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**BIOLOGICAL SCIENCES****VARIABILITY OF GENETIC MARKERS OF AVIAN INFLUENZA  
A OF H1N1 AND H7N9 STRAINS. EXPRESS-METHOD DIAGNOSTICS  
PCR-RFLP FIELD ISOLATES****Semen Buriachenko<sup>1</sup>****Borys Stegny<sup>2</sup>**DOI: [https://doi.org/10.30525/978-9934-588-11-2\\_1](https://doi.org/10.30525/978-9934-588-11-2_1)

Type A influenza affects a wide range of hosts: birds, humans, pigs, horses, marine mammals [1; 2]. Influenza A virus is divided into subtypes based on the antigenic properties of its surface glycoproteins – hemagglutinin (H1-15) and neuraminidase (N1-9) [3]. Influenza A virus is highly variable, especially for surface virion glycoproteins [4]. Due to the fact that pigs are susceptible to influenza A viruses in birds and humans, they are considered to be an intermediate host in which genes are reassorted between pigs, human and avian viruses [5]. Given the persistent presence of A (H7N9) viruses in some poultry populations, it poses a threat to the health of the population, as these viruses generally cause severe disease in humans and are also potentially capable of mutation, facilitating their transmission from person to person [6]. Reassortment can lead to the emergence of new antigenic variants of influenza virus, potentially capable of causing epidemics in humans [7; 8]. This fact determines the importance of influenza A not only for veterinary medicine but also for the protection of human health. The purpose of the work is to develop an express method for the identification and detection of avian influenza A virus H1N1 and H7N9 strains based on polymerase chain reaction with restriction fragment length polymorphism (PCR-RFLP) analysis of virus RNA.

Based on the analysis of hemagglutinin, neuraminidase, and nucleoprotein gene polymorphisms, variable pairs of oligonucleotides specific for the H1N1 and H7N9 viral subtypes were obtained. More than 8,000 influenza A, NA, and NP gene sequences of the H1N1 and H7N9 subtypes, allotted by 2017, were used for primer selection. The sequences were analyzed using Alignment Service and Lasergene (version 6.0). The homology level of the selected primers is not less than 95%. The method involves conducting a polymerase chain reaction with RNA virus combined with the amplification reaction for three genes, analysis of the reaction mixture by agarose gel electrophoresis and detection of RNA strains of influenza A viruses by analysis. The proposed method after obtaining biological samples and RNA isolation

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involves two main reactions. The first is the first PCR with primers specific to the site of the influenza A hemagglutinin gene. The matrix for this reaction is single-stranded RNA of influenza virus, and the primers are primers consisting of 20 units: HA5 – ACACCAGCCTCCCATTTCAG, and CCCCTCAATAAAGCCAGCA, which also has 20 units. HA10 – including primers GCCGCAAATGCAGACACATT and GCTGCCGTACACCTCTATT. The second reaction is a second PCR with primers specific for the neuraminidase gene region. The matrix for this reaction is the single stranded RNA of influenza virus, and the primers are primers consisting of 20 units: NA1 CAGGAGCCCATATCGAACCC and CTTTGGGTCGCCCTCTGATT. For the NA8 gene, primers TGCAGGGATAACTGGCATGG and GCTCCCGCTAGTCCAGATTG. Third – third PCR with primers specific for the region of the nucleoprotein (NP5) gene of influenza A virus. The matrix for this reaction is single-stranded influenza virus RNA, and the primers are primers consisting of 20 units: GTGGTCAGCCTGATGAGTCTTGGGTTCGTGGTTC and GGGTCTC. The second reaction is RFLP with endonucleases specific for the hemagglutinin gene, neuraminidase and nucleoprotein regions. We perform RFLP analysis using 2 types of Aval, Apal, BamHI, EcoRI, Clal, NcoI, PstI, and HindIII. The use of a polymerase chain reaction compatible with the restriction fragment length polymorphism method reduces the reaction time. The reaction mixture was analyzed by electrophoresis in 2% agarose gel. The presence in the analysis sample of RNA fragments sized 958 nucleotide pairs (PN) for primers specific for H1N1, and 966 nucleotide pairs for primers (HA5, specific H7N9. For HA10: 416 pairs for H1N1 and 411 for H7N9. For NA1 (H1N1) 845 bp. and 848 for H7N9, for NA8 (H1N1) 450 pairs and 447 for H7N9. For NP5 (H1N1) 166 and 163,166 for H7N9, when using primers specific for the hemagglutinin, neuraminidase and nucleoprotein genes indicate the presence of virus RNA in the starting material.

Identification of strain H1N1, the samples of which form in RFLP analysis using good restriction enzymes to the gene NP unique products sizes 49-50, 348-350, 592-599 BP, others – fragment amplification sizes 21, 39, 201-203, 471-480 BP, identical to the products of RFLP analysis using good restriction enzyme strain H7N9. The in silico analysis of the HA, NA and NP gene amplicons allowed us to obtain theoretical PCR-RFLR electrophoregrams of the analysis, to calculate the reaction conditions, to determine restriction sites in matched restriction enzymes.

An express method for the detection and identification of influenza A H1N1 and H7N9 virus by three (HA, NA, and NP) RNA genes H1N1 and H7N9 in a polymerase chain reaction combined with RFLP analysis was developed. The method of express diagnostics is able to detect avian influenza virus A H1N1 and H7N9 and differentiate it from samples of other pathogens of viral infections of birds and animals. It was established that the PCR-RFLP rapid diagnostic method is able to detect influenza A virus RNA of H1N1 and H7N9 strains with high sensitivity (100% sensitivity). This rapid PCR analysis with RFLP will allow you to detect viral material in one reaction mixture, shorten diagnostic time, percentage of financial costs and technological errors.

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## THE INTENSITY OF INFLAMMATION IN THE PULMONARY SYSTEM OF RATS IN RESPONSE TO THE INHALATION EFFECT OF NITROGEN(IV) OXIDE

**Vitalii Ivchuk<sup>1</sup>**

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A pathological inflammatory response in response to exposure to industrial airborne pollutants is the basis for the occurrence of chronic obstructive pulmonary disease (COPD) of occupational etiology [1, p. 995; 2, p. 1207]. Industrial risk factors that can cause this pathology are particles of industrial dust and aggressive gases that are in the air of the working area. The latter, among workers in the mining

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and metallurgical sectors of heavy industry, can initiate the development of inflammation of the respiratory tract. Clinical observations have shown that even in the post-contact period, with COPD, inflammation in the bronchopulmonary apparatus persists [3, p. 146; 4, p. 124]. The presence of numerous scientific publications leaves insufficiently studied many aspects of the pathogenesis of COPD. In particular, questions regarding the selectivity of the development of this professional pathology, the lack of inhibition of inflammation reactions in the post-contact period remain insufficiently covered in the literature. The discussion on the causes of exacerbations of COPD of professional etiology remains open [1, p. 995; 3, p. 151]. Since the cells of innate and adaptive immunity, vascular endothelium and bronchopulmonary epithelium are involved in the course of chronic inflammation reactions, a more detailed study of the immune mechanisms of the onset and development of COPD of professional etiology will slightly open the veil of the pathogenesis of this disease.

The aim of the study was to assess changes in the intensity of inflammation reactions in the pulmonary system of experimental animals upon inhalation of nitrogen(IV) oxide.

Studies were performed on male Wistar rats ( $n = 35$ ) weighing 160-180 g. Rats were divided into 5 groups: Group 1 – control ( $n = 7$ ); Group 2 –  $\text{NO}_2$  exposure for 15 days ( $n = 7$ ); Group 3 –  $\text{NO}_2$  exposure for 30 days ( $n = 7$ ); Group 4 –  $\text{NO}_2$  exposure for 60 days ( $n = 7$ ); Group 5 – recovery period for 6 months ( $n = 7$ ). The animals were kept on a standard diet. A model of the stage-by-stage formation of COPD, from an acute reaction to damage to a chronic process, was reproduced using the inhaled exposure to nitrogen(IV) oxide [5, p. 8]. Animals were removed from the experiment by cervical dislocation. All manipulations with experimental animals were carried out following the rules of the European Convention for the Protection of Vertebrate Animals used for research and other scientific purposes, as well as in accordance with scientific and practical recommendations for the maintenance and handling of laboratory animals. Bronchoalveolar lavage was performed on isolated lungs with isotonic sodium chloride solution at room temperature. Using a hemocytometer in 1.0 ml of bronchoalveolar lavage fluid, the total cell count was calculated and differential cell analysis was performed. Functional activity of alveolar macrophages was determined using standard latex particles. By the method of selective precipitation with polyethylene glycol in the blood serum, the content of circulating immune complexes was determined. By the method of enzyme-linked immunosorbent assay in blood serum and bronchoalveolar lavage fluid, the concentrations of tumor necrosis factor alpha ( $\text{TNF}\alpha$ ) and transforming growth factor beta ( $\text{TGF}\beta$ ) were determined. Statistical processing of experimental data was carried out using STATISTICA 6.0 software (StatSoft, USA). The significance of differences in values between independent quantitative values was determined using Student's t-test. Changes were considered statistically significant at  $p < 0.05$ .

Significant changes in the cellular composition of bronchoalveolar lavage fluid were observed on day 15 of  $\text{NO}_2$  inhalation. So, in comparison with the control, the number of macrophages decreased by 2.4 times, while the content of neutrophils and

lymphocytes increased by 9.5 and 4.8 times, respectively. The number of lymphocytes was consistently high throughout the entire time period of the experiment. After 30 days of NO<sub>2</sub> exposure, the number of neutrophils approached control values. Until the completion of the recovery period, it was stable. At the same time, after 60 days of inhalation of NO<sub>2</sub>, the number of macrophages approached the indices of the control group of animals.

A study of the phagocytic activity of alveolar macrophages showed no statistically significant changes. However, it can be noted that there is a relationship between the gradual increase in the phagocytic number and phagocytic index and the duration of exposure to NO<sub>2</sub> – its strength increases with time.

The most significant changes in the concentration of circulating immune complexes were observed after 60 days of experience. There was 9.2 and 3.8 times increase in the content of circulating immune complexes with high molecular weights and average molecular weights, respectively. A mutually opposite trend between the concentration of circulating immune complexes of various molecular weights was observed after the completion of the recovery period of experimental animals. So, in the blood serum the content of circulating immune complexes with high molecular weight decreased by almost 4.5 times. The concentration of circulating immune complexes with an average molecular weight remained almost at the level of the animal group after 60 days of NO<sub>2</sub> exposure and exceeded the control group by more than 3.5 times. Since circulating immune complexes with an average molecular weight settle in the lung tissue and thereby contribute to the launch of the cascade of release of cytokines and chemokines, it becomes obvious that these complexes exhibit the greatest pathogenic effect. In addition, it is known that an obstacle in the development of repair processes in lung tissue is an increase in the content of these immune complexes, which, thereby, induce the persistence of inflammation.

The concentration of TNF $\alpha$  in blood serum and bronchoalveolar lavage fluid increased in proportion to the time period of the effect of NO<sub>2</sub> in experimental animals. In blood serum, it increased by 3.2 times, and in bronchoalveolar lavage fluid by almost 145.0 times. The completion of the recovery period of the experimental animals led to a decrease in the level of TNF $\alpha$  in the blood serum by 2.9 times, which brought it almost to the level of the control group. While the concentration of this factor in bronchoalveolar lavage fluid remained almost at the level of numerical values of the group of animals after 60 days of NO<sub>2</sub> exposure, which indicated the continuation of reactions in the focus of inflammation.

A similar dynamic was also revealed in the analysis of the content of TGF $\beta$  in blood serum and bronchoalveolar lavage fluid of rats of experimental groups. The effect on rats of NO<sub>2</sub> for 30 days showed an increase in the concentration of TGF $\beta$  in blood serum by 2.6 times, in bronchoalveolar lavage fluid by 3.2 times compared with the group of animals, where the exposure lasted 15 days. The rapid growth of this factor by 33.0 and 14.7 times, respectively, in blood serum and bronchoalveolar lavage fluid was observed after 60 days of exposure to NO<sub>2</sub>. After completion of the recovery period, the serum TGF $\beta$  content decreased by 14.2 times compared with the group of animals where the exposure lasted 60 days, while in the bronchoalveolar

lavage fluid almost did not change. It is known that TGF $\beta$  plays the role of one of the leading regulators of the processes of fibrosis and elastolysis.

The results of experimental studies indicate the presence of persistence of the chronic inflammatory process in the bronchopulmonary system of rats, which occurs as a result of prolonged exposure to NO<sub>2</sub>. With the occurrence of such an inflammatory reaction, obviously, there is the possibility of the formation of an autoimmune mechanism to support the process. The occurrence of morphological changes in the lung tissue may be due to the presence of an excess concentration of circulating immune complexes. After all, it is known that the latter are involved in the development of immunopathological reactions and thereby contribute to lengthening the course of the inflammation during the recovery period of experimental animals.

When interacting with cellular receptors of neutrophils, T- and B-lymphocytes, circulating immune complexes disrupt their functional activity. Strengthening the adhesion of neutrophils to the vascular endothelium is observed after phagocytosis of circulating immune complexes. As a result, they release a number of enzymes into the lumen of the bronchi, in particular elastase and proteinase, whose biological targets are cells of bronchopulmonary tissue [1, p. 995; 4, p. 125]. Together with these processes, changes in the structure and function of the epithelium of the bronchopulmonary apparatus begin to occur. They occur in response to inflammation reactions that progress due to prolonged exposure to proteinases and oxidants. The latter are expressed by effector cells of inflammation – neutrophils and macrophages. Goblet cells begin to actively produce and secrete mucous secrets, as a result of exposure to neutrophilic elastase [2, p. 1207; 3, p. 148].

The results of experimental studies allow us to draw certain conclusions. Nitrogen(IV) oxide during prolonged inhalation causes the formation of a local and systemic chronic inflammatory process in rats. Pathological processes that occur in response to exposure to nitrogen(IV) oxide are accompanied by changes both at the level of natural and adaptive immunity, and continue until the completion of the recovery period. The development and course of autoimmune processes in lung tissue can maintain the persistence of inflammation in the bronchopulmonary tract.

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## **AGRICULTURAL SCIENCES**

### **AGROBIOLOGICAL AND ECOLOGICAL BASES OF PRODUCTIVITY INCREASE AND GENETIC POTENTIAL IMPLEMENTATION OF NEW BUCKWHEAT CULTIVARS IN THE CONDITIONS OF THE NORTHEASTERN FOREST-STEPPE OF UKRAINE**

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Obtaining steady and high yields of agricultural crops is inextricably linked to the soil fertility, which depends on the intensity of organisms' processes in the soil.

It is known that the increase in plant productivity can be achieved not only by the introduction of necessary fertilizers rates and biological preparations in the complex of crops cultivating technological operations, but also by selection methods.

Improving the agrotechnical methods of buckwheat cultivation through the technology elements combination (choice of cultivars, biological preparations, mineral fertilizers, plant growth regulators, microfertilizers) will contribute to the implementation of its genetic potential [1, p. 350].

In the technology of growing crops, plant growth regulators are an important factor in controlling the growth and development of plants. Growth regulators give the opportunity to better realize the potential of plants, regulate the ripening periods, improve the quality of products and increase yields. The basis of microbiological preparations are live microorganisms, which are characterized by a complex of agronomic-beneficial properties – nitrogen fixation, phosphate mobilization, growth stimulation and antagonism to phytopathogens [2, p. 26-30].

Important role in the formation of crops is devoted to fertilizers, but there are questions remain of their interaction with microbial preparations and its impact on the productivity of buckwheat. By changing the chemical composition of the substances entering the plants, its number and time of receipt, it is possible to increase the yield, to enhance the growth, to improve the chemical composition and quality of the products, as well as to increase the plants resistance to adverse conditions.

The application effectiveness depends on the degree of its compliance with the biological requirements of agricultural crops in specific soil and climatic conditions [3, p. 140-142].

Literary data testify to the positive influence of microbiological agents and plant growth regulators on the production of grain crop yields [5, p. 96-100].

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Improvement of plant productivity can be achieved not only by breeding methods, but also by introducing the necessary fertilizer rates and incorporating biological preparations into a set of successive technological cultivation operations [4, p. 89-94].

The modern innovative way to increase the productivity of agricultural crops is the biopreparations usage that improves the conditions of nutrients use from both fertilizers and soil. When using microbial preparations, the supply of useful microorganisms in the required amount is provided at the optimal period and in the right place [6, p. 22].

Creating a space for the domination of agronomically beneficial bacteria in the root zone of cultivated plants helps to ensure the mineral nutrition. At the same time microbial preparations, having in its composition physiologically active substances of bacterial origin (original growth stimulants, but not chemical), actively influence the root system growth and form the significant absorbent area, which, in general, contributes to the increase of fertilizer use degree by inoculated plants. In addition, vegetative treatments intensify the general development of plants with an orientation towards increasing their productivity and improving product quality [7, p. 17-19].

Experiments with buckwheat were conducted in the short-term field crop rotation of the Institute of Agriculture of the North East NAAS, which is located in the conditions of the northeastern Forest-Steppe of Ukraine. Research methods are field trials that included phenological, biometric observations and structural analysis of plants.

In the experiments of 2016-2018 it was found the influence of mineral fertilizers, biopreparation, microfertilizer and plant growth regulator on the formation of buckwheat inflorescences and its maintenance by photosynthetic leaf layer.

The greatest growth of leaf surface was observed during the period of flowering – beginning of fruit production. Subsequently, the leaf surface continued to increase, but the intensity of its growth was low.

The maximum leaf area of the buckwheat plants of Selyanochka cultivar was observed on the variant of complex application of seed inoculation with biopreparation, plant growth regulator and mineral fertilizer application (depending on the fertilizer rate varied within the range of 230.5-271.3 cm<sup>2</sup>). The same variant with Slobozhanka cultivar formed the maximum leaf surface area depending on the fertilizer rate (308.4-321.4 cm<sup>2</sup>).

The results of mineral fertilizers, biopreparation, growth regulator and micronutrient influence on the formation of buckwheat plants productivity in 2016-2018 years have revealed that the structure of the buckwheat crop was significantly influenced by the use of biomaterial. The intensity of plants growth and development was uneven and depended on hereditary properties and conditions of the environment.

The structural plants analysis was carried out in order to detect and characterize the influence of investigated factors on the elements of productivity in different buckwheat morphotypes cultivars. The inoculation of buckwheat seeds with the biopreparation increased the number and weight of buckwheat grains compared with the variant without biologic agent application.



Maximum number of grains per plant (48 pcs.) was recorded in variant of Selyanochka cultivar with plant growth regulator (Sodium humate 1.0 l/ha in the budding phase) in combination with mineral fertilizer  $N_{16}P_{16}K_{16}$  application into rows. Moreover, minimum number of grains per plant (40 pcs.) was formed by Selyanochka cultivar in variants without mineral fertilizers, seeds treated with water and seeds treated with Microhumin 200g/ha, which indicates a negative effect of additional mineral nutrition absence.

Selyanochka cultivar maximum weight of 1000 grains (26.3-27.5 g) was obtained in the variant with complex seeds inoculation by biopreparation, microfertilizer and plant treatment. These variants obtained maximum weight of grains from plant (1.27 g).

The dependence between the weight of 1000 grains and weight of grains per plant was not noted in Slobozhanka cultivar. The highest level of the weight of 1000 grains was formed in the with plant growth regulator on the background of  $N_{30}P_{45}K_{45} + N_{15} - 25.9$  g, while the weight of grains per plant was 1.12 g, which is average for experiment. Complex seed inoculation with biopreparation, microfertilizer and plants treatment by plant growth regulator provided the weight of grains per plant in the range of 1.18-1.21g, but the weight of 1000 grains was 25.1-25.6 g.

According to the results of the research, the use of the growth regulator, which was introduced separately as well as in mixtures with biopreparation, imposed a significant influence on the formation of buckwheat grains yield and exceeded the control variant.

Accordingly to results of our research in the conditions of the northeastern forest-steppe of Ukraine Selyanochka cultivar was better responding to the use of seed inoculation and fertilizer application than Slobozhanka cultivar. The variant of complex use of seeds treatment with biopreparation, microfertilizer and introduction of plant growth regulator in the phase of budding of buckwheat plants, on the background of mineral fertilizers use  $N_{16}P_{16}K_{16} + N_{15}$  achieved maximum yield – 2.20 t/ha, with increase from fertilizers – +0.42 t/ha, from biopreparation, microfertilizer and plant growth regulator – +0.27 t/ha.

The highest yield level of Slobozhanka cultivar (1.92 t/ha) was obtained in the variant with mineral fertilizers application into rows  $N_{30}P_{45}K_{45} + N_{15}$  with increase – +0.41 t/ha compared to control. The yield increase from the use of plant growth regulator Sodium humate was 0.19 t/ha.

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## EFFECT OF THE CULTIVATION OF LEGUMES ON THE DYNAMICS OF SOD-PODZOLIC SOIL FERTILITY RATE

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In order to preserve and increase soil fertility, as well as to increase agroecological resistance to adverse anthropogenic factors, it is essential to accumulate organic matter in the soil. Due to the sharp decrease in the number of livestock in the farms of Ukraine, it is almost impossible to address this problem only by introducing manure. Therefore, it is necessary to find ways to restore and maintain the optimal level of soil fertility by means of the application of alternative methods of accumulation in the soil. One of the main resources and promising direction in solving this problem can be the cultivation of perennial legumes [3, p. 106-110].

Perennial legumes are one of the factors, which enable to stabilize the processes occurring in the soil – plant – animal – human system. A large phytomeliorative role of perennial legumes on the arable land, the optimal ratio of plowed land, hayfields and pastures will contribute to the elimination of destructive processes that occur in agricultural landscapes, reduce erosion and increase soil fertility and crop yields [4, p. 18-21; 7, 30-34].

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It should be noted that perennial legumes improve the fertility of soil, protect it from wind and water erosion, leave dry roots and nutrient residues in the soil (from 40 to 100–120 kg/ha). Their root system contains between 2.5–3 and 4% nitrogen (per dry substance). After its dying and decomposition, nitrogen stocks in the soil increase by 150–200, sometimes 300 kg/ha. Accumulated in the root system and crop residues of leguminous crops, nitrogen in the soil is well absorbed by other crops involved in rotation [2, p. 53–57].

The scientists claim that the use of leguminous crops, perennial grasses that can improve soil fertility and form high yields in crop rotations facilitate a solution to the issue of providing livestock feed and organic fertilizers – crop production. Therefore, most farms develop these important agricultural sectors from a comprehensive perspective.

At the same time, perennial grasses enrich the soil with organic matter and biological nitrogen, which stabilizes its fertility. The manufacture of their products is economically justified [5, p. 9].

Nitrogen is an important element for plant growth and development. Perennial grasses, especially legumes, in terms of nitrogen accumulation in the soil, are a very good precursor to many major cultivated plants [1, p. 391–393].

According to the calculation of scientists, in the conditions of the Central Forest-Steppe of Ukraine alfalfa for three years of life is able to absorb from the air 735 kg/ha of nitrogen, enriching the soil in the amount of 598 kg per 1 hectare [6, p. 54–57].

The soil cover of the experimental field is represented by sod-podzolic surface-gleyed soil on the slope of the north-western exposure with steepness of 1–3°. Prior to the sowing of legumes, the research plot was characterized by the following indicators: humus content – 2.4% (low), alkaline hydrolyzed nitrogen – 67.1 mg/kg of soil (very low), mobile phosphorus – 75.6 mg/kg of soil (medium), exchangeable potassium – 66.0 mg/kg of soil (low). The soil reaction was very acidic and acidic (pH of the salt extract is 4.4–4.8), hydrolytic acidity – 5.8–6.0 mg-EQ per 100g of soil. The amount of calcium absorbed in the soils was 6.3 mg-EQ, magnesium 2.5 mg-EQ per 100 g of soil, indicating low base saturation.

The scheme of two-factor experiment provides for the three levels of fertilizing. Mineral fertilizers were applied at-ground in the form of ammonium nitrate, granulated superphosphate and double manure salt in early spring. The size of seedling plots was 15 m<sup>2</sup>, accounting plots – 10 m<sup>2</sup>. In addition, perspective varieties of legumes such as cow clover – Darunok, alsike clover – Rozheva 27, birdsfoot deer vetch – Aiaks, alfalfa – Andi, were sown and released.

A positive effect of the cultivation of legumes on the rate of fertility of sod-podzolic soil has been established on the basis of the conducted research. The results of experiments have shown that the long-term cultivation of perennial legumes on nutrient-poor soils results in the development of a highly branched root system. As a result, the weight of the root and stubble residues exceeds the weight of the above-ground mass or approaches it. Thus, the yield of the above-ground herb mass for two years of use has amounted to 14.6 c/ha of air dry matter, and the yield of legumes – 14.2 t/ha. The root and stubble residues are amounted to 165.3 and 132 c/ha,

respectively. With a well-developed root mass, a large amount of nitrogen remains in the soil (231.4 and 145.2 kg/ha, respectively), which largely (about 50–70%) compensates for the expenditure of soil nitrogen to form a yield of herbs.

It has been established that the productivity of perennial legumes on average during the years of research with the two-haying use on the variants without fertilizers and with the application of  $\text{Ph}_{60}\text{P}_{60}$  is in the range of 5.03–of 6.47 t/ha of dry weight, 3.62 – 4.98 t/ha of fodder units, 0.79 – 1.08 t/ha of crude protein, 43.3–58.2 GJ/ha of exchange energy.

The highest content of alkali-hydrolyzable nitrogen is observed in the soil when growing alfalfa – 80.4 mg/kg of soil, due to the productive activity of symbiotic nitrogen-fixing bacteria of this species of herbs. The nitrogen content in the soil under cow clover was 4.8% lower and amounted to 77.0 mg/kg of soil. The other experimental plots had almost the same nitrogen content – 77.5–77.8 mg/kg of soil that was 3% less compared to the variant under alfalfa. When applying phosphorus-potassium fertilizers on the variants of alfalfa +  $\text{Ph}_{60}\text{P}_{60}$  and alfalfa +  $\text{Ph}_{90}\text{P}_{90}$ , the nitrogen index increased by 10.6 mg/kg of soil. On all variants of the experiment the content of alkaline hydrolyzed nitrogen was very low.

The content of mobile phosphorus on the experiment variants ranged from 80.9 to 83.2 mg/kg of soil (average level) depending on the crop. It has been established that the cultivation of cow clover, alsike clover, birdsfoot deer vetch, alfalfa against  $\text{Ph}_{90}$  during the study period contributed to the growth of mobile phosphorus in comparison with its content in the soil prior to the sowing of herbs by 4.2–5.9%, in particular, in the variant with alfalfa it was amounted to 5.0 mg/kg of soil. This is due to the fact that the stockpile of phosphorus in the soil is the most stable among other indicators of fertility, and the creation of cover with perennial herbs with a developed root system contributes to the suspension of erosion processes, the content of mobile phosphorus in the soil increases.

Characterizing the balance of nutrients of sod-podzolic soil subject to the cultivation of legumes, the analysis of nitrogen expenditure has shown that this element of nutrition is most heavily used by birdsfoot deer vetch and cow clover – the yield is 105.4 and 100.3 kg/ha, respectively. This is due to the high productivity of these crops. The lowest nitrogen losses are found in alfalfa – 98.6 kg/ha that correlate with the lowest productivity of that variant. The rate of biological nitrogen entering the soil is largely dependent on the efficiency of nitrogen fixation. The highest nitrogen intake from nitrogen fixation is recorded on the variant with birdsfoot deer vetch – 140.8 kg/ha, and the lowest – on the variant with alsike clover – 91.8 kg/ha, which is 34.8% lower compared to the previous variant. The total balance is negative in the variants with alsike clover and amounted to 8.2 kg/ha.

It has been established that phosphorus is the most intensely removed by birdsfoot deer vetch – 320 kg/ha and cow clover – 31.0 kg/ha. Its smallest loss is observed in the variant with alfalfa (25.5 kg/ha). Relative to the potassium regime, this food element is the most heavily used by birdsfoot deer vetch – 91.4 kg/ha. The lowest potassium expenditure is observed in the variant with alfalfa – 71.4 kg/ha, which, in our opinion, is connected with the yield of the crop grown. The balance of potassium

in the soil in the variants with legumes when applying potash fertilizers at the rate of 60 kg/ha is negative.

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## **ORGANIZATIONAL AND TECHNICAL ASPECTS OF INTRODUCTION OF INNOVATIONS OF ORGANIC AGRICULTURE AND RATIONAL LAND USE OF THE AGRARIAN ENTERPRISES**

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The innovative nature of production should be supported by attracting a healthy level of investment. Agro-industrial sector is one of the leading sectors in the economy of Ukraine in terms of capital investments. On the one hand, relative stagnation, stability of the domestic economy, on the other, pent-up demand for investments in the tough time in 2014-2015. These factors influenced a dynamic improvement in attracting investment in the sector in recent years [1, p. 44-48].

For example, according to the Office for National Statistics, the amount of capital investments in agriculture increased by almost 28% – 634 billion UAH in 2017, compared to 2016.

Positive trend continued in the previous year. According to official statistics, in the period from January to June 2018, agro-industry acquired 264 billion UAH that is 9% more than in the same period of the previous year. Only the innovative development of the agricultural sector can influence further investment flows to Ukraine (Official site of the State Statistics Service of Ukraine, 2018 [5, p. 175].

In addition, the development of organic farming, the process of reviving the fertility of agricultural lands, may solve many problems associated with the renewal of the Ukrainian village. The works of domestic and foreign scientists show a great interest in this subject and are the basis for further investigation.

Using Agrovit-Kor fertilizer that we offer for Ukrainian soils is the latest development which aims to increase the soil fertility and introduce science-based farming. There is no data found about using complex organic fertilizer (COF) in the fields of Eurasia, however, it is obvious that this issue is under investigated and requires additional studies and further research [4, p. 86-96].

The purpose of the article is to investigate the implementation of innovations, scientific and technological development progress in the agro-industrial sector of Ukraine, considering the international practices.

Construction of enterprises for growing and processing poultry is aligned with an increased demand for chicken in both domestic and foreign markets. Due to lower cost, compared to other types of meat, the share of poultry in the structure of meat consumption in Ukraine is gradually growing and today is 49%, while the share of pork is 40% and beef – 11%. In addition, domestic companies continue to increase exports of poultry meat. In particular, in January-September 2018, Ukraine shipped

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215 thousand tons of poultry meat abroad, which is 11.9% more than in the same period of the previous year [2, p. 428].

Considering the fact that the Saudi investment fund SALIC has recently purchased the agricultural holding Mriya and the President of Ukraine stated that our country is ready to create all the necessary conditions to attract investors, experts and market participants still believe that these events will not be a crucial drive or a strong positive signal for attracting investment in domestic agricultural sector [3, p. 59-63].

The companies from the Sumy Region were selected based on published data of financial organizations, government and companies themselves. All they should have already implemented projects, funded and launched in 2015-2018.

Options 2 and 3 are relevant for innovation activity of Kernel company: Kernel agricultural enterprise cultivate land in the Sumy Region – in Nedryhailivskiy, Romenskiy, Burynskiy, Trostianetskiy, Velyka Pysarivka, Krasnopilskiy, Bilopilskiy, Lypova Dolyna, Sums'kiy, Lebedynsky districts. Therefore, the production and use of innovative fertilizer is the latest development, which aims to increase soil fertility and maintain science-based farming.

Kernel is the world's leading and the largest in Ukraine producer and exporter of sunflower, a key supplier of agricultural products to world markets from the Sumy region, and is part of the Druzhba Nova cluster. Kernel company exports its products to more than 60 countries around the world. It also aims to double export volumes in the financial year 2016-2020 through balanced development of agricultural production with low cost due to investments in technology.

The increase in the production of sunflower in Ukraine is stimulated by the owners of processing enterprises who are trying to load their plants as much as possible. By the way, the export of oil and fat products in the structure of the agricultural production is 28%.

The problem today is not that sunflower occupies 20–25% of the cultivated area, but ignoring the necessary measures to balance its impact on the soil and other crops. And if balance of nutrients and moisture is not taken into account, then even limitations of 7-8 years on re-seeding will not change the situation.

New fertilizer allows not to change the soil in greenhouses up to five years. A distinctive feature of COF from other types of fertilizers is a high concentration of nutrients (nitrogen, phosphorus, potassium, organic matter), environmental safety (no heavy metals, pesticides), low amounts (biohumus – from 3.0 to 10 tons per hectare, super-fertilizer – from 0.5 to 2.0 tons per hectare for cereals and up to 3.0 tons per hectare – for potatoes).

For intrafarm usage of concentrated organic fertilizers, which should be carried out simultaneously with the row-crop planting, a machine based on the seed drill SUPH-8 was developed. It allows to apply concentrated organic fertilizers in amount from 0.4 to 3.6 t/ha. The developed power-driven process showed positive results during production inspection and testing at the machine-tractor station. These results allowed to start the serial production of necessary devices. So, the innovative nature of COF – super fertilizer Agrovit-Kor is supported by positive aspects in ecology, economics, and the efficiency of agricultural production. The capacity of COF production line

may differ. Preliminary calculations have shown that of all possible alternatives, an average agricultural enterprise will be satisfied with a line with a capacity of up to 3 tons per day. But theoretically, the volume of COF production can be 100 tons per year.

It is planned to engage ZAT Nadiya, a private company (Sumy Region, Lebedyn, 30 Lenina Street), which deals with raising beef cattle, to the production of manure. In accordance with the established composition of COF components, we determined the required number of components, taking into account the farm demand for the 10th crop rotation, the farm field size – 1257 hectares and the rate of fertilizer usage for one field of crop rotation – 0.75 tons/ha.

The farm has the necessary amount of the most significant component in the structure – decomposed manure. The soil, which is a part of the fertilizer, is taken from any field. It does not have to be chernozem (black-earth soil), but not the clay. The rest of the components the farm must purchase.

The issue of preserving the soil fertility under agrarian production in modern conditions of management remains relevant. Thus, in the Sumy region, the annual loss of humus in agricultural land is very high – more than 1.1 tons per hectare. Soil fertility is a variable quality of land, which is determined by the content of humus. As a result of the continuous exploitation of arable land, a large amount of nutrients and humus is produced by the harvest, but these stocks are not replenished entirely because of the very limited amount of fertilizers, in particular organic ones. Reduced humus content in the soil is accompanied by a decrease in crop production, a decrease or lack of profits of agrarian enterprises.

The proposed model will create a sustainable base for the development of an agricultural enterprise of the «science-development-introduction-competitiveness-profit» type.

In order to ensure the success of COF production by ZAT Nadiya in Sumy Region it is necessary to: effectively use all available resources of the farm; increase staff productivity; optimize production processes, reduce the cost of working time; minimize risks; enter the domestic market with innovative products COF and forecast export operations.

Hence, it should be noted that soil fertility of the agricultural land is an important object of state protection. The biggest natural wealth of Ukraine is black soil (chernozemic soil). It occupies almost 50% of the world's black soil reserves. Plowed land in Ukraine makes up about 85% of the area of steppes (campo ucn.) and forest-steppes. The cultivated area occupies 33,5 million ha. 60% of black soil has already been damaged, 100 thousand hectares of fertile soils are lost every year. Therefore, preserving our national wealth – land resources, is possible only through introducing organic farming and rational land use, taking into account its capabilities.

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## ADAPTIVE PROPERTIES OF MAIZE FORMS FOR IMPROVEMENT IN THE ECOLOGICAL STATUS OF FIELDS

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Maize is a dominant crop in the world's total grain production. Approximately 850 million tons of maize, with an average yield of 5.2 t/ha, are produced on the total area of 162 million hectares. In more recent times, the production of this crop grain has increased at a record pace up to 850 million tons in the world, and 39.0–46.2% of it is harvested in the United States, the high gross yield is observed in China and Brazil as well.

In Ukraine, 4.5-5.0 million hectares are occupied by maize that is almost a quarter of all grain crops. Grain maize is grown on 4.0-4.5 million hectares, maize for silage and green fodder – on 0.2-0.4 million hectares [1, p. 783-790; 3, p. 40-45]. The introduction of intensive technology and new high-performance hybrids into production has significantly increased the yield of maize on large areas. Many of the best farms obtain 9-10 t/ha or more, including in new maize-growing areas (Polissia of Ukraine). In some regions of Ukraine, the yield is amounted to 4.5-6.0 t/ha, but in general in Ukraine the volume of maize yield remains low, including as a consequence of entomopathogens and phytopathogens [1, p. 783-790].

According to the long-term data, the total shortfall in maize grain production caused by stem rot, smut, kernel rot and European corn borer is estimated at an average of 30.9%.

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This a reason that the search for sources of resistance to these diseases and pests is particularly relevant, and the creation of maize hybrids with a group character of resistance to major diseases and pests remain one of the main practical tasks of the breeding of maize plant.

An increase in maize grain production is possible primarily due to the limitation of losses during harvesting. Annual losses of grain yield from the lodging of maize plants reach 20%, and in some cases, especially with stem breakage, up to 20-40% of the crop [2, p. 134-137].

The goal of our research is to determine the effectiveness of the use of maize lines various in genetic basis and resistance to diseases and pests.

The selection of parents for the generation of heterosis is crucial in the breeding of hybrid vigor. The maximum effect of heterosis is achieved only by the hybridization of specially selected lines.

The relevant material was used and the principles of choosing self-pollinated lines for the selection of hybrids in this direction were developed in order to create high-yielding maize hybrids resistant to diseases and pests [5, p. 5-8].

The 125 forms resistant to boil smut, of which only 9.2% were characterized by the stability of this character, were distinguished from the studied self-pollinated maize lines. The variation in the resistance of lines and hybrids by years is explained by the different distribution of climatic factors during the period of the greatest susceptibility of plants.

Based on the results of our research, it was found that among the diseases, the greatest harm to the maize breeding material was caused by boil and head smut in the experimental areas. The results of studying the resistance of self-pollinated lines of different origin to the infestation with boil smut indicate that the breeding material studied in the conditions of natural infectious background, regardless of the ripeness group, is highly resistant to this disease.

However, the early ripening lines F 101, MA 11 and mid-ripening lines UHK 411 had a high level of resistance, and the mid-early lines SO 255, UHK 372, HLG 293, HLG 998 and mid-ripening lines SO 113, KL 17, HLG 45 were characterized by low resistance to the infestation with boil smut.

The resistance of simple maize hybrids to the infestation with boil smut depended on the parent components which took part in the crossing, and a heterosis effect. The following samples characterized by high resistance to the disease were selected among the hybrid combinations of different ripeness groups:

early ripening – HLG 81 x HLG 272, HLG 272 x HLG 81, PLS 61 x HLG 562;

mid-early – HLG 1278 x HLG 1216, KL 13 x UHK 411, HLG 33 x HLG 163, SO 108 x MA 22, UHK 409 x MA 22, SM5-1-1 x KL 17, UHK 411 x KL 13, HLG 1216 x HLG 1278, UHK 409 x F 502, MA 22 x F 502, SM 5-1-1 x SO 108, UHK 409 x SM 5-1-1, F 502 x SO 108, SO 108 x F 502, HLG 1339 x HLG 1128, F 502 x MA 22, F 502 x SM 5-1-1, UH 405 x F 502, HLG 1128 x HLG 1339, HLG 562 x PLS 61, HLG 294 x HLG 293, UH 405 x SM 5-1-1.

mid-ripening – SO 108 x UH 405, DK 44-1 x HLG 42, F 502 x UHK 409, UH 405 x SO 108, HLG 42 x DK 44-1, UHK 409 x UH 405, KL 17 x UH 405, UHK 409 x

SO 108, SO 113 x AS 77-4-1, MA 22 x UH 405, UH 405 x UHK 409, SM 5-1-1 x UH 405, B 37 x MA61A37, F 502 x UH 405.

Other simple hybrids were characterized by medium and low resistance to the infestation with boil smut. It should be noted that if such lines as SO 255 and KL 17 took part in crossing, the resistance of hybrid combinations was low.

In support of these statements, a number of researchers [6, p. 103-105] note that the resistance of maize to *U. Zeae* is a rather complicated feature, which is determined by the anatomical and morphological, and physiological and biochemical characters of plants that are controlled by genetic factors in the system of plant – host – pathogen – environment. Many authors point to the significant variability of immunological properties of lines and hybrids to boil smut depending on the year and place of testing. Most of them explain this fact by the difference in environmental conditions. On the other hand, the stability of resistance of lines and hybrids to *U. zeae* depends heavily on the ability of the parasite to change its pathogenicity under the influence of various factors [7, p. 64-66].

The results of studying the resistance of self-pollinated lines to the infestation with boil smut indicate that the breeding material studied in the conditions of natural infectious background, regardless of the ripeness group, is highly resistant to this disease. Thus, we recommend to use such lines as SO 255, KL 17, SO 113, HLG 45 for the breeding of maize resistant to head smut.

During the test years, the infestation of maize plants with head smut under the field conditions was not found. Against the provocative background the plants infested with *Sorosporium reilianum* were found in 2017. In the hybrid combination of S0255 x KL 17, the infestation was equal to 9.5%. In 2017, the maize lines and hybrids were infested with head smut to a greater extent on the breeding plot. This was obviously facilitated by the accumulation of infection in the soil and the weather conditions favorable for the spread of the disease.

The majority of the studied lines have turned out to be resistant to head smut, and only such lines as SO 255, KL 17, SO 113 and HLG 45 were affected by this disease. Among dialele hybrids, the share of those infested with the pathogens of head smut is equal to 11.1%, with the lines as one of the parental forms of these hybrids. The genotypic differences in resistance to diseases and pests in self-pollinated lines open the potential for the effective selection of forms with integrated resistance, and their use in hybridization will enable to obtain hybrids resistant to a set of diseases and pests.

The authors have distinguished the self-pollinated lines with integrated resistance to major pests and diseases, namely: HLG 81, HLG 224, F 502, K 210, HLG 163, HLG 189, HLG 1216, HLG 562, K 212, HLG 1278, UH 405, HLG 1339. Their resistance to the infestation with smut diseases amounts to 0.0-5.0%. These are the lines that may be effectively studied and used to create resistant to entomophagous and phytophagous hybrids and in further breeding study.

Therefore, the significant infestation of susceptible lines with head smut was observed in terms of monoculture, and the maize cobs were characterized by heavy infestation that significantly influenced the harvest of these lines. In connection with

this, the assessment of lines and hybrids for resistance to head smut against the enhanced provocative background is a very important step in breeding the hybrids resistant to diseases. The improvement in the effectiveness of assessing the resistance of lines and hybrids to this disease in the Right-Bank Forest-Steppe of Ukraine, where the disease is not widespread, requires the use of artificial provocative background.

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## **DYNAMICS OF MICROARTROPOD ABUNDANCE IN CHERNOZEM TYPICAL OF DIFFERENT FARMING SYSTEMS IN THE CONDITIONS OF THE LEFT BANK OF THE FOREST-STEPPE OF UKRAINE**

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Introduction. Due to the problems of changes in biogeocenotic cover due to anthropogenic activity, the question arises about changes occurring in arable soils at the present stage of soil formation, their characteristics and diagnostic features. Soil invertebrates, as a structural element of ecosystems, play an important role in the processes of transformation of matter and energy. Ground animals are part of complex food chains, sometimes containing several trophic levels. Since most soil invertebrates are saprophages, the greater the number and diversity of groups, the more efficient they are in the work of the destruction of dead plant residues, thereby contributing to the supply of microorganisms with nutrients and available organic matter. It is also worth remembering that with the active involvement of animals and insects, the decomposition of organic residues is much faster than without them, since they grind up organic residues thereby increasing the reaction area and are carriers of microorganisms, and cause the change of the fungal phase of decomposition into microbial [1, p. 96-106; 2, p. 125-127; 3, p. 5-11]. Analyzing the qualitative and quantitative characteristics of invertebrate communities, it is possible to determine the effectiveness of functioning of different ecosystems, to predict their development and to draw conclusions about the use of their ecological potential [4; 5, p. 66-76]. This is important for determining the magnitude of anthropogenic changes in modern biogeocenosis and finding ways to optimally use land in Ukraine. Therefore, the study of the composition and abundance of small arthropods (microarthropods) in chernozem typical is important for understanding and studying the development of chernozem soils.

Objects and research methods. Chernozems typical of the forest-steppe of Ukraine within the Zinkiv district of Poltava region were studied. Individual soil samples were selected from farms operating under two radically different farming systems, in particular PE «Agroecology» of Shishatsky district, Poltava region where own model of organic agriculture is created, based on surface tillage and widespread use of various organic fertilizers, and LLC «Burat Agro» of Zinkiv district of Poltava region where used system of various-depth tillage and plant protection products of the best domestic and foreign producers. The following options were selected for the studies: 1) corn for grain (intensive farming system), 2) corn for grain (organic farming system), 3) winter wheat (organic farming system), 4) fallow (over 20 years without cultivation). Sampling (0-10, 10-20, 20-30, 30-40 cm) was carried out in the first decade of May, August and November by the method of cutting ring by

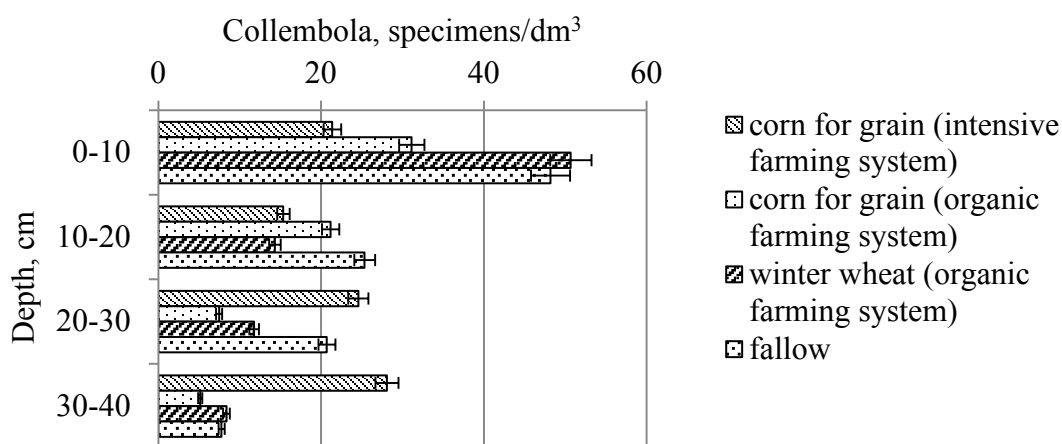
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N. A. Kachinsky cylinders. Catch of springtails and oribatide samples was performed in simple Tulgren funnels, followed by their fixation in aqueous-alcohol solution with the addition of 3% glycerol. The amount of microarthropods was recalculated by 1 dm<sup>3</sup> in the corresponding soil layer [6, p. 163-174; 7].

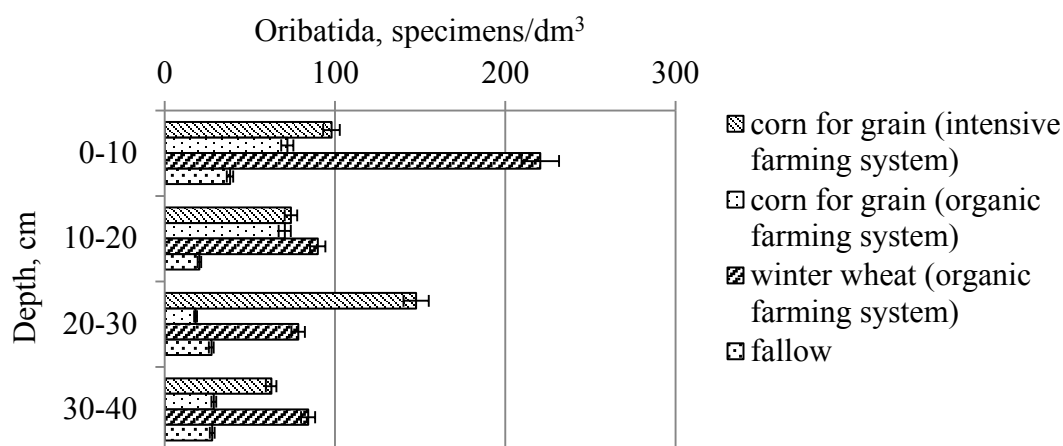
Results and discussion. Based on the analysis of the obtained data, Fig. 1-5 it should be noted that, with depth, the number of microarthropods decreases. In addition to the option of corn for grain grown under an intensive farming system, where there is an increase in their numbers at a depth of 20-30 cm. This is a clear sign of the use of plowing in the soil tillage system, which results in plowing of crop residues and redistribution of microarthropods by depth. It should also be noted that in the variant of the fallow, the highest values of the number of springtails and the mites were recorded. Conversely, the variants of agrogenic use showed the lowest indices of springtails and the highest – oribatide.

Regarding the spread of microarthropods by profile, it should be noted that their largest numbers were recorded in the most rich organic horizons. That is, with depth, usually their number decreases. This pattern is especially clear in the autumn in the corn grain variant (intensive farming system), where the outbreak of numbers was recorded in a layer of 20-30 cm where there were freshly plowed plant residues. We note a decrease in the number of microarthropods in the layer of 0-10 cm in the variants of the agricultural use of soils in the spring and autumn, which is caused by the drying of this layer of soil as a result of cultivation of soil tillage units. This trend is absent in fallow and winter wheat (organic farming) variants.



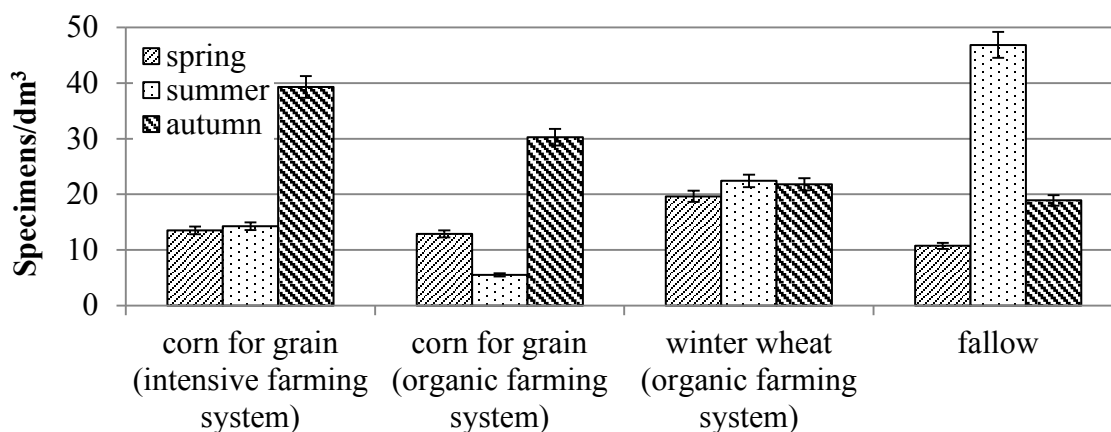
**Figure 1. The average annual number of springtails at depths, specimens/dm<sup>3</sup>**

Having analyzed data of fig. 1-2 it should be noted that, the average annual number of microarthropods ranged from 21-51 specimens/dm<sup>3</sup> springtails and 38-221 specimens/dm<sup>3</sup> oribatides in the layer 0-10 cm. But gradually decreased to 5-28 specimens/dm<sup>3</sup> springtails and 28-84 specimens/dm<sup>3</sup> oribatides in the layer of 30-40 cm. The maximum number of springtails is found in the variant of winter wheat 51 specimens/dm<sup>3</sup> in the layer of 0-10 cm, and the minimum in the variant of corn for grain (organic farming system) 5 specimens/dm<sup>3</sup> in the layer of 30-40 cm.



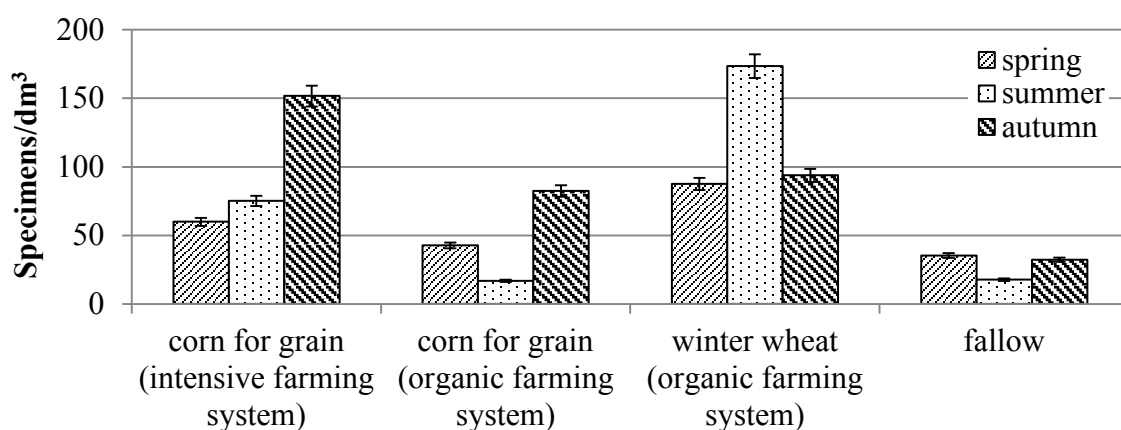
**Figure 2. The average annual number of Oribatid mites at depths, specimens/dm<sup>3</sup>**

These figures. 3 indicate that the highest number of springtails in the layer of 0-40 cm was recorded in the summer in the overgrowth of 47 specimens/dm<sup>3</sup>, and the smallest – also in the summer but in the variant of corn for grain (organic farming system) 6 specimens/dm<sup>3</sup>. The maximum number of springtails in corn variants for grain in the autumn and is 39 specimens/dm<sup>3</sup> at growing corn under intensive farming and 30 specimens/dm<sup>3</sup> at organic farming. In the variant of winter wheat grown by on the organic farming system, there was a slight fluctuation in the number of springtails over the seasons.



**Figure 3. The number of springtails in the layer 0–40 cm by seasons, specimens/dm<sup>3</sup>**

We note an increase in the number of oribatides in soils of agrogenic use, but with similar trends in seasonal dynamics (Figure 4). Maximum values of the number of mites were recorded in summer in the variant of winter wheat (organic farming) 173 specimens/dm<sup>3</sup>, and the minimum in the summer in variants of corn (organic farming) 17 specimens/dm<sup>3</sup> and fallow 18 specimens/dm<sup>3</sup>.



**Figure 4. The number of Oribatid mites in the layer of 0–40 cm by seasons, specimens/dm<sup>3</sup>**

Conclusions. Agrogenic use causes an increase in the number of oribatides while reducing the population of springtails. Prolonged fallow use has led to the formation of more stable populations with smaller variations in their numbers by season and a more even distribution in the H (A) horizon. The use of siderates in the crop rotation link contributes to the increase in the total number of microarthropods, especially oribatide. As the impact of different farming systems and fertilizers on the microarthropods has been poorly studied, further studies are relevant to uncovering the direction of biological processes under the conditions of the agrogenic use of chernozem soils.

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## RESISTANCE OF SUNFLOWER LINES AND HYBRIDS TO OROBANCHE CUMANA WALLR

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Sunflower is the main oilseed crop in Ukraine. Sunflower sown areas in Ukraine occupy more than 2 million hectares, which is 96% of all oilseeds [2, p. 67].

According to scientists, the competent selection of a hybrid provides 35% of the yield, the rest – agrotechnological and soil-climatic factors. Preference should be given to drought-resistant hybrids, resistant to lodging and shattering, high-oil hybrids, adapted to the continental climate.

High yields are achieved when using seeds for sowing with a mass of 1000 seeds of at least 50 g. Moreover, the similarity for hybrids should not be less than 85%, for varieties – at least 87-92% [1, p. 25].

Compliance with the minimum period of return to the field, which for sunflower is 7-8 years, is one of the main conditions for obtaining high and stable crop yields [3, p. 88; 4 p. 36].

**Research methodology.** The research program was designed to establish resistance of lines and hybrids to the sunflower sobole (*Orobanche cumana* Wallr.). To find decisions during 2017-2018 field experiments were carried out, they were carried out in the household of SGI-NTNS «Dachna» of Biliayivskiy district of Odesa region. In the experiments, the degree of infestation by diseases of both the whole plant and seeds, as well as the oil content were determined. The studied hybrids are represented by two groups of ripeness: mid-early and mid-ripening belong to the simple interline and oil type.

**Research results.** Our research data during 2017-2018 evidence that the hybrids were early maturing – Ex. 133/18 and Ex. 135/18, in which the period from germination to flowering was 93 days. This period was somewhat longer in the experimental hybrids – Ex. 126/18 – Ex. 132/18. Thus, the period from germination to flowering varied among them at the level of 96-99 days, however, these hybrids also belong to early ripening. Hybrid Ex 134/18 belongs to the middle early ripeness group, therefore the period from germination to flowering was 100 days (Table 1).

The plant height indicator is not standardized that's why it's not constant. It usually has his limits. In the vegetation conditions 2017-2018 the highest plants were plants of experimental hybrids Ex. 126/18 and Ex. 134/18. Thus, the height indicators were consequently 167 and 170 cm. The rest of other studied hybrids were somewhat lower and ranged from 149 to 160 cm.

As for the diameter of the basket, the biggest is in Ex. 129/18 – 24 cm, and the smallest in Ex. 133/18 and was 15 cm.

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The oil content of the seeds of all studied hybrids was at a sufficiently high level and a high rate was in the hybrid Ex. 130/18 – 50.4%.

This shows that growing the studied hybrids it's possible to get seeds with a high level of oil content. The lowest indicator of this feature was observed in Ex. 131/18 having – 43.2% of oil content.

Table 1

**Basic morphological and biological indicators of sunflower hybrids  
(SE «Experimental base» Dachna «2017-2018)**

<b>№</b>	<b>Hybrids</b>	<b>Period from germination to flowering, days</b>	<b>Plant height, cm</b>	<b>Basket diameter, cm</b>	<b>Oil content, %</b>	<b>Huskness, %</b>	<b>Mass of 1000 seeds, g</b>
1	Ex. 126/18	96	167	16	45,1	27,0	48
2	Ex. 127/18	97	160	17	45,5	33,3	60
3	Ex. 128/18	99	157	16	45,0	38,5	52
4	Ex. 129/18	97	156	24	46,9	29,1	48
5	Ex. 130/18	99	159	16	50,4	29,0	69
6	Ex. 131/18	99	149	16	43,2	22,4	67
7	Ex. 132/18	97	155	17	46,7	21,8	87
8	Ex. 133/18	93	155	15	47,3	31,1	61
9	Ex. 134/18	100	170	18	47,3	24,6	69
10	Ex. 135/18	93	152	17	48,1	31,9	47

The lowest huskness indexes were in the hybrids under study Ex. 132/18 and Ex. 131/18 and were respectively 21.8 and 22.4%, the highest were in Ex. 135/18 and Ex. 128/18 – 31.9 and 38.5%, respectively.

On average, for 2017–2018 years of research, high levels of oil content were in the experimental hybrid – Ex. 130/18 and amounted to – 50.4%, however, the mass of 1000 seeds was slightly lower and amounted to – 69 g.

Then, the largest indicator of the mass of 1000 seeds was in hybrid Ex. 131/18 and amounted to 87 g, meanwhile it has the lowest indicators of huskness – 21.8%, which in its turn indicates the positive economically valuable traits of this hybrid.

According to the table 2, the tendency of damage of various hybrids by the main diseases was established. On average for 2017-2018 of investigations of sunflower plants resistance to sobole under conditions of a natural infectious background ranged from 50 to 100%, while the degree of damage was 3–9 points.

Thus, 2018 in comparison with 2017 was less favorable for the formation of resistance of sunflower hybrids to sobole in conditions of natural infectious background, while the grade of plant damage in 2018 decreased.

The lowest indicators of resistance and damage grade were in 2018 in the Vivat standard and were respectively 56% and 3 points, whereas in 2018 they were even lower and were 50% and 3 points.

Table 2

**Sunflower hybrids infestation by sobole in natural infectious background  
(SE «Experimental base Dachna»)**

№	Hybrids	2017		2018	
		Resistant plants, %	Grade of infestation, points	Resistant plants, %	Grade of infestation, points
1	Ex. 126/18	100	9	100	9
2	Ex. 127/18	94	7	96	8
3	Ex. 128/18	92	6	90	7
4	Ex. 129/18	100	9	100	9
5	Ex. 130/18	78	5	70	5
6	Ex. 131/18	92	6	88	6
7	Ex. 132/18	94	7	90	7
8	Ex. 133/18	94	7	90	7
9	Ex. 134/18	96	8	92	7
10	Ex. 135/18	96	8	94	7
11	Vivat st.	56	3	50	3

So, in 2017 – the most resistant hybrids to sobole were Ex. 126/18 and Ex. 129/18, the resistance of which was 100%, and the grade of the lesion – 9.

So, in 2017, these indicators were slightly lower in the Ex studied hybrids. 134/18 and Ex. 135/18 resistance of sunflower plants to sobole was 96%, while the infestation grade was 8. So, we can conclude that the most resistant hybrids to sobole in 2017-2018 in conditions of natural infectious background are Ex. 126/18 and Ex. 129/18, the resistance of which was 100%, and the grade of infestation – 9.

Sunflower hybrids infestation by sobole in artificial infectious background over the years of research ranged from 36 to 100%, respectively, the degree of infestation ranged from 3 to 9 points. Thus, in comparison with 2018, 2017 was less favorable for formation of sunflower hybrids resistance in conditions of artificial infectious background to sobole, while the plant infestation grade in 2017 has decreased.

The lowest indicators of resistance and infestation grade were in 2017 in Vivat standard and amounted to 36% and 3 points respectively, whereas in 2018 they were slightly higher and amounted to 40% and 3 points (Table 3).

So, in 2017, the most resistant hybrids to sobole under conditions of a natural infectious background were Ex. 126/18 and Ex. 129/18, the resistance of which was 100%, and the grade of infestation – 9. Slightly lower these indicators were in 2018 under conditions of artificial infectious background in hybrids Ex. 127/18 and Ex. 128/18 the resistance of plants was respectively – 94 and 92%, the degree of infestation was at the level of 7-8 points.

Table 3

**Sunflower hybrids infestation by sobole in artificial infectious background  
(SE «Experimental base Dachna»)**

№	Hybrids	2017		2018	
		Resistant plants, %	Grade of infestation, points	Resistant plants, %	Grade of infestation, points
1	Ex. 126/18	100	9	100	9
2	Ex. 127/18	90	7	94	8
3	Ex. 128/18	90	7	92	7
4	Ex. 129/18	100	9	100	9
5	Ex. 130/18	68	5	70	5
6	Ex. 131/18	88	6	84	6
7	Ex. 132/18	86	6	88	6
8	Ex. 133/18	86	6	88	6
9	Ex. 134/18	90	7	90	7
10	Ex. 135/18	90	7	90	7
11	Vivat st.	36	3	40	3

So, in 2017-2018 somewhat lower these figures were in studied hybrids Ex.134/18 and Ex. 135/18 the resistance of sunflower plants to sobole under conditions of artificial infectious background was 90%, while the infestation grade was 7.

Therefore, it can be concluded that in 2018 the most resistant hybrids to sobole under artificial infectious background were hybrids Ex. 126/18, Ex. 129/18 and Ex. 127/18, the degree of infestation was 8-9 points.

Consequently, to increase the yield and the quality of sunflower it is crucially important to select new hybrids with different adaptive capabilities to specific zonal conditions and which fully reveal genetic potential of their productivity.

A complex study of economic properties showed that such elements of the crop structure as the size of the basket, the mass of 1000 seeds, the oil content and the yield are closely related and have dependence.

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## ENGINEERING SCIENCES

### THE USE OF PHOTOCATALYTIC TECHNOLOGY FOR THE DISINTEGRATION OF HAZARDOUS CHEMICAL SUBSTANCES

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**Introduction.** The experience of recent years shows that in modern world the threat of using nuclear, biological and chemical weapons as well as high-precision weapons remains, as a result of which potentially hazardous facilities can be destroyed. There are more than 1,5 thousands chemically dangerous objects on the territory of Ukraine, whose activity is related to the production, use, storage and transportation of hazardous chemicals, and more than 22 million people live in the areas of their location. The danger of functioning of these objects of economic activity (chemically dangerous objects) is related to the probability of accidental emissions (spillages) of a large number of hazardous chemical substances (hereinafter referred to as «HCHS») outside the objects, because many of them retain 3-15 daily supplies of chemicals.

Since the effectiveness of the assigned tasks depends of the degree of protection of personnel, it is necessary to look for approaches to address this problem. Filter-ventilator units, both stationary and on armored vehicles, and filter systems that were created in Soviet times, do not protect personnel from hazardous chemical substances, as chlorine, ammonia, sulfur trioxide etc.

Priority direction of improving the efficiency of the filtering systems from HCHS to protect armored vehicles and stationary structures is the additional installation of the mesh with a coated layer of catalytic material in the absorber filter. Neutralization of toxins of different nature due to photocatalytic gas purification [1], in which titanium dioxide is used as a photocatalyst, is a promising development direction in the defense sphere of the state.

**Exposition of basic research material.** Photocatalytic properties of titanium (IV) oxide [2] depend on its morphology, crystalline form, particle size, specific surface. The most famous forms are anatase, rutile, brookite and a new modification – eta TiO<sub>2</sub> (η-TiO<sub>2</sub>). Titanium oxide, when absorbing a quantum of light with an energy greater than 3.2 eV (light with a wavelength less than 390 nm – ultraviolet), generates free charge carriers – negative (electrons) and positive vacancies (holes). Electrons

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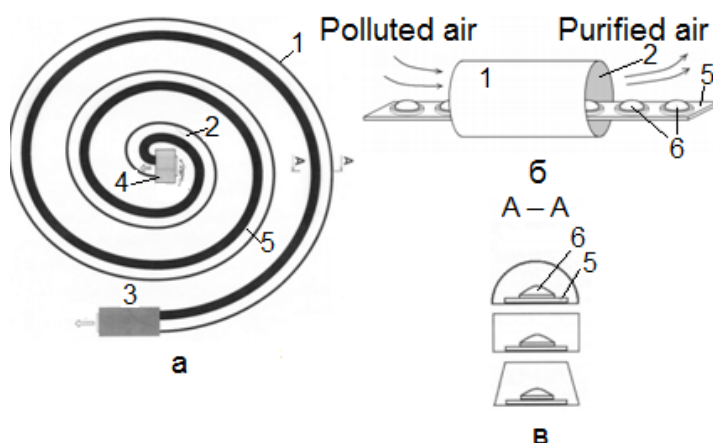
and holes, coming to the surface of  $\text{TiO}_2$  enter into redox reactions with oxygen and vapors of water from the air or water, as a result of which strong oxidizers ( $\text{O}_2$ ,  $\text{OH}$  and radicals) are formed, which directly interact with various organic pollutants. The formation of such kinds of particles makes the surface of  $\text{TiO}_2$  a very strong oxidizing agent, which allows decomposing harmful substances through their photocatalytic oxidation to harmless  $\text{H}_2\text{O}$  and  $\text{CO}_2$ .

Valence band, conduction band, organic pollutant, active oxidizers, oxidation products

In practice, a photocatalytic air purifier includes a porous carrier coated with  $\text{TiO}_2$ , which is irradiated with UV rays, and through which air is pumped.

Currently, LED lamps are widely used, but their use for photocatalysis was limited to a rather narrow emission spectrum, which made it possible to generate these products. Numerous experiments have proven that the most effective for photocatalysts based on titanium dioxide is ultraviolet radiation of the A and B sub-ranges (wavelength from 280 to 400 nm) – with the extreme degree of air purification achieved at a wavelength of 320 nm [3].

In [4], it was proposed to use LED strip in the so-known «tubular photocatalytic air purifier». In this design, titanium (IV) oxide is applied to the inner surface of the tube equally along its entire length, and the most technologically advanced is a section in the form of a circle (Figure 1). When using a gas-discharge lamp as a source of ultraviolet rays, a lamp (a tube of quartz glass) is placed along the axis of the air purifier, therefore it uniformly irradiates the entire inner surface with a deposited  $\text{TiO}_2$  layer. When placed on the strip of separate LEDs at a certain distance from each other, there were so-called «dead zones», that is, areas of the inner surface of the tubular air purifier, which receive a relatively small stream of UV rays. The issue can be solved by placing LEDs at a shorter distance or by replacing them with incandescent lamps that are directional and emit light without additional focusing and shielding.

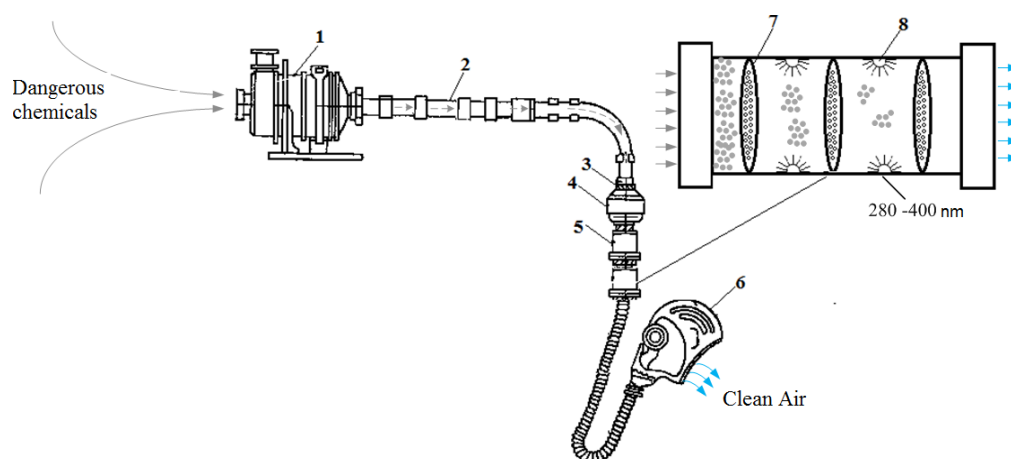


**Figure 1. Photocatalytic air purifier a – top view; b – placement of the LED strip in the housing; c – forms of housing sections; 1 – spiral housing; 2 – photocatalyst layer; 3 – pump fan; 4 – dust filter; 5 – LED strip; 6 – UV LEDs**

In [5], we studied the catalytic properties of coatings with mixed oxides in the oxidation reaction of carbon monoxide. The catalytic activity of mixed oxide systems was tested in the oxidation of carbon (II) oxide to carbon (IV) oxide on a laboratory bench in a tubular flow reactor made of silica glass with a coaxially wound heating coil.

Exposition of basic material. According to the results of the analysis of the above material, it was established that there are no such types of filters that protect against all HCHS. Therefore, it is necessary to formulate requirements for collective protection systems both on armored vehicles and stationary ones, which will protect against HCHS.

In works [6], it is indicated that in collective protection system it is possible to improve the performance characteristics without significant structural changes and significant material costs due to the additional installation of a cleaning system (Figure 2) in filter-ventilator installations (units) on armored vehicles and stationary structures.



**Figure 2. Scheme of improvement of the filter-ventilator unit FVU-3,5:**

**1 – filter-ventilator unit assembly FVA-3,5; 2 – hose; 3 – valve; 4 – canister; 5 – electric radiator; 6 – facepiece; 7 – titanium alloy mesh; 8 – LED**

This will enable to neutralize (decompose) toxins of various nature at high efficiency performance in a wide range of temperatures and corrosion resistance. In the purification system, the polluted air passes through the meshes of titanium (IV) oxide coated with a layer of catalytic material, which receives ultraviolet rays from the LEDs installed in the system. This makes  $\text{TiO}_2$  a very strong oxidizing agent, which allows the decomposition of harmful substances through their photocatalytic oxidation to safe  $\text{H}_2\text{O}$  and  $\text{CO}_2$ .

Conclusion and prospects for further development of this direction. According to the results of the analysis, it was established that photocatalytic purification from hazardous chemical substances is a very important issue for the protection of personnel. To improve the existing collective protection systems, they need to be equipped with a system of UV irradiation of the mesh surface with a layer of titanium (IV) oxide for photocatalytic destruction of toxicants. One of the following research tasks is to define the system requirements:

- determine the type of source of UV radiation that will provide uninterrupted emission of radiation under conditions of vibration, different acceleration and impact;
- optimize the placement of the UV radiation source to reduce the size and number of «dead zones» in which the radiation does not fall, and determine the radiation power that will ensure the energy-efficient disintegration of toxicants, depending on their composition and content in air mixtures.

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## APPROACH TO CHOOSING A DRIVING ROUTE WHEN ORGANIZING A CAR DRIVING PRACTICE

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While organizing the process of learning practical driving, a considerable role is played by the choice of the venue, namely the choice of playground or a fully-fledged route in the city. Typically, in primary classes, such training takes place at separate sites of specialized racetracks. As the practical skills are consolidated, the combination of skillful application of theoretical knowledge of learning becomes a

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more complex plane of practical driving, namely learning to drive a car on the roads under different road conditions.

Given the above, it can be noted that practical driving training can take place on several routes that differ from each other by a number of criteria. The consideration of these criteria when choosing a training route is an important practical task that determines the importance of this topic.

The generally accepted approach to choosing a training route is based on the classical mathematical problem of determining a circular route that passes through several points, provided that each point is passed through only once and the end point coincides with the initial one [2, p. 127; 3, p. 63]. A more complex principle of the multicriteria approach was considered in papers [4, p. 74; 5, p. 68]. In view of the above, it is proposed to consider the choice of a training route in terms of logistics, taking into account the qualitative and quantitative indicators [7; 8].

In order to solve the problem of choosing a training route, 12 criteria have been developed that satisfy the requirements of the system characterizing road safety «Driver-Car-Road-Environment» [3, p. 56].

There are criteria that characterize the learner-driver:

- the qualification of the learner-driver (level of theoretical knowledge and practical skills);
- psychological and emotional state of the learner-driver, depending on the traffic conditions in the traffic flow.

The criteria that characterize the training car include:

- correspondence of the technical characteristics of the educational vehicle (overall dimensions);
- compliance of the technical condition with the requirements of the legislation;
- actual movement speed.

The criteria characterizing road conditions include:

- visibility in the direction;
- type and condition of the road surface;
- availability of means of traffic organization and their condition (road signs and marking);
- total length of ascents and descents with a slope of more than 40%.

The criteria that characterize the environment include:

- natural and climatic conditions (time of year, weather conditions);
- complexity of route configurations (organization of crossroads, pedestrian crossings, public transport stops, etc.);
- traffic flow intensity.

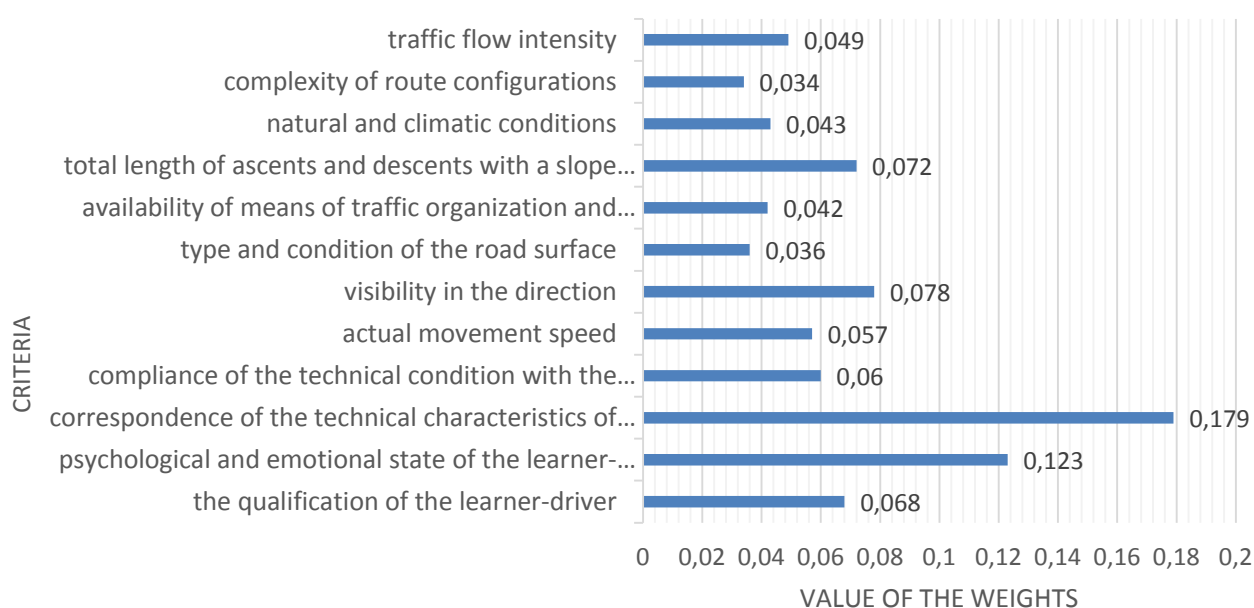
Using the expert evaluation method, 20 experts determined the rank of each of the criteria. Due to this the most significant criterion is the highest value of rank.

The rank estimates obtained from all the questionnaires were entered into a spreadsheet to further determine the consistency of the Kendel coefficient and Pearson's criterion, and the values of the weights of each criterion were calculated. Average rank sums for all criteria, deviations and squared deviations of rank sums for

each criterion were calculated relative to the average rank sums for all criteria for each expert group.

According to the obtained rank estimates of the criteria, the values of Kendel's coefficient of concordance  $W = 0.61 > 0.6$  and Pearson's criterion  $\chi^2 = 198.7 > 22.4$  are obtained, which satisfies the conditions of agreement of experts' opinions. Of all the weights determined,  $y_i$  there were distinguished by all criteria the most significant ones that satisfy the condition  $y_i > 1/n$ , where  $n = 12$  is the number of evaluation criteria.

The results of calculations of the values of the weight coefficients of each criterion  $y_i$  are presented in Figure 1.



**Figure 1. Diagram of the values of the coefficients of the weights of the criteria that influence the choice of study route**

To determine all possible alternatives to the educational route of traffic and to evaluate them, it is necessary to calculate the final integral indicator. The calculations are performed on the basis of the methodology specified in [4, p. 124]. By this method, all the criteria are divided into three groups: quantitative, qualitative and relational, which increase the objectivity of the selection process. Qualitative indicators are obtained on the basis of statistical, reporting and reference data and are evaluated on a three-point scale: 1 – excellent, 2 – good, 3 – satisfactory.

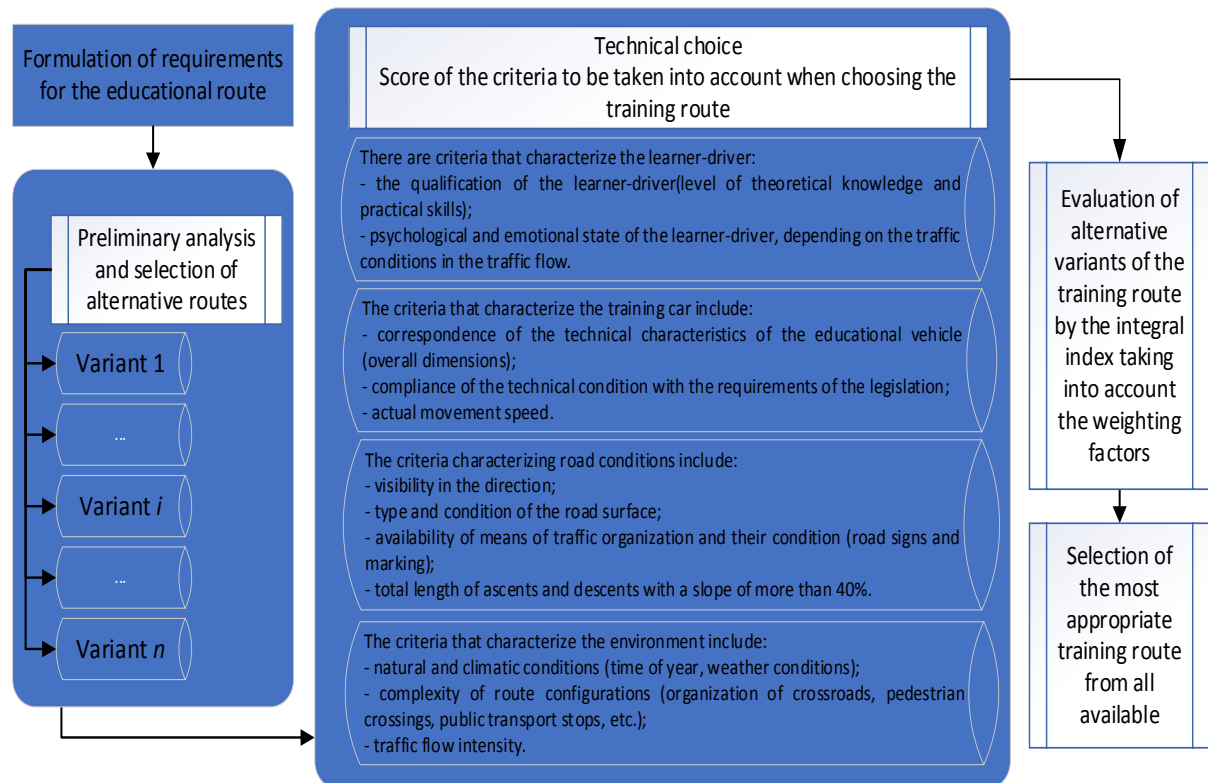
The desirability function [4, p. 130] is used to reduce qualitative indicators to quantitative expression. To evaluate alternatives of routes by quantitative and qualitative indicators [4, p. 135], for each criterion a reference value is selected – maximum or minimum, depending on its influence on the overall assessment, and its relative value is calculated.

The total integral index  $K_0$  is calculated by the expression:

$$K_0 = \sum_{i=1}^n K_i y_{i0} \rightarrow \max$$

where  $K_0$  is the arithmetic mean score in the i-go criterion provided by the experts;  $y_{i0}$  is the weighting factor of the i-th criterion.

The steps of choosing a training route are shown in Figure 2 where the final training route is chosen by the largest values of the integral indicators.



**Figure 2. Structural-logical scheme of choosing the educational route of movement**

In this paper, there has been developed a scheme that allows to choose from several alternatives the optimal educational route of movement. It should be noted that this approach takes into account the criteria stipulated by the Driver-Car-Road-Environment system.

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## CHOOSING THE SHAPE OF A SEASONAL HEAT ACCUMULATOR

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The exhaustion of traditional fuel resources and environmental degradation adds relevance to research on renewable and alternative energy and the need to bring environmentally friendly energy sources to the energy balance of Ukraine. A promising direction is the use of heat of solar energy for communal heat supply, which can provide large heat needs even in temperate climates. Basically, methods for using the thermal energy of the sun as a whole are cost-effective, but the proportion of thermal solar energy is quite small. It is possible to significantly increase the efficiency of the use of solar energy in the presence of a seasonal heat accumulator of large thermal capacity. The problem of excess heat in the summer, when the demand for it is reduced, is relevant for existing heat-generating enterprises (CHP). It can also be solved by accumulating these surpluses with their further use in the heating period [1, p. 44; 2, p. 58].

To reduce the unit cost of 1 GJ of stored heat, the efficient design of the heat accumulator should have minimal heat loss to the environment. When choosing the shape of the heat accumulator in the plan, you should try to simplify its shape as much as possible. Since the greatest heat loss occurs through the walls, it is desirable that their surface area is the smallest. It is well known that with the same volume, the ball has the smallest surface area. However, it is not rational to build a heat accumulator in the form of a ball in an effort to significantly reduce heat loss, since it is very difficult to calculate and constructively execute a spherical heat accumulator. For real construction, the configuration of a heat accumulator in the form of a cube is best suited, since the outer surface area is the smallest in it, so for further calculations

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we choose just such a shape. But you need to check how the location of the heat accumulator will affect its shape, in which case it is better to adhere to the cubic shape, and in which it is better to use the shape of a parallelepiped [3, p. 105].

Consider how the shape of a heat accumulator depends on its location:

- Option 1 heat accumulator is located under the house;
- Option 2: The heat accumulator is arbitrarily located in the ground.

To calculate the specific indicators, we take the volume of the heat accumulator 1 m<sup>3</sup>. Heat loss through any wall of the heat accumulator is determined by:

$$Q_{hl,i} = \frac{\lambda}{\delta} \cdot (t_{ha}^a - t_s) \cdot F_i, W \quad (1)$$

where,  $\lambda$  – the thermal conductivity coefficient of the wall of the heat accumulator, W/(m·K);

$\delta$  – the wall thickness of the heat accumulator, m;

$t_{ha}^a$  – the average temperature of the heat accumulator during the heating period, is defined as the half-sum of the temperatures of charging ( $t_{ch}$ ) and discharging ( $t_{dch}$ ) the heat accumulator:

$$t_{ha}^a = (t_{ch} + t_{dch})/2 = (140 + 55)/2 = 97,5^\circ C.$$

$t_s$  – soil temperature, taken  $+8^\circ C$ .

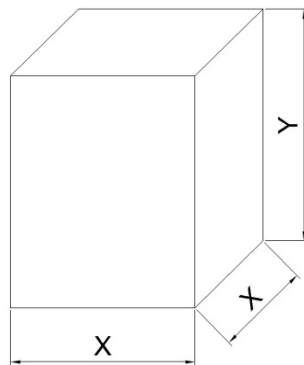
$F_i$  – the area of the walls of the heat accumulator, m<sup>2</sup>.

Since the depth of immersion of the heat accumulator in the soil most affects its cost during the installation of a heat accumulator, we need an effective form of a heat accumulator with a lower height.

To do this, we denote the length and width of the heat accumulator –  $x$ , and the height –  $y$  (Figure 1). We accept the design of the heat accumulator: mineral wool walls with  $\lambda = 0.045$  W / (m·K), and the bottom part made of foam glass with  $\lambda = 0.065$  W / (m·K), wall thickness  $\delta = 1.0$  m, to simplify the calculation.

For the 1st option, when the heat accumulator is located under the house, heat loss through the upper part of the heat accumulator during the heating period is taken into account as heat input to the house. Then the balance equation for the heat accumulator is as follows:

$$Q_{bal} = Q_{h.l.} - Q_{h.i.} \rightarrow \min. \quad (2)$$



**Figure 1. The designation of the sizes of the thermal accumulator for calculations**

Heat loss through the walls and the bottom of the heat accumulator:

$$Q_{h.l.} = (0,065/1,0) \cdot (97,5-8) \cdot x^2 + (0,045/1,0) \cdot 4 \cdot (97,5-8) \cdot x \cdot y = 5,8175 \cdot x^2 + 16,11 \cdot x \cdot y.$$

Heat entering the house through the top of the heat accumulator:

$$Q_{h.i.} = (0,045/1,0) \cdot (97,5-20) \cdot x^2 = 3,4875 \cdot x^2.$$

Heat loss to the environment should be minimal:

$$Q_{bal} = 2,33 x^2 + 16,11 \cdot x \cdot y \rightarrow \min.$$

The estimated volume is taken  $V = 1 \text{ m}^3$ . Substituting different values of  $y$  and expressing  $x = (1/y)^{0,5}$ , we obtain the value of  $Q_{bal}$  (table 1).

Table 1

**1st option,  $Q_{bal}$  value depending on the height  $y$**

Height $y$ , m	Width and length $x$ , m	Heat loss $Q_{bal}$ , W
1	1	13,171
0,9	1,0541	12,766
0,8	1,118	12,373
0,7	1,1952	12,005
0,6	1,291	11,687
0,5	1,4142	11,465
0,4	1,5811	11,438
0,3	1,8257	11,85
0,2	2,2361	13,468
0,1	3,1623	20,282

That is, for the option of placing a heat accumulator under the house, the effective form of the heat accumulator is a parallelepiped with a height  $y = 0.4$  m, width and length  $x = 1.58$  m, but the width and length of the heat accumulator should not go beyond the dimensions of the building in plan.

For the 2nd option, when placing a heat accumulator arbitrarily in the ground, the heat balance equation has the form:

$$Q_{bal} = Q_{h.l.} \rightarrow \min. \quad (3)$$

Heat loss through the walls of the heat accumulator:

$$Q_{bal} = Q_{h.l.} = (0,065/1,0) \cdot (97,5-8) \cdot x^2 + (0,045/1,0) \cdot 4 \cdot (97,5-8) \cdot x \cdot y + (0,045/1,0) \cdot (97,5-20) \cdot x^2 = 9,305 x^2 + 16,11 \cdot x \cdot y \rightarrow \min.$$

Substituting different values of  $y$  and expressing  $x = (1/y)^{0,5}$ , we obtain the value of  $Q_{bal}$  (table 2).

That is, for the option of placing the heat accumulator arbitrarily in the ground, the effective form of the heat accumulator is a cube.

Table 2

**2nd option,  $Q_{bal}$  value depending on the height y**

Height y, m	Width and length x, m	Heat loss $Q_{bal}$ , W
1	1	18,154
0,9	1,0541	18,302
0,8	1,118	18,6
0,7	1,1952	19,122
0,6	1,291	19,991
0,5	1,4142	21,43
0,4	1,5811	23,894
0,3	1,8257	28,457
0,2	2,2361	38,378
0,1	3,1623	70,103

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**APPEARANCE OF TURBIDITY IN ALCOHOLIC BEVERAGES**

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Transparency of alcohols is one of the main components of their presentation. Thus predicting the resistance to different types of turbidity is their important quality indicator.

Alcoholic beverages should meet the requirements of the national standards according to organoleptic, physico-chemical parameters and the expiration date, which is established after determining the projected resistance. The expiration date of alcoholic beverages should not exceed their predicted resistance. In this regard, manufacturers are demanding high quality and following technological modes of processing raw materials, semi-finished products and beverages in order to achieve their guaranteed stability.

However, while storing the alcoholic beverages may not last the expiration dates, they attain turbidity, color changes, sediments. Turbidity is produced in alcoholic

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beverages has physico-chemical nature and can be classified as protein, polysaccharide, phenolic, metallic, etc. [1, p. 73].

Colloidal sediments are usually associated with the condensation of phenolic substances. During the technological stages of beverages making of berry semi-finished products phenolic substances are oxidized, as a result the intensity of color may vary in the finished product. Leucanthocyanins may also change the color of both semi-finished and finished beverages. The degree of color intensity change depends on the type of semi-finished product and the phenolic substances in it [1, p. 71].

Turbidity appears in alcoholic beverages, which do not go through the stage of long-term maturing, that's why to prevent condensation one has to create optimal conditions for the timely oxidation processes.

When grinding fruit and berry raw materials during the fruit or juices alcohols making, water-soluble polysaccharides appear in the liquid phase. This leads to the possibility of colloidal turbidity occurrence.

The resistance of beverages made of berry raw materials is also effected by Calcium, magnesium, iron, and potassium salts which lead to the formation of sediments of different colors [2, p. 39].

A research has made to establish the technological methods of stabilization of different groups of alcoholic beverages, to find out their projected resistance, to identify the sources and crystalline sediments.

As a result of alcoholic beverages research, a variety of crystalline sediments by size, color, and shape has been established. The qualitative reactions and the method of capillary electrophoresis determined the composition of the crystalline sediment microcomponents, which include ions of calcium, sodium, potassium, iron, sulfates, phosphates, oxalates, citrates. Their qualitative and quantitative composition is determined by technological features of alcoholic beverages production: the quality of fruit drinks and alcoholic fruit and berry extracts, alcoholic juices, alcoholic tinctures of herbal raw materials, prepared water, sugar-containing substances, colors, ingredients, regulating acids.

The usage of prepared water in making alcohol beverages, with a hardness of more than 0.1 mol / dm<sup>3</sup> and a sulfate content of more than 50 mg / dm<sup>3</sup>, phosphates of more than 0.05 mg / dm<sup>3</sup>, silicates of more than 5.0 mg / dm<sup>3</sup> leads to sedimentation, including calcium and magnesium pectate. Iron and manganese compounds, with their content in water exceeding 0.05 mg / dm<sup>3</sup>, reacting with the tannin substances in alcoholic juices and fruit drinks, cause the turbidity of the beverages and the formation of sediments.

Sugar color and sugar syrup are also capable of enriching alcoholic beverages with calcium, sodium and ammonium cations, phosphates, oxalates.

Other causes of sediment formation in finished drinks may also be:

- the use of water or water-alcohol mixture of silver-impregnated cartridge filters for additional filtration,
- no additional processing of honey aqua-alcoholic solutions,
- lack of testing before blending and additional processing of essential oils and alcoholic herbal tinctures,



- the wrong turn of blending ingredients and semi-finished products,
- irrational ways of blend stabilization before filtering,
- insufficient maturing of the blend,
- the use of raw filter paper for blend filtration etc.

Longer expiration dates of tinctures can be obtained by increasing the resistance due to multi-stage processing: on the processing stages of each semi-finished product and the following processing of the finished blend.

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## **METHOD TO IMPROVE OF RELIABILITY AND SERVICE LIFE GROWTH FOR OPEN GEAR DRIVE**

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Gear drive takes the leading place in mechanical systems (machines and mechanisms) and the industrial safety and output quality depends on its current technical condition. They are operated in conditions of impulsive-cyclic subgrade loads, which cause high requirements for the loadbearing of gear drive. Reduction of loadbearing is determined by such reasons as: weakening of the tooth at its base, fatigue spalling of contact point and wear of tooth profile.

For increase of reliability of gear and transmission it is of current interest the following: development of scientifically grounded and proved evaluation criteria for limit state of gear drive; development of methodology for operational evaluation of wear rate of teeth working area; improvement of technology of their case-hardening.

Researches concerning determination of common patterns of abrasive wear are the most interesting. The range of works in this direction is based on the usage of theory of similarity. Researches based on the study of abrasive grain mechanic in the zone of teeth contact (Gavrilenko V.A., Ermichev V.A., Kashcheev V.N.) are of great interest. Data of the work is further developed by G.Ya. Yampol'skiy, A.P. Natarov, I.V. Kragel'skiy [1; 2; 3; 4].

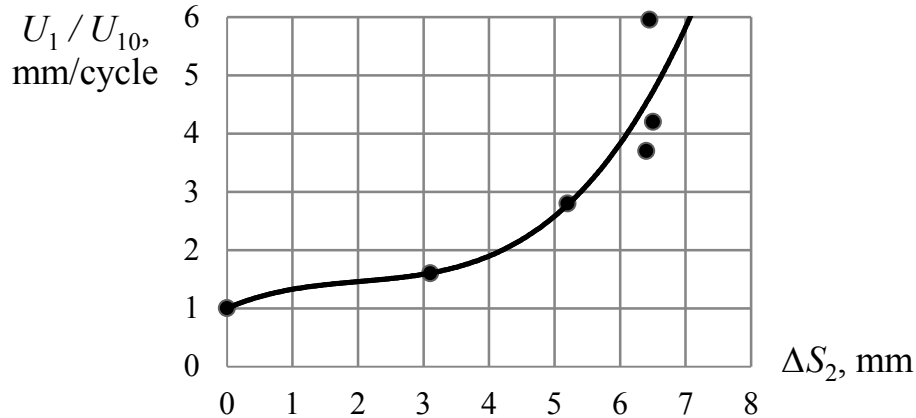
Exploitation experience and experimental research show that service life of rim is determined by economic aspect, not physical capacity. At certain value of rim wear, service life of gear wheel reduces insomuch that its further exploitation does not

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make sense. The Figure 1 shows experimental dependence of the wear rate of MB-7000x2300 mills gear wheel in conditions of Inguletsk mining-and-processing integrated works on the averaged value of wear of the rim teeth.

During the initial period of exploitation of MB-7000x2300 mills, longevity of drive gear was 3-3.5 years. After the wear of rim teeth on the value  $\Delta S_2=6.6\text{mm}$ , service life of drive gear reduced to 6-8 months.



**Figure 1. Dependence of wear rate of MB-7000x2300 mills gear teeth on the wear value of rim teeth,  $U_{10}$  – wear rate at initial time (at  $\Delta S_2 \approx 0$ )**

For heavy-duty elements of friction pairs, to which toothed wheel gearing of exposed drives of mills refers, the wear rate, depending on the conditions of abrasive action  $A$ , physic-mechanical properties of materials  $M_{1(2)}$ , geometrical and linkage parameters of integrations  $K$ , may be presented as following.

$$U_{1(2)} = 6,8 \frac{AK}{M_{1(2)}} \quad (1)$$

where  $U_{1(2)}$  – wear per one loading;  $A = q_a^{2/3} A^{0.5} \sigma^{2.5}$ ; ( $q_a$  – concentration of abrasive impurities in the lubricant or air, %;  $R$  – their midradius, mm;  $\sigma$  – tensile strength, MPa);  $M_{1(2)} = \delta_{1(2)}^{1.5} HB_{1(2)}^{1.5} HB_{2(1)}$  ( $\delta_{1(2)}$  – characteristic of surface coating plasticity –

elongation at failure;  $t$  – contact friction fatigue coefficient;  $K = \sqrt{\rho^*} \cdot \frac{V_1 - V_2}{V_1 + V_2}$ ;

$\rho^* = \frac{\rho_1 \cdot \rho_2}{\rho_1 + \rho_2}$  – relative radius of curvature of joint surfaces, mm;  $V_1, V_2$  – slip velocities of joint surfaces, m/s).

The data processing shows that analytical expressions quite correctly describe abrasive wear of teeth of exposed drive of mills. Besides, for drives that are in close conditions, quantitative agreement of results is also satisfying.

During evaluation of influence of mechanical-and-physical properties of material of gear wheels, as it was mentioned before, in accordance with (1) the value, characterizing mechanical-and-physical properties of material of gear wheels

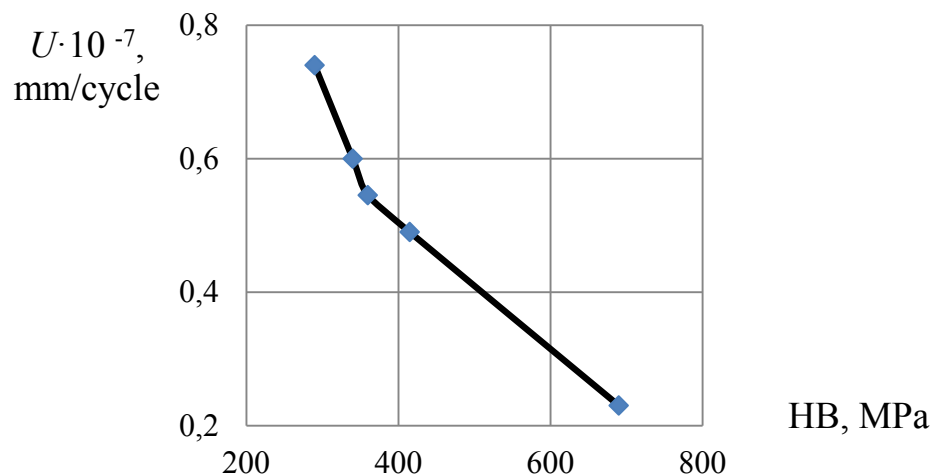
$M = \delta' HB_{1(2)}^{1,5} HB_{2(1)}$ , influences the velocity of abrasive wear. Value  $\sigma$  is the combined variable of parameter characterizing abrasive action of the medium. Therefore,  $\sigma$  is the function of hardness of active surfaces of teeth. That is why, considering the influence of mechanical-and-physical properties of materials, let us note that the wear rate:

$$U_{1(2)} \approx \frac{\sigma^{2,5}}{\delta' HB_{1(2)}^{1,5} HB_{2(1)}} \quad (2)$$

Increase of hardness of active surfaces of teeth causes the reduction of  $\sigma$ . As one may see from (2) the increase of teeth hardness of one of the wheels leads to the reduction of wear rate as the teeth of the other wheel of gear set.

Increase of hardness of active teeth surfaces of open gear wheels, besides it promotes the reduction of accompanying species of wear, increase of their contact hardness.

Experimental research of influence of hardness of active surfaces of teeth on their longevity was fulfilled in conditions of Pridneprovskiy hydroelectric power plant on Sh-50 mills. Gear teeth were exposed to case-hardening by high-frequency currents. In result of imperfection of production method, surface hardness of various teeth was different. During operation of gear wheel, wear rate of teeth was measured, depending on the hardness of their active surfaces. Experimental results are shown in the figure 2.



**Figure 2. dependence of the wear rate of gear teeth on the hardness of their active surfaces (Sh-50mill, Pridneprovskiy hydroelectric power plant)**

Therefore, increase of durability and longevity of coarse-grained tooth gear operation is of high priority for all machine builders.

The above mentioned necessitates the researches of existing technologies for solution of task of performance incoordination, increase of service life, wear-resistance of working area of teeth of coarse-grained gear wheels. Upcoming trend here is work-hardening heat treatment of working area by concentrated energy flow

[5, p. 124]. The structures of hardening type, which are formed during flash heat and cooling, have high hardness, wear-resistance, crack strength.

Common use of known ways of work-hardening by concentrated energy flow (laser, cathode ray, cathode– ionic, etc) is restricted by high cost and complexity of equipment, its insufficient reliability and capacity, necessity of vacuum usage, special places with particular requirements, demand for qualified operation, high maintenance charges. In these conditions surface tempering by plasma arc is reasonable in parameters of generality, availability, environmental friendliness and economical efficiency for prolongation of service life of fast wearing parts [5]. Not changing surface roughness parameters, such heat treatment easily fits into production process of prepare and repair of parts, being a final stage, low-cost, rather productional and allows to increase their service durability effectively.

The aim of plasma tempering is the increase of service life of machine parts due to hardening of their surface coating (several mm in thickness) by thermal treatment of plasma arc at permanent common chemistry of material and retention of initial properties of material in the inner layers.

Hardening in result of high-speed local heating by plasma arc of surface coating to high temperatures (higher than  $A_{c3}$ ) and its rapid cooling with higher critical speed as a result of heat removing into deep layers (inner) of material. Being formed structures during flash heat and cooling of tempering type have high hardness, wear resistance and crack strength. Effect from plasma tempering is determined by increase of part service characteristics due to change of physical and mechanical characteristics of surface coating, because of formation of specific structure and phase metal content and also formation of compressive residual stresses on the surface. Structural changes in common correspond to the occurring ones during volume tempering, but the velocities of heating and cooling cause changes of the relations between structural components, their morphology changes as a result of increased defectiveness of crystalline structure (increase of dislocation content, crushing of blocks and stress raisers in crystal latitude) [5]. The structure of hardened layer with high hardness and dispersability affects the changes of exploitation parameters of hardened materials – wear-resistance, mechanical properties (durability, plasticity, crack resistance and enduring quality), heat– and corrosion resistance.

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## THE DOMINANT FACTORS DURING WATER TREATMENT IN THE BEVERAGE PRODUCTION

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Ensuring high quality and durability of products in alcoholic beverage production is achieved using the main ingredients: ethyl rectified spirit of the varieties of «Wheat tear» or «Luxury» and prepared water with high organoleptic indicators, balanced microcomponents cationic-anionic composition [1, p. 325].

At each stage of the technological process of production of alcoholic beverages, including water treatment, it is necessary to determine the dominant factors that will largely determine the quality of treated water [2, p. 7].

So the dominant factors for individual air-conditioning units of water during:

- mechanical purification are mechanical, structural, physico-chemical characteristics and chemical resistance filter media, the subtlety and flow velocity, the specific volume of the filtrate before reaching the limit values for opacity and tabarlet, timeliness of regeneration and the like;

- deironing and demangeat is structural and physico-chemical characteristics of filter materials, the filtration rate and the ability to modify a specific volume of the filtrate before reaching the limit values for iron and manganese content, determination of the possibility and efficiency of regeneration and the like;

- sorption purification are mechanical, structural, physicochemical and sorption characteristics of the sorption material, the limit values for sorbolene substances, the effectiveness of one or more sorbents to various directed action, the specific filtrate volume to achieve the limit values for permanganate Okinawans, the filtration rate, the possibility of regeneration, the impact of regenerating agents, etc.);

- mitigation is the physico-chemical characteristics of ion exchange material, the specific volume of softened water, filtration rate and regeneration efficiency, the minimum hardness value of treated water in the filtration cycle, the possibility of contamination of the ion exchanger with organic substances and the like;

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– denitrification processes are the physico-chemical parameters of the sorption material, the specific volume denitrification water, filtration rate and the ability and timeliness of regeneration, the minimum value for nitrogen-containing substances in the filter cycle and so on;

– demineralization vorotnavank method is material and selectivity of the membranes, adjusting the flow at permeate and concentrate in an automated manner, the flow rate of demineralized water, the use of regeneration and antiscalants, the need for blocks poperedni cleaning and the like;

– disinfection on the coefficient of efficiency, selectivity, specific output of disinfected water, prolonged duration of effect and the like;

– conditioning for optimal microcomponents cationic-anionic composition and to evaluate the effectiveness and homogeneity of the prepared water

– other stages of water treatment is the use of pumps, the influence of the material of the piping systems are available using membrane elements, and the like.

Identified dominant factors in water treatment contributes to obtaining treated water for the high stability of the finished product.

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## **PRODUCTION OF FROZEN SEMI-FINISHED PRODUCT FOR A SMOOTHIE DRINK BASED STRAWBERRIES, DRIED APPLES AND OAT FLOCKS**

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A major role in strengthening health of people belongs to providing their full and healthy nutrition. A steady growth in the production of high-quality food products and beverages is required in order to accomplish this goal. Healthy nutrition is achieved by a balanced consumption of nourishing nutrients. The human body cannot receive a balanced diet that contains the entire set of essential substances because of the technological treatment of raw materials [1]. To ensure the proper and healthy diet, it is necessary to develop and create new products with high quality. Such products must to be balanced in their composition, as well as enriched with different

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functional properties [2]. When applying plant raw materials, there occurs the enrichment of products with natural nutrients, creating thereby the products with preventive and health-improving properties.

The utilization of Ukrainian plant raw materials and the implementation of developments related to new technologies in food production is a priority direction in the technology of food industry and public catering.

Refrigeration of fruit and berry semi-finished products makes it possible to obtain marketable products, which are sold to people, and then processed into drinks, juices, compotes, jams in the off-season period [3]. Freezing is one of the safest and most effective techniques for canning, which significantly slows down deterioration of food products. Freezing is based on a change in temperature below the cryoscopic, which terminates or suspends most physical, biochemical, and microbiological processes. Quick frozen fruits and berries are almost not inferior to fresh ones for their nutritional value and content of water-soluble vitamins [4].

Creation of alcohol-free drinks using vegetable raw materials – smoothies becomes more and more popular throughout the world. The choice of components for preparing a smoothie drink is rather wide. The recipe composition of the drink may include fresh, frozen, dried fruits, vegetables and berries, and also different spices, bran, groats, milk products. Depending on used components, smoothie may be both juice and a main dish or dessert.

Raw materials for making smoothies were selected that would own a large amount of vitamins and minerals. Strawberries contain many nutrients that condition their food and dietetic value, including carbohydrates, represented by the high content of sugars (up to 12%). The content of cellulose in strawberries is 4,0%, proteins are near 1%, that is a source of irreplaceable amino acids. Lipids are presented by saturated and unsaturated fatty acids. Strawberries contain many macro– and microelements, vitamins.

Dried apples have a rich chemical composition. Their high energetic value is conditioned by the increased quantity of carbohydrates (57,2%). Dried apples have a rich vitamin composition – vitamin B4 (17,6 mg) and vitamin C (3,9 g). As to macroelements, dried fruits contain much potassium (580 mg), phosphorus (77 mg), magnesium (30 mg), calcium (111 mg) and sodium (87 mg), and also many microelements.

The chemical composition of oat flocks contain protein substances up to 12,5%, fats up to 6%, carbohydrates up to 66,5%, ash up to 4,0%, cellulose up to 12,2%, water 12%. Oat flocks exceed other groats by the amount of proteins (13,1 g), they contain all amino acids, irreplaceable for the organism. Their mineral and vitamin composition is presented by the wide assortment of substances, necessary for the human organism [5].

The use of a frozen semi-finished product for making a smoothie drink would make it possible to extent the assortment of frozen products, to reduce expenditures of labor and time for the preparation of drinks at home and in public catering [6]. The use of frozen semi-products at trade enterprises, hotel-restaurant business and everyday life favors the better organization of the staff work, economy of productive resources, decreasing time for cooking drinks.

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## NECESSITY OF FILTRATION IN LIQUEUR-VODKAS PRODUCTION

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The constant development of the market requires the production of more qualitative alcoholic beverages with an increased resistance. Taking this requirement into account producers are looking for methods and means to improve the technology of production. Organoleptic parameters are the most important characteristics of the liqueur-vodkas products quality. While tasting study of products quality it is estimated appearance, taste and aroma, but of the most importance is beverage's transparency [1, p. 356].

For the filtration of alcohol-water mixtures and prepared products there are used such materials as quartz sand, garnet, mountain crystal, hydro-anthracite as well as some variants of linen, cotton, felt canvas, hushcloth, etc. [2, p. 6].

When creating recipes there are used such ingredients as skimmed milk powder, quail and chicken egg white, etc., which are coagulating substances that help to improve the organoleptic characteristics of sorting [2, p. 4].

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In the current «Master formula for the production of vodkas and alcoholic beverages», the filtration stages and their technological parameters are regulated; these are temperature, pressure, speed during the main filtration cycle, during regeneration, etc.

At the liqueur-vodkas enterprise, it is necessary to filter the following main components or semi-finished products:

- rectified ethyl alcohol at the time of acceptance from transport tanks or alcohol cellar;
- compressor air for blending mixtures and automation of pneumatic systems for removing mechanical impurities, moisture and oil aerosols from it;
- sorting before a coal column to prevent the ingress of mechanical and colloidal impurities on the surface of activated carbon;
- sorting after the coal column to remove particles of activated carbon;
- sorting after additional treatments on machines with special adsorbents;
- sorting after treatment with dry skimmed milk to separate protein suspensions in the production of vodkas;
- ingredients before introduction into a blend product;
- after special treatments of honey water-alcohol mixture and spirit solutions of essential oils, and other opalescent ingredients;
- water or water-alcohol mixture while rinsing bottles before filling or before injection into bottle washing machines;
- clean marriage;
- after preliminary clarification or additional treatments of alcoholized juices and fruit and berry drinks, alcoholic tinctures from vegetable raw materials in the manufacturing of liqueur-vodkas products;
- after removal from fining, clarification or additional treatments of blends of liqueur-vodkas products;
- vodkas and finished blends of liqueur-vodkas products to remove fine suspensions, as well as before bottling;
- ready-made blends of liqueur-vodkas products to increase colloidal stability and resistance to the formation of sediment;
- low-alcoholic beverages for microbiological stabilization;
- water after the preparation of the main filters used to separate colloids, possible microflora of low-alcoholic products and other contaminants.

One of the most popular filtering materials used in the liqueur-vodkas production is quartz sand of size variable fractions [1, p. 355].

Sand filters are used to purify water from mechanical impurities, as well as filtering of mixtures before and after the coal column. Sand filters are easy to use and they are relatively cheap. The disadvantages of using sand filters are:

- significant costs during the preparation of quartz sand;
- migration of microcomponents of quartz sand to the filtrate;
- insufficient level of filtration fineness;

- instability and possible changes of pressure in the fluid flow, possible leakage of suspensions and other mechanical impurities;
- formation of microchannels in the layers of quartz sand, which can affect the transparency of the filtered product.

Implemented studies of natural silicide have shown that in comparison to quartz sand this natural material has several advantages, such as higher hardness by 20 – 25% by Moss, chemical resistance by 30 – 35%, and homogeneity by 45 – 50%.

The application of natural silicide as a natural filtering material does not require the use of chemical reagents, including chlorine hydride at the preparation stage, which is positive.

During filtration of water by natural silicide in comparison to quartz sand, the relative volume increases during one filtration cycle:

- prepared water for 200 – 250 volumes/volume of material, while improving the transparency and color of the prepared water by 15 – 30%,
- water-alcohol solution for 350 – 400 volumes/volume of material, and transparency of the water-alcohol mixture by 25 – 30%.

Based on the carried study, it was established that the use of natural silicide gives an opportunity to increase the transparency of prepared water and mixture; it was shown the perspectivity of usage for filtering at the stages of water preparation and mixture clarification in liqueur-vodkas production.

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# PHYSICAL AND MATHEMATICAL SCIENCES

## REPRESENTATION OF EVEN NUMBER IN THE FORM OF THE SUM OF FOUR SIMPLE

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It is known that a weak problem Goldbach is finally solved.

$$p_1 + p_2 + p_3 = 2N + 1 \quad [1]$$

where on the left is the sum of three odd primes more than 7.

The author provides the proof in this work, being guided by the decision weak problem of Goldbach that:

$$p_1 + p_2 + p_3 + p_4 = 2N \quad [2]$$

where on the right sum of four prime numbers, at the left any even number, since 12, by method of mathematical induction.

Theorem1. Any even number starting from 12 is representable as a sum four odd prime numbers.

1. For the first even number  $12 = 3+3+3+3$ .

We allow justice for the previous  $N > 5$ :

$$p_1 + p_2 + p_3 + p_4 = 2N \quad [3]$$

We will add to both parts on 1

$$p_1 + p_2 + p_3 + p_4 + 1 = 2N + 1 \quad [4]$$

where on the right the odd number also agrees [1].

$$p_1 + p_2 + p_3 + p_4 + 1 = p_5 + p_6 + p_7 \quad [5]$$

Having added to both parts still on 1

$$p_1 + p_2 + p_3 + p_4 + 2 = p_5 + p_6 + p_7 + 1 \quad [6]$$

We will unite  $p_6 + p_7 + 1$

again we have some odd number, which according to [1] we replace with the sum of three simple and as a result we receive:

$$p_1 + p_2 + p_3 + p_4 + 2 = p_5 + p_6 + p_7 + p_8 \quad [7]$$

at the left the following even number is relative [3], and on the right the sum four prime numbers.

$$p_1 + p_2 + p_3 + p_4 = 2N \quad [8]$$

Thus obvious performance of an inductive mathematical method.

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<sup>1</sup> Wetzlar, Germany, pensioner

As was to be shown.

2. Any even number starting with six is representable in the form of the sum of two prime numbers. Goldbach-Euler's hypothesis. Consider a sequence of even numbers starting from 6:

6, 8, 10... to infinity. The sum of two adjacent even numbers will be twice the previous number plus 2. Thus [8] has the appearance:

$$p_1 + p_2 + p_3 + p_4 = 2(p_1 + p_2) + 2 \quad [9]$$

where  $p_1 + p_2$  – the previous even number,  $p_3 + p_4$  – the next.

$$p_1 + p_2 + 2 = p_3 + p_4 \quad [10]$$

[10] – mathematical induction for the sum of two simple.

[10] – shows the inevitability of the next number to be equal to the sum two prime numbers. And since the subsequent even number then becomes previous, then the entire sequence of even numbers can be represented as sums of two odd primes. In [10], instead of the previous set the first 6, already 8 should be the sum of two simple ones, further in [10] instead of we set the previous 8, we get 10 inevitably the sum of two simple, etc.

The process is continuous and endless. Case of an even number not equal to the sum of two odd primes categorically excluded since this completely contradicts [8-10].

3. Thus we proved:

Any even number since 6 is representable in the form of a bag of two odd the simple.

$$p_1 + p_2 = 2N \quad [11]$$

Any even number is representable in the form of the sum of two simple. In total even numbers, without exception, since 6 are the sum of two prime numbers. Goldbach-Euler's problem is true and proved! Theorem the four simple and the Goldbach Euler conjecture have a series of corollary. One of which is relevant problem in number theory.

**Corollary 1.** If one of the sum of three primes for any odd number, starting 9, arbitrarily set in the open interval  $[3, 2N-6]$ , then two simple variables in the sum give the required even number. Which is evident from the proven Goldbach-Euler hypothesis.

**Corollary 2.** If one of the sum of four simple for even  $2N$ , starting with 12, arbitrarily set in the open interval  $[3, 2N-9]$ , then three simple variables in total give the necessary odd number. Which, obviously, is from the proven Goldbach hypothesis.

**Corollary 3.** An even number, starting at 14, can be represented by a sum of four where a prime is the sum of three primes.

$$p_1 + p_2 + p_3 + p_4 = p_5 + p_6 = 2N \quad [12]$$

Suppose  $p_4 = p_5$  it is always possible (Corollary 2), the sum of the other three prime number  $p_6$ .

### Theorem.

Any even number starting from 10 can be represented by a sum not fewer than two pairs of two odd primes, 12– exception. Let us show that the sum of four primes for all even numbers starting from 16 can be simultaneously the sum of two pairs of odd prime numbers.

$$3 + 3 + 5 + 5 = 16 = 3 + 13 = 5 + 11$$

We prove this for all even numbers greater than 16. From the proven hypothesis of Goldbach-Euler:

$$p_1 + p_2 = 2N$$

It follows that even numbers can have several pairs of prime numbers, in the sum of  $2N$ .  $N$  is the arithmetic average, where to the left and to the right of the same distance is a pair of prime numbers.

Suppose one pair  $p_1, p_2$ ,  $p_1 \neq p_2$

According to the Goldbach theorem, the sum of three simple ones can be represent any odd number, starting with 9, including prime numbers and they are represented by this sum and start with 11.

$$p_4 + p_5 + p_6 = p_1 \quad [15]$$

$$p_4 + p_5 + p_6 + p_2 = 2N \quad [16]$$

We prove that in [16] there is another pair of prime numbers.

Consider all possible options.

Option 1. ( $p_4 \neq p_2$ ,  $p_5 \neq p_2$ ,  $p_6 \neq p_2$ )

Then the opposite way we have the system:

$$2N - p_4 \neq p_7 \quad [17]$$

$$2N - p_5 = s_1 \quad [18]$$

$$2N - p_6 = s_2 \quad [19]$$

where  $s_1, s_2$  composite odd numbers and in [17] the difference is not equal to the simple odd number-  $p_7$ .

Subtract the left and right sides [18-17], respectively.

$$p_4 - p_5 \neq s_1 - p_7 \quad [20]$$

$$p_4 + p_5 + p_7 \neq s_1 + 2p_5 \quad [21]$$

On the right [21] is an odd number, on the left is the sum of three odd primes, which, according to Goldbach's hypothesis, since 9, is any odd number.

Is [21] inequality? Set one of three simple values. (Corollary 1)  $p_7$ . The sum of the other two is denoted as  $2K$  equal to the difference:

$$2K = s_1 + 2p_5 - 2N + p_4 = p_4 + p_5 \quad [22]$$

$$p_4 + p_7 = 2N \quad [23]$$

Thus we get equality. Assumption that in the system [17-19]. All odd composite numbers are not true. At least one simple a number that creates a pair of prime numbers—  $p_4, p_7$ . Thus it is shown that with  $p_1 \neq 11$ , there are three simple  $p_4, p_5, p_6$

numerical values, for which [17-19], although they can take on the values of three composite numbers, however, there are necessarily three such values at which at least one prime number.

But  $p_4 = p_2$  a new couple is missing. If  $p_1 - p_2 = 0; 2; 4$  then  $p_4 = p_2$  does not fit  $p_1$  and there are at least two pairs sums of prime numbers.

Lemma: If  $2N = 2p$ , where  $p$  is a prime number except 3, is an even number we represent several pairs of sums of primes.

For  $p \square 11$  according to the above in [16]  $p = p_1, p = p_2$ . For smaller:

$$6 = 3 + 3, 10 = 5 + 5 = 7 + 3, 14 = 11 + 3 = 7 + 7.$$

Option2. ( $p_4 = p_2$ )

And similarly to option 1;

$$2p_4 + p_5 + p_6 = 2N \quad [24]$$

$$2p_4 + p_5 \neq p_8 \quad [25]$$

$$2p_4 + p_6 = s_3 \quad [26]$$

$$p_6 - p_5 \neq s_3 - p_8 \quad [27]$$

$$p_5 + p_6 + p_8 \neq s_3 + 2p_5 \quad [28]$$

$$2K_1 = 2p_4 + p_6 + 2p_5 - 2p_4 - p_5 = p_5 + p_6 \quad [29]$$

$$2p_4 + p_5 = p_8 \quad [30]$$

$$p_8 + p_5 = 2N \quad [31]$$

Again possible  $p_5 = p_2$ .

Option2.  $p_4 = p_5 = p_2$

In this case, for  $2p_2$  we use the lemma and double the sum prime numbers will be displayed as the sum of two prime numbers, without  $p_2$ .

Option 3 becomes option 1.

However, this does not happen for  $p_2 = 3$ . In this case again apply corollary 1 replace with a lower value  $p_6$ . Then  $p_4$  or  $p_5$  not equal to 3. And option 3 goes to option 1 or 2.

Exception  $14 = 3 + 3 + 5 + 3$ , where  $p_6$  it is impossible to replace.

Changing  $p_4, p_5, p_6$  we find the third, fourth, etc., (if they have) a pair -sum of two simple odd numbers.

And even to 16:

$$6 = 3 + 3, 8 = 5 + 3, 10 = 7 + 3 = 5 + 5, 12 = 5 + 7, 14 = 11 + 3 = 7 + 7$$

It can be seen that only three even 6,8,12 is the sum of only one pair primes, all other sums of two or more pairs of primes odd numbers.

**Corollary 4.** If the sum of two simple of the sum of four for even  $2N$ , starting at 12, arbitrarily set to open interval  $[6, 2N - 6]$ , then the sum of the remaining two simple variables there is a necessary even number.

What can be seen from the proven Goldbach-Euler hypothesis.

**Corollary 5.** The prime numbers of twins are infinite.

Any even number starting from 14 can be represented as a sum of four odd primes of which two are prime twins.

$$p_1 + p_2 + p_3 + p_4 = 2N \quad [13]$$

Let  $p_3, p_4$  · prime numbers be twins, then the difference is any even, starting at 14, and the sum of the primes of the twins is also an even number, which, according to the proved Goldbach-Euler hypothesis, is equal to the sum of two prime numbers (Corollary 4).

Next, we place the prime numbers from left to right in descending order.

And if the even number  $2N = 2p_2 + 2p_4 + 4$ , then  $p_1, p_2$  · inevitably also twins.

Subtract the sum from both parts [13]  $2p_2 + 2p_4$  :

$$p_1 - p_2 + p_3 - p_4 = 4 \quad [14]$$

From [14], it is obvious – inevitably twins.

Let their finite number and the last prime numbers be twins  $p_3, p_4$  · .

Denote two primes greater than  $p_3, p_4$  · how  $p_1, p_2$  · .

Sum up all four primes and then according to the sum theorem four simple there is an even number  $2N$  at which inevitably large  $p_1, p_2$  · – twins. And then substituting  $p_3, p_4$  · numeric values instead  $p_1, p_2$  · in [13] the process becomes infinite and the prime numbers are twins – infinite number.

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## MILITARY SCIENCES

### FEATURES OF LEGAL EDUCATION OF MILITARY IN UKRAINE

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Unfortunately, the cultural aspect can create a basis for the social norms of behavior in the offensive forces, these phenomena can become massive when the social community is in a crisis situation. Legal socialization of servicemen takes place more quickly when its legal culture, readiness to perceive the requirements of military legislation and to lead its behavior in accordance with these norms. After all, the process of legal socialization is continuous [1, p. 13].

Legal education of servicemen is an integral part of legal work conducted in Ukraine. This is a complicated and multifaceted process, that is, the influence on the consciousness and behavior of military personnel, the purpose of which is the formation of legal concepts, views, beliefs that guarantee compliance with the laws of Ukraine, oath and military regulations.

The question of the concept of legal culture is solved in theoretical literature ambiguously. Kaminskaya V.I., Ratnov A.R. under the legal culture of the proposed system to understand materialized and ideal elements that belong to the sphere of law and their reflection in

consciousness and behavior of people. In accordance with the above, they are included in the legal culture such «cultural components»: law, legal relations, legal arrangements, legal consciousness and legal behavior [2, p. 41].

I.M Keizer complements the already mentioned «cultural components», which are part of the legal culture, criteria for political evaluation of law and legal behavior, law-making activity, legal science. According to O.D. Boykova, structural elements of the legal culture is the right, legal consciousness, legal science, legal relationships and legal behavior [3, p. 19].

After all, the purpose of legal education is the accumulation of knowledge about the right, its functions, abilities protected by law, the formation of belief in the necessity and usefulness of legal orders. In the system of legal education of servicemen, an important role is played by the legal training, which is carried out in the system of humanitarian training and is its obligatory component. The purpose of legal training of servicemen is the formation of legal consciousness, legal culture of servicemen, provision of a certain level of legal consciousness, interests, law and

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order, feelings, legal thinking, formation of scientific legal world outlook. After all, the ultimate result must be the achievement of a high level of legal awareness and legal culture of the individual.

It is very important that the process of legal training of servicemen is based not on mechanical memorization of legal norms and laws, but on a deep understanding of the essence of the theoretical and practical aspects of law. Legal studies consists in conducting lectures, discussions, disputes, all changes in legislation that promote the development of personality, and most importantly in the system of self-education of servicemen as an important element in the system of legal education. After all, the self-education of servicemen is a purposeful active activity that promotes the development of positive qualities in accordance with the normative requirements of society and military service [4, p. 305].

In today's society, the thesis is a thorough study of law, since the success of cognitive activity depends to a large extent on the ability of servicemen systematically and systematically to work on themselves, their own thoughts, beliefs, in order to improve the person.

It should be noted that the legal aspect requires internal stress on the formation of specific qualities of the individual, associated with the establishment of legal skills, beliefs and habits of the legal sphere [3, p. 21].

However, for self-education it is necessary: access to legal literature, the availability of time and conditions for independent work. Therefore, the practical implementation of the requirements of the legislation is necessary:

- in consciousness, freedom, and feelings of servicemen are influenced by the norms of law contained in the statutes, laws;
- the influence on the consciousness and behavior of the military is carried out by the commander;
- formation in servicemen of legal consciousness is determined by support in the military part of the statutory order, that is, there are habits of the act in accordance with the law, oath, statute;
- personal example of a commander to comply with legal norms.

Thus, it can be noted that the legal education of servicemen is influenced by all spheres of the development of individual's life: political, military-professional, ideological, physical and observance of the current practical requirements of the legislation contribute to the rapid development of legal education of servicemen.

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## **GEOGRAPHICAL SCIENCES**

### **PERSPECTIVES OF MEDICAL AND HEALTH TOURISM DEVELOPMENT IN VOLYN REGION**

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Lately, health tourism has become extremely popular in both national and international tourism markets. Firstly, this is due to the fact that modern society is concerned about the health state and its improvement, and secondly, there is a worsening of the population health state, an increase in the incidence rate, the spread of socially dangerous and chronic diseases, which lead to the widespread use of resort therapy and the health tourism development.

Many works of modern scientists, such as B.I. Aksentiychuk, M.M. Baranovsky, H.A. Barkova, V.M. Boholyubova, V.O. Jaman, S.I. Nikitenko, K.A. Nemets, L.M. Nemets, S.V. Leonov, O.O. Lyubitseva, M.P. Malska, N.P. Melnyk, O.Ya. Romaniv, M.Yu. Rutynsky, N.V. Chernenko, L.T. Shevchuk and others, are devoted to the problems of health tourism organization.

Health tourism is a travel to the resort areas for the purpose of treatment. Health tourism is divided into therapeutic, which aims at its own treatment, therapy, rehabilitation after illness, and preventive (wellness tourism), focused on maintaining the body in a healthy state and keeping the balance between human physical and psychological health [4].

Currently, traditional health resorts are no longer a place of treatment and recreation for older people, and they become a multifunctional wellness center for a wider range of consumers. The choice is made between resorts that specialize in the treatment of a particular disease and resorts of mixed type, which generally promote health and contribute to recovery and stress relief [2].

Volyn region has a favorable geographical position, unique historical and cultural sights, wide network of nature reserve fund and possesses significant natural and recreational resources for the development of health tourism and has the necessary infrastructure to provide services to certain categories of tourists and holidaymakers.

There are two distinct types of landscapes in the above-mentioned region – Polesian and forest-steppe. Volyn region has the best natural conditions for the wellness tourism development (large forested areas, large number of floodplains and karstic lakes), although the forest-steppe areas also have considerable potential.

The climate is temperate continental: winter is mild with unstable frosts; summers are warm, spring and autumn – with heavy rainfall. Annual precipitation amounts are

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up to 600-650 mm. Most of them fall in June, July and August (up to 80-90 mm per month). 70% of the total rainfall is in the warm season. The climate conditions of Volyn region are suitable for the health tourism development in the winter and summer months.

The ultraviolet radiation (UVR) mode, which has a bactericidal and vitamin-forming effect on the human body, is of great importance in assessing the health value of climate. The number of sunlight hours depends on the length of the day and promotes long walks [3].

Forest resources are significant for the wellness tourism development. The total forest area of the region is 697.7 thousand hectares. This is one third of the region's territory and 6% of the forest area of Ukraine. The most afforested are the northern Polissya districts (Manevychi, Kamin-Kashyrsky, Shatsk), where the forest area occupies 56-47% of the territory, in the south – in the forest-steppe zone – the forest area is 5%.

Coniferous forests (pine, fir) predominate in the forests – 343.7 thousand hectares (60%), softwood – 137.5 thousand hectares (24%) and hardwood species – 91.6 thousand hectares (16%). The ability of the forest to release oxygen and volatiles and to absorb carbon dioxide is extremely important. The phytoncidal quality of the plantations reduces the number of bacteria and germs in the forest air, improves sanitary and hygienic conditions of the rest. Forest resources play an important role in the treatment of the organism [3].

Balneological resources include mineral waters, which combine into 4 types, and therapeutic muds (peat and sapropels). In total there are 43 mineral waters in the region.

In Ratne district, near the village Osnytsia, village Tur, sanatorium «Lisova Pisnia» («Forest Song») the hydrocarbonate-calcium, sodium bicarbonate and chloride-calcium mineral waters are distributed. They are suitable for the cardiovascular system diseases, peripheral nervous system and other diseases treatment.

Near the village Gremyache Kivertsi district, sanatorium Prolosok there is the source of the chloride-sodium-bromine mineral water. This water is used for the treatment and prevention of musculoskeletal system diseases, endocrine and nervous systems, diseases of the digestive system and breathing.

Sodium chloride waters with high mineralization – 12-13 mg / l – distributed near the village Zhuravychy, Kivertsi district. These waters have impurities of bromine, iodine, radon and they are used to treat cardiovascular system, atherosclerosis, respiratory and digestion.

There is a source near Kovel, which has no analogues in Ukraine. It is sodium chloride-iodine-bromine water. These waters are used in the digestive system, cardiovascular, endocrine and nervous systems, skin and musculoskeletal system diseases.

Near Lutsk, iodine-bromine and sodium chloride waters of high mineralization and slightly mineralized ferruginous waters are used in the treatment of gastrointestinal tract diseases, kidney diseases, and ischemic diseases of the heart, iron deficiency and anemia.

Volyn region has considerable resources for curative mud. In particular, 33 peat curative mud deposits were observed. It is mainly gypsum domed peat containing many organic compounds (bitumen, wax, pitch, ooze, lignins, starch, essential oils, balms, etc.) and inorganic constituents (iron oxides, ammonium salts, boron, barium, strontium compounds, titanium, zirconium, vanadium, silver, chromium, gold, iodine, etc.). Such muds are grease, have high heat capacity, bactericidal, hygroscopic, low thermal conductivity.

Sapropels (bottom sludge) have valuable healing properties. The largest number of sapropel deposits is found in the northern regions, in particular in Ratne, Turiysk and Stara Vyzhva lakes (40.8% of all deposits), Kovel (11.0%), Manevychi (10.0%) and Shatsk (9.4%). Medicines based on sapropel are used for the treatment of diseases of the skin, musculoskeletal system, nervous, genital, cardiovascular systems, digestive organs, breathing; diseases and consequences of injuries of the central nervous system. Cosmetic face masks, which contribute to skin rejuvenation, counteract the processes of skin aging are made from sapropel [1].

The chain of the sanatoriums and resort complexes in Volyn region is presented in the Table.

### Sanatoriums and resort complexes in Volyn Region

Name of the resort	Resort profile	Treatment
Sanatorium «Lisova Pisnia» («Forest Song»), village Haivka Shatsk district, the territory of Shatsk National Nature Park [6]	Traditional treatment with the help of modern equipment, therapy is combined with phytotherapy, manual therapy, homeopathy, hirudotherapy, peat treatment, ozone therapy, salt mine, therapeutic gymnastics, massages.	Cardiovascular system, respiratory system, gastrointestinal tract diseases, joints and spine, nervous system, skin (psoriasis).
Sanatorium of mother and child «Prolisok», village Gremiache Kivertsi district, the territory of NPP «Tsuman Pushcha» [7]	Along with traditional treatment, there is the use of climatotherapy, phytotherapy, hirudotherapy, apitherapy, press-therapy, information-wave therapy, bischofite applications, phytobar, thermo-spa, and also balneological procedures	Diseases of the nervous, endocrine and urinary-genital systems, digestive system, breathing, musculoskeletal system
Regional Children's Anti-Tuberculosis Sanatorium «Zghorany», village Zghorany, Lyuboml district	Along with traditional medical methods, they apply climatotherapy, phytotherapy, aerosol therapy, massage, therapeutic physical training	Nonspecific diseases of the respiratory system
Sanatorium for children and parents «Dachnyi», village Zhabka, Kivertsi district [5]	Medical treatment, phytotherapy, aromatherapy, physiotherapy, electrical muscles stimulation, electrosonics, hydrotherapy (hydromassage baths),	Specialization: pediatric neurology, infantile cerebral palsy, infectious lesions of the nervous system, traumatic injuries

	pressotherapy, ultrasound therapy, magnetotherapy, electrophoresis, paraffin-ozokerite applications, kinesitherapy, manual therapy, Montessori therapy, massage, physical therapy.	of the brain and spinal cord and peripheral nervous system.
Regional anti-tuberculosis sanatorium for adults, urban-type settlement Kolky, Manevychi district	Treatment and rehabilitation factors that are applied: climatotherapy, physiotherapy and medical treatment of tuberculosis. The treatment period is from one to five months.	Treatment of patients with active tuberculosis
«Shakhtar» health resort, village Pavlivka, Ivanychi district	Climatotherapy, ozone therapy, <i>amplipulse therapy</i> , Montessori therapy, massage, physiotherapy.	Diseases of the musculoskeletal and respiratory systems

Thus, for the health tourism development in Volyn region it is necessary to regulate financial and economic activities, to increase the volume of state support, to improve the regulatory framework, to attract investors, incl. foreign ones, to modernize the material and technical base of the existing health resorts and the planning of their territories, to develop fundamentally new approaches to the sanatoriums activity on the basis of the latest SPA-technologies that will improve the quality of recreation and health.

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## **PROBLEMS OF FORMING THE POBUZKA AMALGAMATED TERRITORIAL COMMUNITY OF THE KIROVOGRAD REGION (UKRAINE)**

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The decentralization reform is one of the most widescale reforms in Ukraine today which Ukraine has followed on since 2014. According to the legislation, which formed the basis for the formation regional's Long-term plans, communities must unite or form a new network of territorial associations by their own free desire.

The number of created amalgamated territorial communities (ATC) in Ukraine increased to 951, the number of community residents increased on 8.8 million people and amounts about 10.2 million people for the period from 2015 until September 2019. Incoming of local budgets increased by 25.7% from 68.6 billion UAH up to 267.0 billion UAH in 2018 [1]. Communities occupy 37.9% of the Ukraine's territory by area.

Kirovograd region is at the lowest positions by the number of created ATC (21) [1] and takes 19th place in the overall ranking of the regions of our country in 2019. Despite the active process of decentralization, the problem of forming ATC in this region is getting importance.

Today a new Pobuzka amalgamated territorial community of the Kirovograd region (Golovanivsky district) is forming. This ATC aims to unite two localities: the urban village of Pobuzke and the village of Kapitanka. The choice of these localities is mainly determined by the geographical factor: remoteness from other settlements of the Golovanivsky district and land surveying on the south with the Mykolayiv region. There are also political and economic factors – to break out from control of the current district's administrative center – the city of Golovanivsk. The community will be among the smallest in the country by its structure.

The population of Pobuzka ATC will be 7062 people (20% of the total number of the Golovanivsky district) and the territory will occupy 13.5 km<sup>2</sup> (1.36% of the total area of the district) after the union of the urban village of Pobuzke and the village of Kapitanka. The future amalgamated community will belong to communities with population from 5 to 10 thousand people. The administrative center of the Pobuzka ATC will be determined by the urban village of Pobuzke in conformity with the methodical guidance for determination the center of the community.

There will be one general council and one chairman per amalgamated community. The latest is elected by the whole amalgamated territorial community. The Council of ATC can form departments (financial, educational, healthcare, judicial, economic development, etc.), administration and other executive institutions for implementation authority [2, p. 70]. The creation and composition of these structures are determined

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by the availability of financial resources in the regional budget for the maintenance of the relevant staff.

According to the predicted calculations of the Kirovograd Department of the Association of Ukraine's Cities, the incomes of the Pobuzke as part of ATC will increase from 2 million UAH to 24.77 million UAH per year due to personal and fixed income from personal income tax (PIT). Educational and medical subventions will increase on 18.53 million UAH, reverse subsidies provided for the development will increase on 4.55 million UAH. The Kapitanka's budget will also increase from 2 million UAH to approximately 6.99 million UAH after the amalgamation [3]. In general, incomes will increase almost in 12 and 3.5 times respectively.

Such financial independence will create the basis for community to be able to develop absolutely, to allocate funds for its own needs. It will improve the standard of living of the population. An additional effect will be increasing the competitiveness of the Golovanivsky district, magnification its investment attractiveness and decrease the backwardness of the territory. Cause the social and economic development of the region is inseverable from the development of the community.

The Perspective Development Plan was worked out to attain the successful development of the Pobuzhka ATC. This plan will allow to combine analysis of current events, develop the precise steps for socio-economic development and form a general vision of perspectives. This document includes two blocks: economic and social.

The United States Agency for International Development (USAID) Programme «Decentralisation Offering Better Results and Efficiency» (DOBRE) signed a Memorandum on cooperation with the Kirovohrad Region State Administration and the Regional Council on 18 October 2019. Each community – a partner of the DOBRE program independently prepares projects and decides what to allocate funds to [4]. The result of the signing of this memorandum in the future may be close cooperation and assistance to Pobuzka ATC for its development, implementation some items of the The Perspective Development Plan and new projects.

There are certain risks that could arise in process of forming the Pobuzka ATC: 1) misuse of budget funds; 2) disinclination to take responsibility and disappointment in the successful implementation of the decentralization reform; 3) lack of support from the general population due to a wrong understanding of the decentralization process and a fear to lost a job; 4) possible resistance from the district administration; 5) inconsistency about the distribution of functions and powers between local authorities and district councils; 6) shortage of educated staff to execute new responsibilities which may lead to ineffective use of financial resources.

It is necessary to introduce effective professional development programs for employees of local self-government, provide them with the necessary advice from the executive authorities and ensure effective control of the objective use of funds to identified certain risks. Today meetings are regularly held with the local population and initiative groups in order to clarify emerging questions, determine strategic goals and tactical problems.

As a result, the future Pobuzka amalgamated territorial community matches the basic principles of voluntary unification that laid down in the legislation [5]: the continuity of the territory, the ubiquity of local self-government, voluntary association, economic efficiency and the corresponding quality of service. All certain taxes and funds for the provision of administrative service. All of the taxes and administrative fees will go to the budget of a perspective community (it's a significant plus for the unification). But, at the same time, for the present Golovanivskiy district the loss of revenues to its budget from the Pobuzky Ferro-Nickel Combine (which falls within the boundaries of the Pobuzka ATC) will be negative.

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## **CALCULATION OF THE SPATIAL DISTRIBUTION OF WATER TEMPERATURE AND SALINITY IN THE ACTIVE LAYER OF THE BLACK SEA BY SATELLITE DATA**

**Andrii Sryberko<sup>1</sup>**

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To solve the many practical problems, it is necessary to use vertical distribution of hydrological characteristics of the marine environment. Today there isn't an easy way to get a in situ data for evaluation of the vertical distribution [1, p. 20].

Indirect definitions of the vertical distribution of water temperature through the development of various methods for the calculation of the distribution of water temperature on the vertical are used to date [1, p. 10].

Main purpose of this work is to estimate an ability of using of satellite data for calculation of the spatial distribution of thermohaline characteristics (on the example of the Black Sea).

Calculations of the spatial distribution of water temperature and salinity in the active layer of the Black Sea by satellite data are founded on the «Method of calculation of the vertical distribution of thermohaline characteristics by satellite-based Information (on the example of the Black Sea)» (hereinafter referred to as the Method) created by us in 2016. This Method was presented at the conference in 2016 [2].

In undertaking this work the developed Method [2] was significantly completed with new equations for calculating the vertical distribution of water temperature, salinity and sound speed in water, criteria for calculations, corrections for the temperature of the Water, which significantly improves the accuracy of the calculations of the vertical distribution of water temperature and salinity in the active layer of the Black Sea by satellite data.

Study of vertical distribution of water temperature and salinity in the Black Sea were carried out in the deep-water part sea at standard levels (0, 10, 20, 25, 30, 50 meters) in spring – autumn period. This area of research is represented by the highest number of measurements and is included in the Main Black Sea current zone.

In the process of research, the following tasks were solved:

- the determination of statistical dependences between the values of water temperature at the neighboring levels in the Black Sea according to the averaged data of water temperature and the creation of regression equations;
- the determination of statistical dependences between the values of water temperature, depth and sound speed in water;
- the determination of statistical dependences between the values of water salinity, water temperature, sound speed in water and hydrostatic pressure;

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- estimation of the possibility of calculating the vertical distribution of water temperature in the Black Sea according to developed regression equations based on satellite information;
- estimation of the possibility of calculating the vertical distribution of the sound speed by the values of water temperature calculated according to developed regression equations based on satellite information;
- estimation of the possibility of calculating the salinity of water by the values of water temperature, sound speed in water and hydrostatic pressure calculated according to developed regression equations;
- development of a method for calculating of the spatial (three-dimensional) distribution of the thermohaline characteristics in the active layer of the Black Sea on acoustic and satellite data.

The local calculation of the vertical distribution of water temperature and salinity in the Black Sea by acoustic and satellite data in the layer 0–50 meters at several stations can be easily carried out by applying the developed equations. But if the whole water area of the Black Sea should be counted, this process is very time consuming.

Therefore, we designed a prototype of a computer program (hereinafter referred to as the Program) for the calculating of the vertical distribution of water temperature and salinity in the Black Sea by acoustic and satellite data.

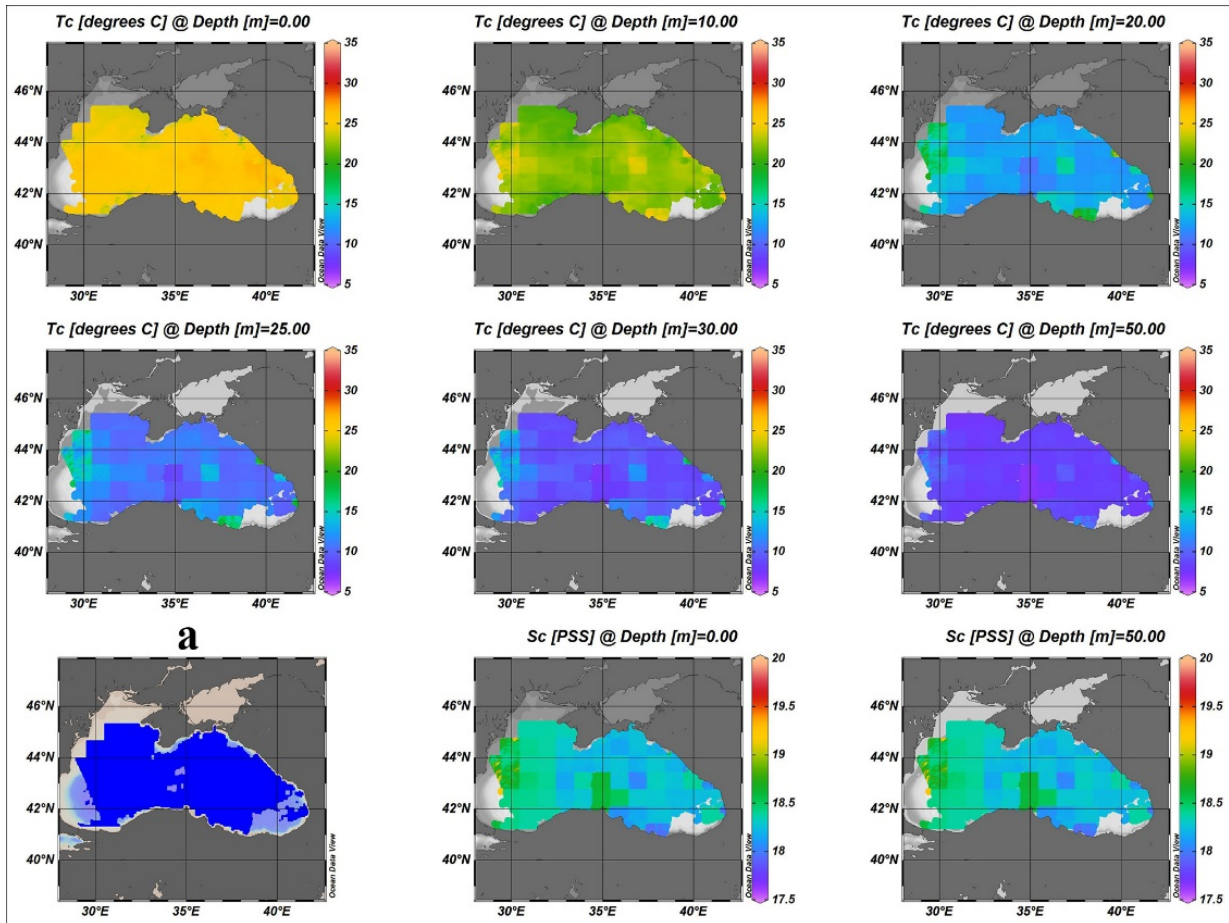
The Program automatically determines where and by what equations the vertical distribution of the thermohaline characteristics in the active layer of the Black Sea can be calculated.

The initial data for the calculations are only daily satellite data of the sea surface temperature and the month of the year.

Research results from the calculations of the vertical distribution of water temperature in the Black Sea by satellite data at standard levels in spring – autumn period showed that the change in the vertical profile of water temperature obeys the exponential law of distribution. The linear law of distribution is dominated when the deviation of sea surface temperatures from climatic water temperature values is more than  $\pm 2^{\circ}\text{C}$ .

Water temperature corrections are introduced on the levels of 10, 20, 25 meters during spring – summer, and in autumn – on the levels 10, 20, 25, 50 meters.

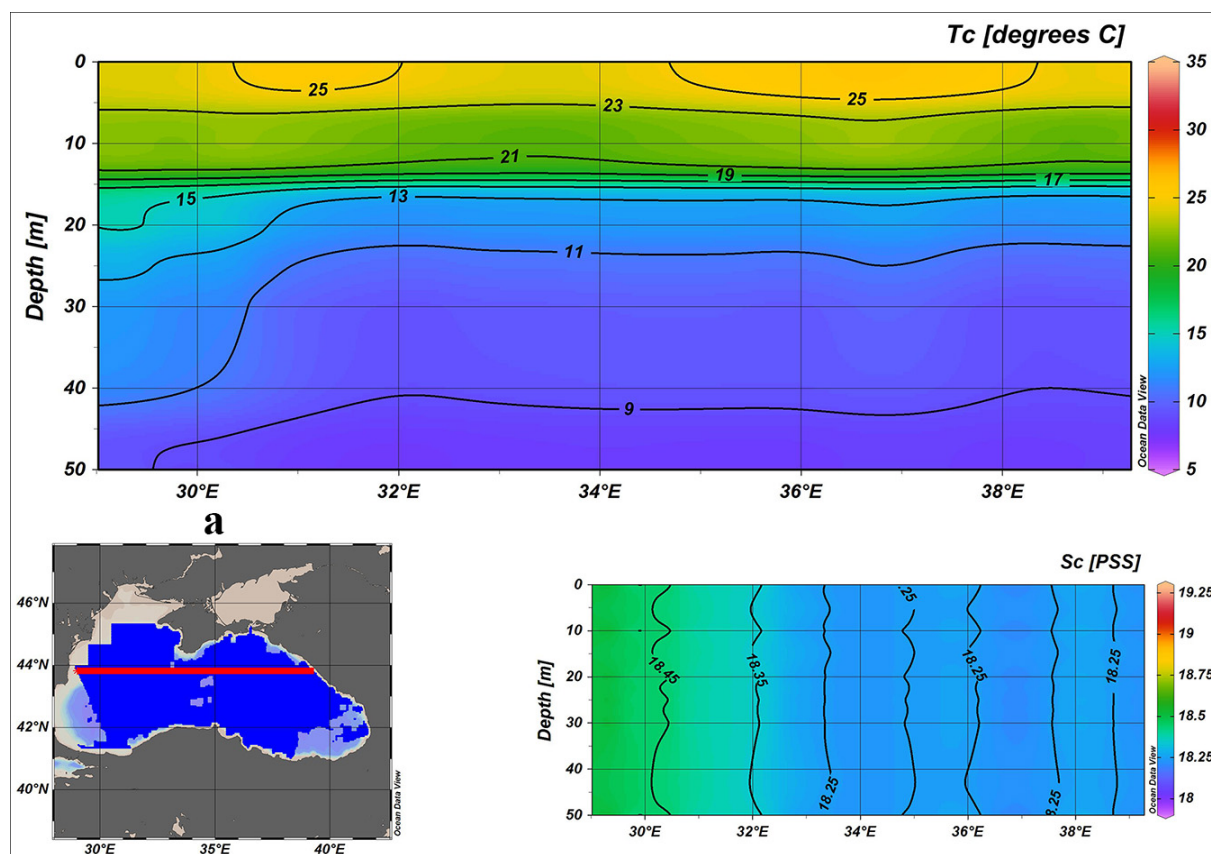
To visualize the results of the calculations by the Program the maps of the spatial distribution of water temperature and salinity at standard levels and zonal section (latitude  $43.8^{\circ}\text{N}$ ) for 08.07.2018 were built.



**Figure 1. Maps of spatial distribution of calculated water temperature ( $T_c$ ) at the standard levels and salinity ( $S_c$ ) at a depth of 0, 50 m in the Black Sea for 08.07.2018. Map (a) is map of the distribution of satellite data for calculation [3]**

On the map (a) (see Figure 1) the initial satellite data were the daily data on satellite measurements of the Black Sea water surface temperature with 4 km step on latitude and longitude, measured companion NASA (Terra MODIS) [3].

The results of calculations of zonal section (latitude 43.8° N) in the Black Sea for 08.07.2018 are presented in Figure 2.



**Figure 2. Distribution of calculated of water temperature ( $T_c$ ) and salinity ( $S_c$ ) on zonal section (latitude  $43.8^\circ$  N) in the Black Sea for 08.07.2018.**

**The map shows the location of section in the Black Sea**

Figures 1 and 2 are built using computer program Ocean Data View (ODV) that is intended for the interactive exploration and graphical display of oceanographic and other geo-referenced profile, trajectory or time – series data [4].

Designed by us, the prototype of a computer program to calculate the vertical distribution of the thermohaline characteristics in the active layer of the Black Sea by satellite data could serve as a basis for the establishment of a «Operational Forecast System of the thermohaline characteristics in the Black Sea» (OFS). With the help of which the dynamics of characteristics and effects of their change on hydrobiological, hydrochemical, hydrophysical processes in the Black Sea and the ecosystem of the sea in general can be evaluated.

In our opinion the developed method for calculating of the spatial (three-dimensional) distribution of the thermohaline characteristics by acoustic and satellite data can be applied to others water area of the World Ocean taking into account their hydrological conditions.

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## ARCHITECTURE

### FEATURES OF ARTIFICIAL LIGHTING WHICH IS CONSISTENT WITH HUMAN BIORYTHMS

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One of the most important issues related to lighting is its impact on living organisms (humans in particular). Modern test and measurement methods make it possible to investigate the effects of light much more carefully, and with the new capabilities of LED technologies for colour temperature control and colour rendering these results are much easier to put into practice [8]. In general, the transition of society to digital LED technologies in lighting may be regarded as a paradigm shift that is happening at a rapid pace. It concerns not only visual perception and energy efficiency, but also the optimization of biological and emotional impact of light [7].

Various definitions, all of which have their nuances, are used to designate lighting that recognizes the effects of light on the body and human activity. In this context the term «biologically effective lighting» is used, but the adjective «biological» here also covers visual processes. The term «dynamic illumination» is widely used if the colour temperature and illuminance change according to daylight, affecting human circadian rhythms. However, the same term refers to light which changes (for example, in colour) but has no biological effect. The term «circadian lighting» is used when illumination is intended to correct or stabilize human circadian rhythms [8]. Over the past few years the notion «human centric lighting» has become particularly prevalent in terms of lighting that meets individual living and working conditions of a user at any time, satisfying not only the visual requirements but also affecting a person emotionally and biologically [7]. This study is based on the proposition that any lighting of a person's living environment is intended to meet his/her needs and therefore is focused on him/her. Thus, the appropriate artificial lighting (such that takes into account the effect of light on the body and human activity) is considered as *lighting which is consistent with human biorhythms*.

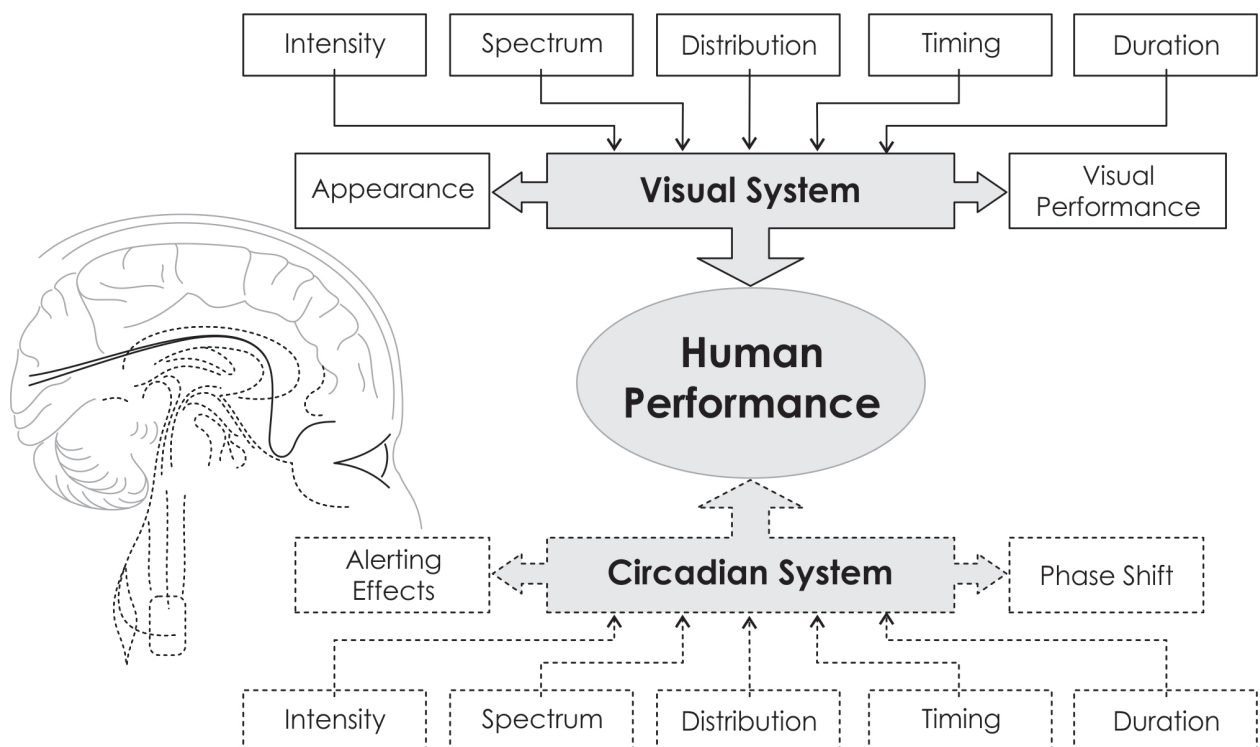
The true extent of the dependence of the human body on lighting has only become apparent in recent decades. The importance of research into the effects of light on a person's biological clock is indicated by the fact that in 2017 Jeffrey C. Hall, Michael Rosbash and Michael W. Young were awarded the Nobel Prize in Medicine for their work on the mechanism known as «circadian rhythm» [4]. Human circadian rhythm is synchronized with the solar daily cycle and regulates not only periods of activity and rest, as well as biorhythms, but also physiological functions at the cellular level.

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Today, it is known that through circadian rhythm light can affect both productivity and human health [6, p. 80-87]: seasonal decrease in daylight in winter in the extreme northern and southern latitudes may cause depression – seasonal affective disorder (SAD) or «winter blues»; daily alternation of light and darkness significantly affects the quality of sleep, extreme cases of which are diagnosed as delayed sleep phase syndrome.

Until recently, it was believed that light detection (photoreception) occurs exclusively with the help of retinal cells such as rods and cones. However, modern photobiologists have identified intrinsic photosensitive retinal ganglion cells (ipRGCs), which are most sensitive to blue light, with a peak of about 460-490 nm [1]. While rods and cones determine shape and colour, imparting this information to the visual cortex, ipRGCs detect irradiation and direct their information to many brain structures, including the suprachiasmatic nucleus hypothalamic which has been studied most thoroughly. Due to the «light and dark» signals coming to it, this nucleus controls the production of the hormone melatonin, which regulates the circadian rhythm. Thus, the light received by the eye is transformed into neural signals that pass through the optic nerve in two ways, one is visual, whereas the other is non-visual [3]. Therefore, when assessing the appropriateness of any method of lighting, one should take into account the physical properties of light, which differently affect the two biological systems of humans – visual and circadian (Fig. 1) [6, p. 85-87].



**Figure 1. The influence of light on humans through the visual and circadian systems**

*Source: developed by the author [6, p. 80-81]*



Today, the main approach to quantifying the effect of artificial light on the circadian system is to calculate the effective amount of circadian stimulation by comparing the radiation spectrum of the source with the circadian action spectrum, which results in a certain level of melanopic lux. Two sources of the same illuminance may have different melanopic lux, which indicates the relative potential of the influence of these sources on the circadian system [1]. In order to maintain the circadian rhythm, it is important that the melanopic levels of morning and daytime lighting are higher than in the evening. To do this, illuminance on the eye of 300 to 500 lx with a colour temperature of 5500 K. should be maintained for several morning hours. Two hours before bedtime illuminance on the eye of up to 50 lx is recommended with colour temperature of 2700–3000 K and minimized blue light components [7].

In addition to the general spectrum of the source and the intensity of the blue part in its radiation, the direction in which light enters the eye is important for the degree of influence of lighting on the circadian system. The field of view of a person indoors has an angular range of about 70° below the line of sight and up to 55° above the line of sight. In most cases, the gaze is directed downwards, since the visual task is usually concentrated at the bottom of the field of view. As lighting within a visual task should first and foremost meet the visual requirements, it is not recommended to plan additional lighting for biological impact in this area. The sensitivity of photoreceptors to biological light effects is higher in the lower retina, so the range of the highest biological light efficiency is -15°–45° to the line of sight [7].

Over the past few years the lighting industry has been focused on creating products that can positively influence the human circadian rhythm (for example, [5]). Such lighting systems tend to use high light stimulation in the morning and limit it a few hours before bedtime [1]. Practical validation of the provisions for biologically effective and human centric lighting at the level of implemented projects mainly concerns health care facilities, including homes for the elderly [2], and school premises. Since natural light is traditionally considered to be the major contribution to the comfortable well-being of a person, the better artificial lighting imitates daylight, the more pleasant and perfect it is felt by humans [4]. In this regard, an effective method of maintaining circadian rhythm is to optimize the levels of natural light, in cases where it is insufficient, by supplementing it with artificial lighting sources [2]. The use of LEDs for such lighting provides the necessary light spectrum and easy running by means of intelligent control systems [8].

Therefore, artificial lighting consistent with human biorhythms, has the following features: dynamism in determining the appropriate time of action, because the biological non-visual impact of light is most effective in the morning and can be detrimental to the sleep-wake cycle in the evening; increasing the light levels and presence of the blue part of the spectrum (460-490 nm) in the morning; reducing light levels and minimizing the blue part of the spectrum in the evening, especially several hours before bedtime; the biologically effective direction in which light enters the user's field of view is -15°–45° to the line of sight.



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## HISTORY OF ART

### CHURCH LAMP COLLECTION IN THE COLLECTION OF THE NATIONAL HISTORICAL-ETHNOGRAPHIC RESERVE «PEREIASLAV»

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At the beginning of the Christian religion, a lamp was filled with oil. It was used to illuminate the caves in which believers secretly prayed, fearing persecution. Then church lamps began lighting in temples during evening worship and in daylight.

The introduction of Christianity in the Old Russian state contributed to the development of cult building. In the temples the lamps lighted before the shrines: the Gospel, the icons of the saints. Gradually, they became an integral part of the traditional Orthodoxy rituals: christening, wedding, burial.

Gradually the peasants faith pagan faith changed the household protected of the heathen religion into the icons. The lamps were lighted in front of icons. At the end of the 19th-at the beginning of the 20<sup>th</sup> century in each Orthodox house there was a peculiar home altar with icons on the special shelves. In front of the icons were placed one or more church lamps. They were shone during prayer, as well as during fasting and major church holidays. Sometimes the unbearable church lamp was lighted in the house and it had been burning for a whole day. It was considered that fire cleaned the house from evil and symbolize the continuity of prayer to God.

Numerical demand for lamps was satisfied by craftsmen and small specialized workshops, that located on the lands of monasteries: Kyiv-Pechersk Lavra, Pochayiv Lavra, Mezhygir Monastery and others [2, p. 80].

Since the 20's 19<sup>th</sup> century, as a result of the state's devastating policies, the authorities in Ukraine have intensified the practice of confiscating religious buildings from religious communities. A lot of the sacred objects were removed from the churches and transferred to public authorities, in private hands, to museum collections for the purpose of conducting anti-religious state policy. Just these circumstances of conservation have protected them from destruction and today they give possibility for Ukrainian society joining to Christian values [1, p. 46].

«Pereiaslav» National Historical and Ethnographic Reserve has a large number of museum objects of sacred importance.

Many of such artifacts are displayed at the Museum of Folk Architecture and Everyday life in the Middle Naddniprianshchyna. The reserve «Pereiaslav» represents the Ukrainian village at the end of the 19th century– the beginning of the

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<sup>1</sup> Pereiaslav National Historical and Ethnographic Reserve, Ukraine

20th century. In the second half of the twentieth century, a significant number of church supplies were collected by museum staff to recreate the interiors of rural churches and people's homes. At the same time, a collection of church lamps was assembled the end of the 19<sup>th</sup> century-the beginning of the 20<sup>th</sup> century. It is numerically small (58 items), but it's valuable in its historical and artistic significance. The objects in the museum collection were come from ethnographic expeditions that worked on the territory of the Middle Naddniprianshchyna [2, p. 79].

The collection was formed for three periods. The first lamps came to the stock collection in the early the 60's of the 20 century, (to create the interiors of the dwellings and churches of the Museum of Folk Architecture and Everyday life in the Middle Naddniprianshchyna).

The second period – the 70-80s of the 20 century. At that time, the Kaniv Hydroelectric Power Plant was being constructed on the Dnieper River, an artificial reservoir was being created, and dozens of settlements were evicted from the flood zone. From this area, lamps for the museum collection were selected from the dwellings and temples.

The next period of formation of the collection is 1990-2000, when church objects were received to the museum collection, both from expeditions and donated by individuals, passed to the customs authorities and other institutions.

The hanging church lamps are the most fully represented in the collection of the National Historical and Ethnographic Reserve «Pereiaslav». They are on three chains, considered the most practical, because they can be attached to the icon at any level. The chains were fastened to the ears of the product or frame, at the top were assembled into a «beam» or joined to a miniature «disk» with a ring [3].

The most numerous group of hanging lamps consist of objects made of glass of different shape, manufacturing technique, method of decoration. Both colorless and colored glass (red, blue, green) were used to make them. The red lights are lit for Easter, the greens are lit for the year. Blue and colorless are used at Great fast.

The collection is presented with hanging church lamps in a metal frame. They consist of several parts: a metal frame, a glass cup for oil, chains holding a hanging church lamp, and a cap that catches the soot. The metal frame is decorated with a variety of patterns.

There are two hanging church lamps as the shape of a dove, the third – has the shape of a church top. They are manually painted with paints and gilding [3].

An interesting museum item is a lamp with a bracket, which has a side attachment to the icon, or the goddess. It has a metal frame rigidly attached to the L-shaped leg, into which a glass glass is inserted [3].

The church lamp is designed for the house. It contains 100-150 grams of lamp oil and it can burn two or three days. It is customary to light it from a church candle.

The museum collection is presented several lamps that were used only in temples.

The collection of lamps of «Pereiaslav» National Historical and Ethnographic Reserve arouses a great interest to excursionists and scientists and it needs further art studies.

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## WOMEN'S EARRING COLLECTION IN NATIONAL HISTORICAL-ETHNOGRAPHIC RESERVE «PEREIASLAV»

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The Ukrainian women's folk ornaments collection in the National Historical and Ethnographic Reserve (hereinafter referred to as NIEZ «Pereiaslav») began to form in 1959. It represents the neck, chest, ear jewelry which refer to the lands of the Middle Dnieper region, in particular Pereiaslav, Poltava, Kyiv, Left and Right (partly) Cherkasy and Chernihiv (partly) regions. The collection contains about 311 pieces of museum artifacts of late XVIII – mid. XX century, which are recorded and stored in the stock groups of «Numismatic», «Fabric».

These are :

- necklace – 147 pieces;
- chain – 7 pieces;
- dukach (lychman), bow – 102 pieces;
- medallion – 1 piece;
- Earring – 50 pieces;
- brooch – 4 pieces.

Thanks to museums, which meticulously were engaged in scientific and practical work on the identification, attribution, preservation and introduction to the scientific circulation of the historical and cultural heritage of the people, these artifacts of folk culture have taken a prominent place in museum collections. The museum collection was created thanks to the ethnographic expeditions of the reserve, which worked in

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<sup>1</sup> National Historical and Ethnography Reserve «Pereiaslav», Ukraine

these regions in the 70's – 90's of the XX century. A considerable amount of material was received from the residents of the city and its district as individual finds.

Jewelry has always been a complementary element in folk dress, its compositional and decorative finish, without which the unity of the artistic ensemble was broken. They were given aesthetic, magical, symbolic functions. Comparing archaeological sites with museum specimens of the 17th – early 20th centuries, it is easy to track the genetic connection of the jewelry from ancient times until the 20th century. Each region of Ukraine had its own traditional jewelry identity. Keeping in common, the populations of individual counties and even villages created their own original sets. Thanks to the goldsmiths who invested all their skills and talent in making a variety of extraordinary women's jewelry. They continued to follow ancient traditions in a slightly different interpretation. Thus, among the variety of women's folk ornaments, a prominent place is occupied by women's ear ornaments, which the museum collection has 50 pieces of preservation.

Like the necklace, earrings are one of the most favorite Ukrainian women's jewelry. They are represented by Pereyaslav, Poltava, Cherkasy region. In Pereyaslav Region they were varied both in form and composition. There are 25 artifacts in the collection, 3 of which are parts from units. They are characterized by a great variety of forms, constructive structure, ornamentation, artistic principle. One of the most famous earrings that had a complex design were «Pereiaslav» earrings. They imitated the shape of the 17th-century ornaments, which consisted of four tiers. By the end of the 18th century, such earrings had three tiers already, and a massive brace clip. The upper tier consisted of an eight-petal flower. The top and bottom were framed with metal leaflets of various shapes. In the upper part they had a triangular shape with pointed tips, and at the bottom – a pair of convex pinnate lobes. The center of the flower itself was decorated with stones. Basically, these were red pebbles in the center and turquoise by the circle.

The middle tier resembled the shape of a bow of the dukach, which was also decorated with a red stone in the center and two turquoises on both sides. The lower tier consisted of pendants that had from seven to ten small coral beads and resembled a bunch of viburnum. The beads were fastened by the pins, with one end bent, so that the beads did not fell off. Sometimes they used a multifaceted red stone instead of corals. «Pereiaslav» earrings had been worn in many villages. Sometimes they had been customized, consisted of fewer elements. In such earrings, the lower part consisted of paired convex leaves, decorated with a turquoise stone on top. Often from these leaves were hanging coral beads in the form of a bunch. In some earrings, instead of coral beads, a red multifaceted pebble was hung, between which there were two lids. Such earrings, in some villages in Pereyaslav Region, were called «bow». In simplified variants, there was only circle with an eight-petal flower with a red glass stone framed by two-petal leaves. There are 8 storage unit such «Pereyaslav» earrings and their simplified copies in the collection.

Peculiar artistic features have earrings with pendants, the roots of which date back to ancient times. Similar jewelry, that reminiscent of moon shaped pendant are also known among jewelry of ancient masters. They were less spread in Pereiaslav region and had

more complex structure. A shield that hung on a massive clip was often in the shape of one or two birds, with their backs turned to each other – (2 pieces) was hung to the massive ring. Not less popular were the arch earrings – (2 pieces) [1, p. 101].

Earrings from Poltava region – 12 pieces of storage. Almost all of them are made of silver and remind of a circle with concave eight petals and a stone in the center. Decorated with carvings in the form of dashes and curves. The collection has 11 pieces of these «Kalachyk» (local name) earrings. One piece from the collection (odd), made in the form of a ball with an oblong leaf attached to it.

The dominant motifs in goldsmiths products of the Middle Dnieper region were the floral ornament, both in the product itself and in its ornamentation: serrated and wavy silhouette. The collection of earrings from Cherkasy region is represented by its left-bank land, that is, the former Zolotonoshi district of Poltava province.

Therefore, it is natural that some types of earrings have become widespread in both the present Poltava region and Cherkasy region. In the collection there are 4 «Kalachyk» (local name) pieces. Among this type, the most common were earrings in the form of an eight-petalled concave flower with a red stone. «Kalachyk» with convex six-petalled flowers has a slightly different shape. The «Knyshyk» massive earrings had a form of a large flower with petals convexed in two rows. The form, resembled «Knyshi» – festive pancakes.

The «moon» or «half-moon» earrings were very popular among Ukrainian women. Their shape resembled a steeply bent moon, hung by its horns. Metal beads were attached to the horns of these earrings. These earrings were made by most of the left-land goldsmiths, decorating them with rhinestones in the form of a floral ornament. The shape had an ancient origin associated with the cult of the moonlight.

In many villages they were called «flat» – (4 pieces in collection). The local goldsmiths also often expressed their creativity in coin-made earrings. The collection holds two pairs of earrings made of «10 kopiiok» coin dated 1910 and the coin «25 pennia» dated 1917. The last one had pendants with wings. In the left-land Cherkasy region such earrings could be hung over with «butterflies», «wings», and «balls». Such earrings were called «Bovtyky». The «butterflies» had their wings raised up, and the «wings» had them downwards. The wings of the «wings» earrings were encountered much less often than the «butterfly» one. This was due to the fact that the fashion for «wings» existed in an earlier period, which had been gradually supplanted by the «butterfly» pendants. Only a few goldsmiths were known to make «wings» [2, p. 109].

The works of Ukrainian goldsmiths were distinguished by the construction of forms, shapes and decorative means, dynamics, plasticity, openness, variety and originality. Their jewelry can be recognized by the proportionality and expediency of all the components. One must emphasize multicolor of the products, their ornamentation and creative improvisation of the masters. In addition, Ukrainian goldsmiths have made an unlimited contribution to the treasury of world material culture.

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## MUSEUM OF UKRAINIAN TOWEL NATIONAL HISTORICAL-ETHNOGRAPHIC RESERVE «PEREYASLAV»

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Birth of a child and christenings, betrothal and weddings, seeing off and meeting dear guests – all these rituals were accompanied by a towel. Its ornaments contain ancient magical signs: images of the Tree of Life, Savers (Beregini), symbols of earth, water, celestial luminaries, which were further embodied and developed in a variety of customs and rituals. As a saver (oberig) the towel was transferred from family to family, from generation to generation. The Museum of Ukrainian Towel is located on the territory of the Museum of Folk Architecture and Mode of Life, in the northern part of Middle Dnieper area. The exposition, which was opened in 1995, is located in the building of the Three-Holy Church built in 1651 and moved from the village Pyshchiki of the Skvyra district of Kyiv region. Creating a permanent museum exhibit in a church room is connected with preserving the church as a monument of folk wood architecture and the need to demonstrate a unique collection of towels. In the 1960s and 1970s, when the Soviet authorities massively closed and destroyed churches, the question arose as to how to prevent this. In many cases, such premises were used to create museum facilities. The pereyaslav museums, headed by M. Sikorsky, also did this. The author of this article has published information about the temple [1], museum items on display [2; 3; 5], and about some aspects of museum formation [4]. The purpose of the study is to highlight the process of forming a collection of towels, the establishment and development of the Museum of Ukrainian Towel, as well as to promote the monument of architecture in which it is housed.

M. Sikorsky, director of the Pereyaslav National Historical and Ethnographic Reserve, said: «We have been collecting this good since 1952. If you knew how many villages our tireless women went: E. Nesterovskaya, I. Scotnikova,

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M. Chukhno, O. Yuzvikova, O. Rak and S. Sobol. Then they were joined by V. Shkuleta, M. Ermoliev, M. Shaveiko, V. Yuzvikov, M. Zham. That is why we have such wealth – the whole history of the Ukrainian towel» [8].

For many years of collecting and research work the Reserve has been pleased to collect 3944 original towels from different regions and districts of Ukraine.

With such wealth, Mikhail Ivanovich was born with the idea of creating a Towel Museum. Since December 1994, work has begun on the creation of an exhibition of the Museum of Ukrainian Towel. Scientific substantiation was written, structural and thematic-exposition plans were drawn up. According to the first, towels were organized according to regional features, technique and dating. The second stage of the work was to sew loops (over a thousand) on towels. In May 1995, the Museum of Ukrainian Towel was opened.

The exposition occupies three halls – the altar, the «nava» and the «babinets». The first hall exhibits the famous perejaslav towels of the 19th – early 20th centuries, although their ornamentation dates back to ancient times. Pereiaslav woven towel is a unique page in the history of Ukrainian folk art. In the past, Pereyaslav Region was one of the weaving centers in Ukraine. Towels were woven in every home, every village, but in the county there were several villages in which weaving became industrial (Letski, Vinentsi, Pomokli, Strokova and Velyka Karatul). In the villages Vinentsi and Velyka Karatul weave to this day (the works of craftswomen from these villages are exhibited in the altar). The works of the Pereyaslav masters are unique in their compositional richness and size: the ends of the towels were almost completely filled with horizontal, vertical and reticulated stripes or continuous ornament. Among the great variety of woven towels are Krolevets towels that are displayed in the second hall. Red and ornamental elements which have saving (oberig) meaning make them festive and ceremonial. Without them, no significant event in the life of Ukrainians was complete. The ceremonial role of the Krolevets towel was determined by a number of amulet symbols-oberigs: two-headed eagles (sign of the sky deer); bowls (Goddesses-Beregines); bell-churches-monastirki.

These ornaments were applied on the canvas by the hands of master craftsmen who lived in the vicinity of Krolevets and Romain. In the middle of the nineteenth century the first manufactories for the production of the famous Krolevets towel emerged. He gained fame not only in the Russian Empire, but also abroad. The arches of the church are decorated with ancient woven Polissia towels of the XIX century. Their ornamentation is characterized by the horizontal arrangement of the pattern, with predominant black, red colours and sometimes a sprinkling of blue tones. A large museum collection – embroidered towels by various techniques. The most ancient and the most interesting of them in artistic terms are the products that are embroidered with towel seams, the so-called Poltava towels (XIII-XIX centuries). This group includes towels of the ancient Poltava region (Pereyaslav region, part of Cherkasy region) and Poltava ethno-region. Particularly interesting in the collection are «monastery» or «monks» towels, early XIX – early XX century. (Chigirin, Lubny, partly Pereyaslav region). These are unique works of folk art. They are distinguished in the composition asymmetry, in ornamentation – stylization of plant



forms to geometric ones; the presence of anthropo-, zoo- and ornithomorphic forms and other signs-symbols. This transforms the household item into a ritual, ritual attribute: a towel for such events as births, weddings etc. The exhibition blends in with the architecture of the temple, giving the Museum not only beauty but also spirituality. The Ukrainian Towel Museum is a museum in which the soul is tempted, as evidenced by the book of impressions and wishes [7]. During the years of the Museum's operation, exhibitions have been opened, in particular «Monastery Towels» (2002); Towels of the Flooded Villages of Pereyaslav Region (2008); «The author's work on stencil of the master Chornobay» (2015) and others. The attendance of the museum is significant: every year, over four thousand sightseers visit the Museum. The Museum of Ukrainian Towel holds cultural events. So, on the occasion of the 20th anniversary of the Museum's creation, on September 26, 2015, they held an All-Ukrainian action of embroidering the unity towel – «Let's hug, my brothers!» The Ukrainian Towel Museum fits in harmoniously with the wooden interiors of the Three Saints Church, combining ethnographic history of Ukrainian. Towels as an ethnographic material are studied by students, art critics, they are a model for modern designers and fashion designers. Each towel is unique, because there is not a single model in the exhibition, and only authentic samples of folk embroidery are presented.

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## THE PIANO FANTASIES BY V.A. MOZART IN THE CONTEXT OF PHILOSOPHICAL AND POETIC CONCEPTS OF IMAGINATION

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By the end of the 18th century, the phenomenon of fantasy receives multifaceted understanding, while being developed as a philosophical category and as a genre that embraces music, literature, poetry, theatre, and visual arts.

The philosophical development of imagination and fantasy of the end of the 18th century can be found in the works by I. Kant of 1781-1798 [1], the first of which was written almost simultaneously with the piano fantasies by V.A. Mozart. I. Kant identifies the types of fantasies that manifested themselves in music. Such are fantasy as contemplation (a contemplative beginning is inherent in fantasy), a dream (its characteristic features are fragmented kaleidoscopic images), playing (a playing method as a way to create an artistic image – the fundamental one for fantasy). The functions of fantasy – illusory, transforming, associative, transcendental, synthesizing, were embodied in the creative work of V.A. Mozart.

In the theory of literature at the end of the 18th century, the concepts of fantasy as a fundamental type of artistic creation were developed in the legacy of English romantics – S.T. Coleridge and W. Wordsworth. Imagination is the ability to synthesize perceptions of various kinds. The function of fantasy, according to S.T. Coleridge is in «collecting the diverse experiences of being according to the laws of associations» [2, p. 28]; fantasy is the ability to bring together images that do not have natural connections, but are connected by a poet «according to the principle of a random coincidence» [2, p. 62]. Imagination «modifies images, gives unity to diversity and focuses everything in one». W. Wordsworth notes that fantasy «helps to comprehend the essence of things and characters immeasurably deeper» [3, p. 142]. The piano fantasies by V.A. Mozart were created during the last – the climax of the composer's creative work. The fantasy trilogy of 1782 (fantasy and fugue C-dur 394 KV, fantasy c-moll 396 KV and d-moll 397 KV) marked the beginning of a mature stage in the composer's creative work, the fantasy and sonata c-moll of 1785 (475 KV) coincided with the era of writing opera masterpieces (the end of the work on «The Wedding of Figaro» and the beginning of work on «Don Juan»).

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The only major fantasy by V.A. Mozart is the «heir» of the baroque interpretation of the genre. Its prototypes are the polyphonic diptych by I.S. Bach and the new synthesized form of fantasy created by F.E. Bach. Despite the fact that all the fantasies by V.A. Mozart, starting with the c-moll of 1782, represent the progress of the development of the genre proposed by F.E. Bach, each of them is distinguished by an individualized artistic solution. All the four piano fantasies by V.A. Mozart is consistent with the Kantian definition of fantasy as contemplation and dreaming. At the same time, each of them represents a peculiar type of interpretation of contemplation. According to the type of content, c-moll fantasy should be defined as contemplation, the subject of which is the universe. Fantasy d-moll embodies a variety of types of contemplation, characterizing both the state of the subject of contemplation (the hero of the composition) and its object (the object of contemplation). The subject of contemplation is distinguished by its types such as contemplation-action, contemplation-joy; the object of contemplation embraces the earthly and heavenly, as a result of which the connection is established between the micro– and macrocosm. Fantasy d-moll embodies the controversy of contemplation arising from the invasion of the fateful beginning into the ideal world. Fantasy c-moll, preceding the sonata, consists of six sections, each of which represents a special type of contemplation, which allows us to interpret the composition as a cycle of fantasies (pre-romantic interpretation of the genre).

In the Mozart interpretation of fantasy as contemplation and dreaming – the leading romantic categories, ways of knowing the universe – the insight of the Viennese genius into the field of the art of the future lies. The provisions of the concept of imagination, developed in the philosophical works by I. Kant and the literary and poetic views of S.T. Coleridge and W. Wordsworth within twenty years, find concentrated refraction in the music created by V.A. Mozart. This is the evidence of the unity of philosophical and artistic understanding of the fantasy of the era of pre-romanticism.

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## CULTURAL STUDIES

### SHOLOM-ALEICHEM MUSEUM IN PEREYASLAV-KHMELNYTSKYI

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Sholom-Aleichem (Solomon Nohumovich Rabinovich) was born in Pereyaslav, Poltava province on March 2, 1859, and spent the best years of his childhood and youth here. Sholom-Aleichem – Peace be with you! It was with this name that he came to literature and became a favorite folk writer.

The National Historical and Ethnographic Reserve «Pereyaslav» holds an interesting exhibit – the newspaper «Pereiaslav Collectivist» dated by February 14, 1939. Under the heading «To the 80th Anniversary of Sholom-Aleichem's Birthday» the events of the regional jubilee committee were published: In order to commemorate the memory of Sholom-Aleichem, it was approved to erect a monument to the writer in Pereyaslav, to turn the house where Solomon Rabinovich was born and spent his childhood, into a house of his name – a library museum, to rename the street where the writer was born to his name, to install a plaque in Ukrainian and Hebrew languages on the house where the writer was born [1].

In 1976, the scientists of the museum prepared an appeal to the Central Committee of the Communist Party of Ukraine and the regional party committee «About the creation of the Sholom-Aleichem Museum in Pereyaslav-Khmelnitsky». But there they rejected this appeal and stated that the museum did not need to be done, and offered to be submit the collected materials to the Union of Writers of Ukraine. Mikhail Sikorsky, the director of the Museum of History, answered this strongly: «There must be a museum. The city already has the Skovoroda and T. Shevchenko Museums. And Sholom-Aleichem is our countryman and we do not want any known name associated with Pereyaslav to be forgotten» [5]. This idea was supported by both Jewish and Ukrainian writers, artists, literary critics – Hryhoriy Polyanker, Mykola Bazhan, Valentina Kaminchuk, Abram Chubinsky.

In the journal «Sovietish Geymland» No. 7 of 1978 the letter of the director of the Pereyaslav-Khmelnitsky State Historical Museum was published requesting assistance in collecting materials for the creation of an exhibition of the Sholem-Aleichem Museum. An initiative group was organized, consisting of writers, artists: poet H. Bader, bibliographer M. Rosenhaus, artists I. Mastbaum, O. Kolesnichenko and others. The group was engaged in the selection of books, paintings, drawings, documents. A considerable number of materials were handed over to the museum by A. Chubinsky, the residents of Kyiv, Hasler, S. Bentsianov, the wife of the writer

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<sup>1</sup> Pereyaslav National Historical and Ethnographic Reserve, Ukraine

Y. Smolich, the widow of the famous artist Z. Tolkachov. There are also letters in M. Sikorsky's archive with that he addresses to Moscow and a letter of appeal to the Chernivtsi regional library to assist in the collection of materials (printed publications) related to the life and work of Sholom-Aleichem [4, p. 93].

The original plan was to create a museum of the Jewish classic Sholom-Aleichem in the synagogue of the city of Pereyaslav-Khmelnytsky, but the local authorities did not transfer the building to the museum, so the museum was created in the house of a miller from the village of Somkova Dolyna of Pereyaslav-Khmelnytsky District on the territory of the Museum of Folk Architecture and Life of in the Middle Dnieper AREA [4, p. 93]. Through joint effort in September 1978, the first European Museum of Classics of Jewish Literature Sholom-Aleichem opened its doors to visitors.

The Museum of the Classic of Jewish Literature has a unique collection of exhibits that tell about the culture, traditions of the Jewish people and most importantly – about the life and work of the writer, whose fate is closely connected with Ukraine. During the years of fruitful and multifaceted work and active educational activity, the Museum of the Classic of Jewish Literature Sholom-Aleichem became the focus of Jewish culture.

The museum exposition is divided into several thematic segments. The memorial space of the living room seems to return visitors to the beginning of the twentieth century, acquaints with the life of the family. Furniture, utensils, a mirror from the Kiev house, where Sholom-Aleichem and his family lived in 1905, religious objects that accompanied Jews throughout their lives. His father's study where he wrote his first literary works «Daughter of Zion», «Jewish Robinson Crusoe» and compiled «Dictionary of Curses and Swordsmanship by the Stepmother», that he would name later it his first literary masterpiece [5, p. 6].

The third hall is dedicated to the life and work of the classic of Jewish literature Sholom-Aleichem and to the memory of him and gives an opportunity to get to know the spiritual and material culture of the Jewish people.

The museum exhibits books, family photographs, letters, works of art, Jewish periodicals in Russian. XIX – early XX century: «Dawn», «Sunrise», «New Sunrise», «Russian Jew», «Jewish Week», «Jewish News», «Jewish World», «Jewish Life», «Jewish News», «Weekly Chronicle of the Sunrise». Thanks to them, it is possible to make an idea of the life of Jewish communities in the Russian Empire, to get acquainted with the works of Jewish publicists, writers, poets [3, p. 101].

Special attention is paid to lithographs and autolithographs by famous artists Zinoviy Tolkachev and Mikhail Gorshman, based on the works by the classic of Jewish literature Sholom-Aleichem. In the artists' portraits of individual characters are complemented by pictures of the true life of the Jewish town, where people were the main ones, who, despite all the difficulties, radiated good and faith in a better future.

A part of the collection of the Museum of the Classic of Jewish Literature Sholom-Aleichem is the author's ceramics of the decorative and applied purpose of the Polonsk Ceramics Factory. Author's works – decorative plates by M. Kozak and Z. Oleksenko with views of Pereyaslav of late XIX – early XX century and the works

in which the world of heroes of Sholom-Aleichem's works was created allow to show the facets of the writer's work more widely [2, p. 139].

A separate section of the museum is dedicated to the theme «Sholom-Aleichem – playwright». The exposition presents works by the writer, bills of the plays, which were staged on the stages of the theaters of Odessa, Kyiv, photos of actors, as well as sketches of costumes for the play «Traveling Stars».

Thousands of visitors have visited the museum for over the 41 years of its existence. Numerous opinions in the review book tell about their impressions of the exposition. Words of gratitude of the average visitor as well as of writers, poets, writers, scientists, who are known worldwide. Particularly valuable in the book is the response left by the granddaughter of writer Bel Kaufman, who visited the museum in 1999 and wrote: «The Sholom-Aleichem Museum from the granddaughter of the Bel Kaufman. With deep love and gratitude for the fact that my grandfather is so sensitively remembered. I wish you all the best. Bel Kaufman». In 2019, director of the Sholem-Aleichem House-Museum in Tel-Aviv, Professor Abraham Novershtern, wrote after his visit to Pereyaslav: «We are pleased to visit the Sholom-Aleichem Museum and make sure that it is faithfully kept in memory of him» [6].

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## PHARMACEUTICAL SCIENCES

### ORGANIZATION INDEPENDENT LEARNING OF PHARMACIST IN THE POSTGRADUATE EDUCATION

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The reform of modern education leads to a permanent enhance proportion of hours, which are allocated to individual pharmacists work interns. It attracts attention to the optimization of this type of training. Current trends are forcing educational institutions to introduce distance-learning methods in their teaching. Medical specialties require continuous improvement of knowledge specialists. We consider the only promising way to solve this problem is the introduction of distance Massive open online courses (MOOC) in educational process.

The main objective of postgraduate education is to increase the level of practical training of graduates of medical (pharmaceutical) educational institutions, their professional readiness for self-employment.

One of the ways to optimize this process is the use of a professionally oriented learning approach. The basic principles organization of professionally oriented training is qualitative methodological support of educational process and their accompanied the practical activity of future specialists of pharmacy [1, p. 3]. Conscious thinking pharmacists in making practical decisions is important. Therefore, the task of the pharmacists in this approach to learning is the acquisition new knowledge, formation of practical experience of their use and to strengthen the self-reliance in their decision, and the role of the teacher must directed to the selection of professional tasks [2, p. 6].

The department of educational-methodical complex of the discipline develops an important aspect in the organization of professionally oriented training. Educational-methodical complex includes regulatory documentation, training and methodological support disciplines and methodological support for monitoring of the practical skills.

Current approaches ask such challenges for teacher to development program for MOOC: to develop a thematic plan for the discipline, to create actual tasks and methods of control. When you create a thematic plan, the teacher must pay attention to all the competences that the pharmacist must have for professional work. You must also use the possibility of recording video-lectures to demonstrate their pharmacists-interns and trainees of training courses, which are now actively implemented at our

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Department. It must use a special approach in the development of objectives for each topic. It should be based on modeling to specific problems in front of the pharmacist, which may appear before them during their professional activities [4, p. 347]. Special attention should be paid to methods to control the execution of individual work depending on the types of problems and their solutions [3, p. 726].

Modern information technologies allow the teacher closely interact with the cadet at a distance, and the pharmacist can improve their knowledge without interrupting the work process in a comfortable environment. Our department of clinical pharmacy, pharmacotherapy and MEPh has already launched online courses for pharmacists on the EDX platform.

It is possible to control the activity of the pharmacist in the educational process, the implementation of situational and practical tasks, tests and preparation for offset now. Even the offset can be done in the distance form, but we think that, final control of specialist knowledge should take place in a personal interview with the teacher.

Continuous improvement of postgraduate education should improve the professional skills of specialists, paying attention to the fact that the pharmacist is trained during the implementation of professional activities. It is precisely the optimization of independent work that occupies a lot of attention.

#### Conclusions:

1. Continuous improvement of postgraduate education should improve the professional skills of specialists, paying attention to the fact that a pharmacist learns during the performance of professional activities. Much attention is precisely the optimization of individual work.

2. The implementation of pharmacists-interns of various types of independent work promotes not only the accumulation of knowledge and formation of professional thinking and special skills.

3. Professionally oriented approach to learning is an important factor for the improvement of pharmacists professional thinking in practical decision-making.

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## MEDICAL SCIENCES

### STUDY OF ACIDITY AND MICROFLORA OF STOMACH FOR PATIENTS WITH POLYPS IN HIM

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**Topicality.** Prolonged use of antisecretory drugs and low acidity of gastric juice are the causes of disorders of the microecology of the gastrointestinal tract. Hydrochloric acid destroys most of the microorganisms that enter the stomach [1]. The absence or reduction of hydrochloric acid leads to hypergastrinemia. Hypergastrinemia is a risk factor for the development of tumors [1; 2].

**The purpose:** is to evaluate the acidity and microflora in the patients with polyps.

**Material and methods.** We examined 35 from 97 (36%) healthy individuals (group I, comparison) and 62 from of 97 (64%) patients with gastric polyps (group II, main).

Group II was divided into 2 subgroups: II A and II B. II A subgroup comprised 32 from 62 (51,6%) patients with 1-2 gastric polyps. II B subgroup consisted of 30 from 62 (48,4 patients who had more than 2 gastric polyps).

The research was conducted on the basis of the National Academy of Medical Sciences of Ukraine State Institution «Shalimov National Institute of Surgery and Transplantology».

All patients underwent fibroesophagogastrroduodenoscopy and examined the condition of the mucous membrane, identified polyps, took the material for biopsy and performed morphological examination.

We applied with Video *Endoscopy System* (manufactured by Olympus, Japan) and a set of standard tools.

For detection of *Helicobacter pylori* infection, a respiratory urease test (Helic-test), serological study (enzyme-linked immunosorbent assay IgG for *Helicobacter pylori*) and staining of histological sections of gastric biopsy specimen (Giemsa) were performed.

The acidity of the stomach was determined using an AC-1pH-E acidogastrograph. The study was performed on an empty stomach after exclusion of any medication for a week. The evaluation of the acid-forming function of the stomach was performed at the lowest pH (according to the pH levels of the stomach).

**Results.** In healthy subjects (group I, n = 35) normocidal status of gastric juice (pH = 1,6) was established. In patients with gastric polyps (group II, n = 62), an anacid or hypocidal status of acidity of gastric juice was detected.

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Patients of the subgroup II A (1-2 polyps,  $n = 32$ ) showed moderate hypoacidity ( $\text{pH} = 2,3 - 3,5$ ) of gastric juice.

Patients of the subgroup II B (more than 2 polyps,  $n = 30$ ) had a established hypoacidity ( $\text{pH} = 3,6 - 6,9$ ) or an anacid status ( $\text{pH} = \text{more than } 7,0$ ) of gastric juice.

The differences in bacterial composition were established in the groups I and II. In 35 healthy individuals (group I), *Helicobacter pylori* (*H. pylori*) was not detected.

In 62 patients with gastric polyps (group II), *H. pylori* was detected. In 32 patients (51,6 in group II, gastric polyps were first established, which coincided with the presence of *Helicobacter pylori* in it.

In 30 patients (48,4%) of group II the recurrence of polyps was found. The recurrence of polyps has repeatedly been combined with the coexistence of *H. pylori* bacterial infection (according to the patient's medical record).

### **Conclusions.**

1. In patients with gastric polyps established low acidity ( $\text{pH} = 3,6 - 6,9$  or  $\text{pH} = \text{more than } 7,0$ ) of gastric juice was detected and *H. pylori* was detected.

2. The presence of *H. pylori* coincided with the recurrence of polyps in the stomach and its hypoacid or anacid state.

3. Lower pH was combined with the presence of multiple gastric polyps (in patients of subgroup II B).

**Prospects for research.** Against the background of low acidity of gastric juice, it is necessary to prevent and treat dysbacteriosis, which will have a positive effect on the condition of gastric mucous membranes and will reduce the likelihood of polyps in it.

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## PSYCHOLOGICAL SCIENCES

### ECOLOGICAL POSITION AND CONSCIOUSNESS OF THE FACTS OF THE ECOLOGICAL REALITY

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Ecological changes from hidden of sight danger have evolved into a clear threat to the survival of all living things. Many biological species in consequence of harmful changes to the natural environment are struggling to be able to live. People are just beginning to wonder about what the dominant foundation of the life of human society is contrary to future stability. The anthropocentric nature of ecological change recognized by members of the scientific community, but not all subjects of ecological change are prepared to accept this fact. That response against ecological problems does not require efforts, and most importantly transformation behavior with destruction to nature conservation. It is worth noting that according to I.V. Kryazh eco-destructive or (eco)conservation course of actions of the subject depends on the ecological position. This position is represented by the ratio of biospheric and financial-economic (monetary) senses and identifies that the subject will review as the main resource for his vital activities – biosphere or money [1]. The mentioned senses can define the criteria for a «normal» environmental situation. The dominance of biosphere senses in a person leads to a feeling of changes in the natural environment, acceptance of the reality of environmental problems and responsibility as a reserve for coping. Reserves, which, would then be used as conservation of resources of vital activities – the biosphere, promoting to conservative behavior. Activation of the described (eco)conservation reserves and behavior build on the conviction, that people's actions can improve/aggravate the environmental situation, help/ harm other members of the ecological community. The dominance of monetary senses, vice versa, will cause the person to deny the reality of environmental threats as a defense of old lifestyle – the infinite possibility to obtain ecological goods and services. Such a disregard saves the monetary resource of a person's vital activity through habitual destructive behavior. Activation of the eco-destructive reserves and behavior will be strengthened confidence into something, that investing enough money release from environmental problems at any moment [1; 2; 3; 4]. Therefore, the *aim* was to study the effect of ecological position on consciousness of the realities and the severity of environmental threats.

In the furtherance of this aim were used: the questionnaire of ecological attitudes 'Eco 30' I.V. Kryazh (scales: biocentrism, 'Money'(financial-economic priorities)

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and 'The denial of global environmental threats'); the subscale 'The possibility of an ecocrisis' (Cronbach's  $\alpha=0,52$ ) on the New Ecological Paradigm (NEP) scale devised by R. E. Dunlap, K. D. Van Liere, A. G. Mertig, R. E. Jones (in adapting I.V. Kryazh). Participants in the study were 94 individuals (age  $M = 26$ , 60,64% females and 39,36% males).

For data analysis was used multiple regression and structural equation modeling. In the regression equations of indicators of the ecological position: scales biocentrism and 'Money' as the explanatory variables explain 34% of the total variance of the scale 'The denial of global environmental threats' and 24% of the total variance of the scale 'The possibility of an ecocrisis'. While built and tested a structural model shows that the latent factor 'Ecological position' greatly affects the latent factor 'Consciousness of the reality and seriousness of environmental threats'. Validity of the model:  $\chi^2/df = 0,90/1$ ;  $p = 0,34$ ; RMSEA 0,03; GFI 1; AGFI 0,95. Thus, the results of the analysis confirm that the ecological position impact on the subject's ability to conceptualize environmental threats as facts are fraught with real danger for living beings or ecosystems. It as a threat, which can translate into a human-induced disaster on a planetary scale without sacrificing the consumer lifestyle of humanity.

Ecological position impact on the consciousness of the reality and seriousness of environmental threats, that is, a person's ability, first, to accept the fact of existence and the need to address environmental threats for productive vital activities of all living beings;; secondly, to realize the onset of anthropocentric environmental crisis, if the consumer way of interaction between man and nature is supported.

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## FEATURES OF THE USE OF FILM ANALYSIS IN DEALING WITH GENDER ISSUES

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Today, the issue of reform is particularly acute for Ukrainian society. As our country's desire to become part of the European Union requires it to comply with the relevant rules at the legislative level. However, equally important is the desire to uphold the values that are important to a democratic society. One of such values for Ukraine should be gender equality. The issue of equality must be raised at different levels and in different areas of our society. Gender mainstreaming is of particular importance in the field of education. After all, it is in this field that the foundations are laid, which play a key role in shaping a person's worldview, his or her ability to profess democratic values.

That is why the search for effective educational methods that can be used in the field of gender issues remains relevant for modern Ukrainian education [3]. Therefore, more and more scholars and teachers are attracting the means of non-formal education, which can be referred to as the method of film analysis.

Film analysis is widely used in psychology. It was used by such psychologists as: J. Lacan, J. Campbell, S. Zizek [2]. The advantages of this method include: relative ease of use, the ability to reach a sufficient number of audience, a significant impact on human consciousness.

In general, the researchers identify two models of movie viewing.

The first option. Watching the movie as an «alien world» that the individual cannot join. Usually these are films whose main purpose is to distract a person from his or her life problems, that is, to entertain. In this case, there is no deep effect on the psyche and the unfolding of self-reflection.

The second option involves emotional involvement, involving the viewer in what is happening on the screen, as if in the «mirror» of his being [1]. Such a model emphasizes the need for a sound approach to the selection of films: they (films) must accommodate the problems that exist in real life.

To use the film-analysis method, the teacher / psychologist should remember the following.

1) Choice of film / film production to be shown to students. In the context of gender equality, films that have a direct bearing on the subject of gender inequality and gender discrimination should be selected.

2) Choose the form of conducting: group / individual. The film-analysis method can be used both in bulk and individually. The choice of the form depends on the opportunities available to the teacher / psychologist. First of all, it is time and technical. The group form requires the availability of time (the length of the movie and its

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subsequent discussion) during which the group members must be indoors and watch the movie. Conditions must be created under which the review should not be interrupted by external factors. In addition, there must be adequate technical support for the group viewing, such as a projector or interactive whiteboard that will show the movie production. In the absence of the necessary resources, the movie can be viewed individually: participants are provided with information about the movie (name, director, year of release) and set timeframes when they need to watch (eg, a week).

3) To determine how feedback from group members. We emphasize that the method of film analysis assumes the presence of feedback. Because the goal is not just reviewing the movie, the goal is to update the students certain experiences to enrich their knowledge and new experience. Therefore, a prerequisite is the elaboration of the information (including psychological component) that is present in the film. Therefore, if viewing of the film took place in the group, after viewing, you should organize a debate-discussion. The teacher/counselor in advance to prepare questions for discussion and to think through the organization so that the discussion-the discussion was attended by all participants. We emphasize that this method of feedback is the most optimal because it allows immediately to study the material (including psychological), which was received by group members during the viewing.

When viewed individually, the feedback can be realized in the form of an essay reflection on the film's story (impressions of the film, the importance of the topic for modern society, etc.). Writing an essay gives young people the opportunity to structure their experiences and share their experiences with writing in writing.

We emphasize that the use of the method of film analysis is usually accompanied by other methods (seminars, trainings, etc.) that contribute to the formation of gender competence of young people. In this article, we want to emphasize the potential of gender-based film analysis. In addition, depending on the purpose and issue, different films can be selected to cover the necessary aspect (gender discrimination, domestic violence, women's rights violations, etc.).

The general scheme of film analysis may include the following elements:

- preparatory phase (the teacher chooses a film that should update the topic: in our case, it is a gender issue),
- own movie viewing (group / individual),
- final stage (includes reflection on the information received and can be held in the form of discussion, essay reflection, etc.).

Therefore, one of the methods that can be used when working with young people in the context of gender is film analysis. This method is quite simple and does not require too much effort from the psychologist / teacher. However, in spite of its simplicity, film analysis has a significant psychological effect on personality and can be used on a variety of topics, including gender.

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## **HISTORICAL SCIENCES**

### **GREETING-CARDS FROM THE FIRST PERSONS OF THE UKRAINIAN STATE IN THE PERSONAL ARCHIVE OF M. SIKORSKY**

**Tetiana Grudevich<sup>1</sup>**

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Mikhail Sikorsky (1923–2011) is a prominent museum, public figure in the field of culture and museum affairs of Ukraine. M. Sikorsky was born on October 13, 1923 in Chigirin city, Cherkasy region, in a family of workers. The parents died very early, and Michael was raised in the Chigirin orphanage, where he graduated from 8 classes. In 1939–1943 M. Sikorsky studied in aviation technical school. In 1946–1951 he studied at Taras Shevchenko University at the Faculty of History in Kyiv. After his graduation he became a director of the Pereyaslav-Khmelnitsky Historical Museum. For 60 years of his work, