Academician M.V. Pavlova successfully conducted her research in several scientific fields. She was interested in the problems of paleozoology, studied the causes of extinction of animals in past geological epochs, investigated the fossil remains of elephants, rhinos, tapirs, ungulates, lower Mesozoic ammonites, described numerous fossil remains of mammals of Tiraspol gravel. Her talent was clearly manifested in the field of science, unusual were her abilities in the history of science, and in the promotion of paleozoological knowledge. Pavlova made a significant contribution to the treasury of world science by her many-sided scientific, social and pedagogical activity. Her merits in creating a national paleozoological school are invaluable. Her paleozoological works are known far beyond our country. Encyclopedism and theoretical thought are characteristic features of M.V. Pavlova, born as a result of the continuous work of a scientist. Her works mark a deep knowledge of history and a belief in the succession of all things progressive. She interestingly and publicly taught the most difficult questions, wrote her works with great pedagogical skill. A special place among scientific works of Pavlova is occupied by those studies that resulted from the generalization, critical rethinking of new concepts: studies of fossil elephants, phylogenetic rows of ungulates, environmental impact on ungulates. An analysis of these concepts has allowed her to draw very important conclusions that are consistent with our time.

**Key words:** Paleozoology, M.V. Pavlova, Paleontology, Tiraspol gravel, elephants, Deinotherium, Mastodons.

**Introduction.** The importance of paleozoological research for taxonomy and systematics, evolutionary morphology and phylogenetics, paleoecology, biostratigraphy and paleogeography is now universally recognized and undeniable. The development of the systematics and phylogeny of mammals relates to problems of theoretical content and is based on the principles of the evolution of adaptations as the basis of phylogenetics. Applied tasks of this direction are realized through comparative-morphological analysis and evolutionary morphology, practical systematics and phylogeny of groups, biostratigraphic schemes and paleogeographic maps. The history of paleozoology, as a separate field of natural knowledge, initiated more than 150 years ago, testifies to the successive stages of the development of the animal world and includes a whole range of ways of knowing the evolution of the organic world through the field of zoology and historical geology. In fact, it is the history of the formation of Paleozoology, an independent science of extinct mammal forms from the beginning of their formation in the early Mesozoic and up to the present. Ukrainian scientists have made a significant contribution to paleozoology, its history and major achievements.

**General problem setting.** Our research results of the contribution of academician M.V. Pavlova into the study of post-Tertiary elephants from Tiraspol gravel is based on a broad analysis of her scientific paleozoological heritage. It is reflected in numerous publications, manuscripts, catalogs, diagrams and various media (monographs, textbooks, articles, etc.). Publications of Pavlova testify that in the history of the study and knowledge of the extinct fauna there were certain periods or stages of analytical synthesis of the accumulated data and achievements. These publications include the works of M.V. Pavlova: “Fossil Elephants” (1899) [1], “Post-Tertiary Elephants from Different Territories of Russia” (1909) [2], “Findings of Elasmotherium sibiricum in the Stavropol Province and Other Locations” (1916) [3], “Causes of the extinction of animals in past geological epochs” (1924) [4], “An outline of the historical development of the study of tertiary and post-tertiary fossil mammals found in Russia” (1922) [5], “Elephants of the southern USSR Elephas planifrons Falc. and others” (1931) [6]. These scientific works of M.V. Pavlova cover the history...
issues of paleozoology and, in particular, the origin of elephants. Almost 100 years have passed since the final analytical publications on the subject, so our data characterize mainly the first third of the twentieth century.

**Analysis of recent research and publications.** Academic Heritage of Academician M.V. Pavlova was considered in the works of Chaurina R.O. [7], Bessudnova Z.A. [8], Zagrebayeva V.M. [9]. However, even today, the analysis of the scientific work of Academician Pavlova, as a Ukrainian scientist, remains relevant.

**The purpose and objectives of the research.** To carry out the analysis of works of academician M.V. Pavlova on the study of post-Tertiary elephants, including in the territory of Ukraine, to reveal the little-studied problem in paleozoological science.

**Presentation of the basic research material.** The history of the study of extinct elephants of the fauna of Romania, Moldova and Ukraine has been known since the beginning of the 19th century, which is recorded in archival materials and publications of European naturalists. The first half of the nineteenth century was a period of accumulation of materials and data on fossil elephants from Tiraspol gravel extracted for railway construction of tracks near Tiraspol (then Kherson province). Part of this collection, especially of Artiodactyla mammals (including elephants), was immediately elaborated by M.V. Pavlova in 1907 [10]. At the same time, she was offered by Kyiv professors P.Ya. Armashhevsky and V.V. Hvoky to study the bones of elephants collected by them during excavations of the Kyiv-Kirillovsky stand. M.V. Pavlova immediately agreed to inspect the collection of bones of elephants in Kiev. In addition, she received elephant teeth from sediments in present-day Moldova and the Odessa region of Ukraine (especially in the Kuyalnycy stuary zone). Also she got the remnants of an elephant found in the territory of the modern Russian Federation in Nizhny Novgorod province from the professors V.D. Laskaryov and I.P. Tolmachov. The data of the bones of the elephants were immediately deposited in the Museum of Peter and St. Petersburg Academy of Sciences (they are still stored in St. Petersburg today).

