productivity of agricultural products;

3) the tasks that the state set before the institutions, despite the name "experimental", continued to remain in the format of exclusively practical ones, did not reach the level of presenting the problems of the theory of the set scientific task;

4) at the end of the 19th – beginning of the 20th century there began to develop actively in matters of theory and methodology, another component of agricultural science as a separate branch of knowledge – agricultural economics, the purpose of which was and remains, first of all, to evaluate the effectiveness of everything new from conducting agricultural production and experimentation for its needs. Given this, Professor P. F. Barakov argued that "... the science of agriculture is divided ... into two large sections: I) agricultural machinery and II) agricultural economics". Its first component is divided into three parts: 1) the doctrine of growing agricultural plants: agricultural crop production or agriculture (forestry, horticulture, horticulture, etc.); 2) the doctrine of the rational maintenance and breeding of animals – animal husbandry or animal husbandry; 3) the doctrine of the processing of agricultural products to give them greater value – agricultural technology. At the same time, the scientist attached exceptional importance to the study of the laws of agriculture in order to "... provide a scientific basis for choosing such a set of techniques for growing agricultural plants, which, being the most suitable for the given natural-historical and economic conditions of the area, would provide the farmer with a constant high income with area units" (Barakov, 1916, p. 1);

5) the lack of a complete array of knowledge, both in theory and practice, with its separate three components in the modern sense, proposed by the author of the study. It is no coincidence that S. K. Chayanov argued that "... experimental work in breeding, animal husbandry, horticulture, grassland, land reclamation, etc., is the result of the work of the post-revolutionary period". Among the achievements of the revolution, he singled out "... the connection of research with life," when in the second half of the 20s of the last century, it became the "chain of agricultural production". An example of the fact that in Ukraine before the events of 1917 there were no "... special complex experiments ... in the field of horticulture" or, as they say today, vegetable growing, is the opening remarks of the head of Department of Horticulture M. F. Gladky to the annual report of the Poltava Agricultural Experimental Station for 1926. In it, he writes: "Until very recently, all the experimental stations of Ukraine, in particular the Poltava Experimental Station, devoted all its attention and strength to studying the methods of cultivating field plants, while the focus was on grain breads", and "... the experimental stations of Ukraine did not deal with the issues of studying the culture of garden plants at all ... although already from 1910 the question of the need to study the culture of garden plants was raised in the periodical press at experimental stations", because "... the methods of culture practiced in the northern provinces – in provinces that differ significantly in natural and climatic conditions from our rather arid region" (Gladky, 1927, pp. 7–8), are not acceptable for Ukraine. Based on the decisions of the Poltava provincial council of researchers, together with representatives of public agronomy, held in the winter of 1919 – 1920, the Poltava station became the first in Ukraine to start testing varieties of vegetable crops to study the density and timing of sowing, the aftereffects of applying organic fertilizers. To this end, in 1921, a special gardening department was opened at the station, which was responsible for conducting field experiments and summarizing their results, processing special methods for performing relevant work and its evaluating;

6) the emergence of agronomy as such in domestic agriculture only in the 80s of 19th century. The agronomic organization as an advisory collegiate institution in the form of economic councils under provincial and district governments arose no earlier than 1889. This happened owing to the law of 1888 (Chuprov, 1907, p. 132), which introduced the position of provincial government agronomist with the main responsibility of holding public lectures and conversations with the owners specifically on the introduction of new from our own and foreign experience. First of all, this concerned the use of mineral fertilizers and the improvement of seeds as a primary approach among activities that increase the profit of the farmer. Accordingly, they were of great economic importance for the transition from small-scale to industrial economy. Because before that, rational farming was based on costly approaches for the small landowner in the form of melioration, machines, etc., which could only be afforded by big capital endowed with certain agronomic knowledge. As a result, in fact, few were able to make any methodical or encyclopedic definitions, and even more so with regard to agricultural experimental work, which began to develop actively from the 80s of the 19th century, first of all, owing to the achievements of agronomy.

Thus, having accumulated new knowledge in the understanding of agronomic processes over the past 140 years, nowadays agricultural experimental work, according to the author's definition, is interpreted as: "... a deep and comprehensive study in specialized research institutions of agronomic, zoo-technical and other agricultural phenomena occurring in natural and specially created conditions, using appropriate methods and tools in order to develop rational ways and approaches to raising the cultural level of agriculture, as well as to

find other means and methods for providing scientific and practical assistance to agricultural production in order to obtain as much as possible and the best quality of ecologically balanced agricultural products" (Verhunov, 2012, p. 228).

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