Mariya Pavlova is the outstanding scientist-paleozoologist, geologist and paleontologist, doctor of zoology, professor (1910), academician of the AUAS (1921), corresponding member of the Academy of Sciences of the USSR (1925), honorary academician of the USSR Academy of Sciences (1930), Honorary Member of the Paleontological Society, Head of the Paleontological Museum and Head of the Department of Paleontology at Moscow University (1919–1930).

Mariya Pavlova (Gortynska), is from Kozelets of Chernihiv region. She is one of the most prominent paleontologists and paleozoologists of our country and the world in general. She has written a number of scientific papers related to the evolution of fossil mammals in the territory of modern Ukraine, about which she had no idea. Her major works are devoted to the history of fossil ungulates (horses, rhinos, various artiodactyl and elephants). In particular, M.V. Pavlova identified the ancestor of the modern horse. She expressed her opinion about the place of the hoofed tertiary horse-hipparion in the evolutionary tree of horses. Before her, the hipparion was considered as a direct ancestor of the horse. Mariya has convincingly shown that it is only a side branch. She also suggested that horses and paleotheria should be excluded from direct ancestors. All this contradicted the conventional wisdom at the time. However, thanks to the research of M.V. Pavlova, her point of view on location in the evolutionary development of the horse hipparion and paleotheria became dominant. M.V. Pavlova published a manual “Paleozoology” (in 2 parts), for a long time headed the Department of Paleontology at Moscow University, created a section “Fossil Mammals” at the Paleontological Museum.

Although the work on the study of the bones of fossil elephants in the early twentieth century extended, but the main material is still the remains of elephants from Tiraspol gravel, represented by several jaws, more than 35 teeth, both upper and lower. The bones of other parts of the body of the elephants were large in number, though incomplete, but still gave some idea of the elephants of antiquity, their size, distribution, etc.

In the work of M.V. Pavlova (1907) post-tertiary animals, which included part of the material from the Tiraspol gravel, emphasized that she sought to determine the age of geological deposits in the mammal and shell fauna. She concluded that the elephants from under Tiraspol are the closest to the geological layers of Mosbach, the oldest layers of Germany.

In this article Pavlova gives general information, and in the next article in 1909 went to paleontological presentation of the material, in order to explain the question whether it is really possible to attribute the remains of elephants to El. trogontherii Pohl. She noted that by chance, the material she found was much larger than that described for her for this species.

Studying the bones of elephants from Tiraspol gravel, she wondered, first of all, the size of the bones, which significantly outweighed the size of the mammoth bones. After comparing the Tiraspol forms of elephants with European elephants, she began to compare them with elephants from other countries in Asia and America, of which there was rich material in the literature. The main feature of the characteristic teeth of El. planifrons were additional humps between the enamel plates. And this feature existed on the teeth of elephants from Tiraspol gravel – very thick enamel with rounded humpbacks and large gaps filled with cement, complemented the similarity of the teeth of these fossil elephants with the teeth of mastodons.

M.V. Pavlova turned to the elephants of North America. She found forms that appeared to be similar to the Tiraspol elephants. Yes, El. columbi, which most paleozoologists bring closer to El. meridionalis, and even more so with El. the emperor, whose large body size is exactly the size of the Tiraspol elephants. All
comparisons point to the community of such remote forms. A comparative study of extinct elephants with current elephants indicates a genetic link between El. namadiens and El. africanus, on the one hand, and El. ahntiquum and El. indicus – on the other.

M.V. Pavlova concludes that the mammoth skull, brought from Indigirka, was one of the first skulls, which became the basis not only for the study of fossil remains of elephants in the Russian Empire, but also gave rise to the science that owes its origin to G. Cuvier, – paleontology. Moreover, M.V. Pavlova concludes that already at the end of the eighteenth century the study of domestic post-tertiary fossil fauna was started using a comparative-anatomical method. M.V. Pavlova also noted that under the influence of G. Cuvier's works there was an opinion that some of the extinct species are close to those animals that live today but are not identical with them. Even close-knit, one-of-a-kind species are broken down into separate species for a more detailed study of their skeletons, especially teeth. In J.I. Fischer von-Waldheim this is used in the study of elephants.

M.V. Pavlova notes that E.I. Eichwald points in his “Paleontology of Russia” to the remains of mastodons and dinotheria, such as those found in the soils with mammoth in the Podolsk and Volyyn provinces. The application of the evolutionary method in the study of fossil mammals became the best way in the works of M.V. Pavlova for the period from 1886 to 1907. The study of post-tertiary forms is the last section of the study of the development of their tertiary precursors, on the one hand, and the link with modern animals, on the other

In 1914, M.V. Pavlova, in her work, “A brief description of the new tertiary mammal fauna of southern Russia,” noted that during the last five years, the mammal's findings in Russia have been a great joy, although the first find about the dinosaur tooth was mentioned by P.S. Pallas as early as 1777 [12]. Most of these remains are individual teeth or bones, so finding a tooth was not richer.

Laskarev found another bone-enriched site for almost all major representatives – the village of Taraklia in Bessarabia. Following this discovery, other localities appeared: near Sevastopol, Odessa, Tudorov (now Tudora village), and Chobruchi in Bessarabia (now Moldova). Most of these collections came to the University of Odessa as the closest location to fossil mammals discovered by the researchers, as well as to the Petersburg Academy of Sciences and to the Geological Committee in Petrograd, which were also actively involved in the excavations.

Much of the remnants of the designated areas have been made available to the Geological Museum of Moscow University, which became the material for articles by M.V. Pavlova on tertiary and post-tertiary mammals, published in 1913–1914. Pavlova reported the first fossil mammals near the village Grebinnyky, even then emphasizing their importance. After all, the animal forms found there were new to the deposits of southern Ukraine and indicated their closeness to the forms of Pikermi and Samos island (Greece), with the forms of Kurouron (France) and Eppelsheim (Germany). Since then, collections of fossil mammals have increased significantly, so Mariya in her article provides a detailed description of forms from the following areas: Tiraspol – line of railway, villages – Grebinnyky, Taraklia, Tudor, Chobruchi, Kalfa.

The sediments in which mammal remains were found are considered identical with the Pikermi deposits. This conclusion was reached by the husband of Mariya Vasylivna – a geologist and paleontologist A.P. Pavlov when he visited in 1908 with her some of the listed areas. He formed his conclusion on the basis that these sediments had no turtle invertebrates at all. Mariya Vasylivna began the description of the ungulates (camels, gazelles, deer, pigs), which are represented by as many as 7 families of tooth-and-tooth animals. The researcher also did not miss the attention of the equine animals (horses, hipparians, elephants, Mastodons, Deinotherium), carnivores (6 genera – feline, hyenas, marten), and after a detailed description concluded that in Ukraine the forms closest to the fauna Pikermi in these areas by the number of investigated forms. Moreover, she found that there is one such representative in Ukraine that is absent in the Pikermi fauna – it is a species of fossil Aceratherium. Stranger are the forms that have much in common with the forms of North America. However, M.V. Pavlova says: “We know that this is not the first indication of the community of representatives of the known deposits of the Old and New Worlds. This is another confirmation of the connection between these continents in the tertiary era” [Ibid, p. 190].

M.V. Pavlova also notes that ordinary fauna, similar to ours, is called the Pikermi fauna, or the hipparion fauna, or the dinosaur fauna. But this is not entirely true, since the last two names, in particular, have a wide geological distribution from the Upper Miocene to the Upper Pliocene, and their different forms vary in different layers. Recent findings of fossil
tertiary mammals in southern Ukraine today confirm this. Sevastopol fauna with hipparions, described by A.O. Boryssyak, much younger than the fauna of Chorbininki and Chobruch. The above-mentioned forms, which inhabited a vast area from southern France, through Germany, Austria, southern Russia (Ukraine), Greece, Persia (Iran), Central Asia, and reached North America died at the same time after a long geological life, apparently due to some unusual catastrophes [Ibid., p. 191]. And further Mariya Vasylyvna paints a picture of that terrible tragedy: “The conditions in which fossil remains of these animals in the above-mentioned localities found are of a general nature i.e. chaotic. All bones are broken, mixed, pressed into each other. I saw it in Pikermi, in the Cucuronian and here. Descriptions of other places – Samos, Maraga – give the same. Apparently, these various animals were killed at the same time and found themselves in very strong streams, which carried them quickly, breaking and mixing, setting aside places in each country and covering them with silt and sand. In addition to the mammals described, there are turtles in our collections that are close to but not identical to Pikermi ones. They will be described separately. March 10, 1914”[Ibid., p. 191].

Such features of the research program of M.V. Pavlova in Paleozoology as latitude and pragmatic are to be mentioned. The latitude was determined by the drift of research towards the direction of the fauna, which originated and departed from the main line of paleozoology development in the twentieth century [13]. A similar drift towards geology has been sustained by actively working as researchers, students of M.V. Pavlova, especially V.V. Menner, M.O. Bolhovitinova, M.I. Shulga-Nesterenko et al. On the other hand, the rapid growth and differentiation of paleozoology, its rapid entry into the “great science” phase, have also swallowed up many professional geologists and, in part, the objects of their research. The breadth and pragmatic focus of the program at the school Pavlova provided her with a long life beyond the real science school, to this day.

Reflections on the Specific Program of the Scientific Paleozoological School M.V. Pavlov shows that the research program of any scientific school carries both the sprouts of the progress of scientific knowledge and the breakthrough in understanding phenomena, and factors that inhibit or stabilize the scientific process, sometimes divert it away.

Conclusions. In conclusion, it should be mentioned that the program of identification of scientific schools has gained high popularity in the post-Soviet space. At the same time, when selecting scientific schools, they often forget to take into account their main feature – the presence of a research program. Although science schools are notable for their competing research programs.

The reconstruction of the research program of a scientific school is always laborious and is a non-trivial task for the historian and sociologist of science. We made an attempt to reconstruct the research program of the Paleozoological School of M.V. Pavlova that has become a prominent phenomenon in world paleozoological science. Elephant fossils from the Tiraspol gravel (Moldova) occupy an extremely important place in the research of M.V. Pavlova. With our publication, we call on modern paleozoologists to actively explore the world's fossil elephants.

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необхідні були її здібності у створенні вітчизняної палеоалеозоїчної школи. Її палеоалеозоїчні праці відомі далеко за межами нашої країни. Енциклопедія і теоретична думка – характерні риси М.В. Павлової, яка народилася у результаті безперервної роботи вчені. Її праці відзначаються глибоким знанням історії і вірі у наступництво всього прогресивного. Вона віків і заслугована видатна нікелевий питання, вислів свої праці з великої педагогічної майстерності. Особливо місце серед наукових праць М.В. Павлової посідає дослідження, які стали результатом узагальнения, критичного переслідування нових концепцій: дослідження викопних слонів, філоденомічні ряди динозаврів, вплив низькоглихого середовища на опівтварини. Аналіз цих концепцій дозволив їй зробити важливі висновки, які спеціально нашому часові.

Ключові слова: палеоалеозой, М.В. Павлова, палеоалеозой, Тираспольський гравій, слони, динозаври, миоцен.

Дефордж А.В. Академік М.В. Павлова об історичному розвитку послетретичних слонів в Тираспольського гравію.

Академік М.В. Павлова успішно проводила свої ісследования сразу по нескольким научным направлениям. Она занималась проблемами палеозоологии: изучала причины вымирания животных в прошлых геологических эпохах, исследовала ископаемые остатки слонов, носорогов, тариров, непарнокопытных и парнокопытных, наземных амфий, описывала многочисленные ископаемые остатки млечопитающих Тираспольского гравия. Её талант ярко проявился в области єстествознания, необхідні були її здібності у створенні вітчизняної палеоалеозоїчної школи. Її палеоалеозоїчні праці відомі далеко за межами нашої країни. Енциклопедія і теоретична думка – характерні риси М.В. Павлovoї, яка народилася у результаті безперервної роботи вчені. Її праці відзначаються глибоким знанням історії і вірі у наступництво всього прогресивного. Вона віків і заслугована видатна нікелевий питання, вислів свої праці з великої педагогічної майстерності. Особливо місце серед наукових праць М.В. Павлової посідаєдослідження, які стали результатом узагальнення, критичного переслідування нових концепцій: дослідження викопних слонів, філоденомічні ряди динозаврів, вплив низькоглихого середовища на опівтварини. Аналіз цих концепцій дозволив їй зробити важливі висновки, які спеціально нашому часові.

Ключові слова: палеоалеозой, М.В. Павлова, палеоалеозой, Тираспольський гравій, слони, динозаври, масеовання.
тате непреривній роботі учениці. Її роботи оновлюються глибоким знанням історії і верою в безпосередність всього прогресивного. Вона цікаво і об'єднуючи в роботі на видалим педагогічним майстерством. Особливе місце серед наукових трудів М.В. Павлової займають теоретичні роботи, які стали результатом обміну, критичного переосмисління нових концепцій: розглядаючи історичних слонів, філогенетичні ряди копитних їхній житті, ефективність, що впливає на біологічні животинні. Аналіз цих концепцій дозволив їй зробити важкі висновки, які зв'язані з нашим часом.

Ключові слова: палеозоологія, М.В. Павлова, палеонтологія, Тирангольський гравій, слони, динотерии, мастодонти.

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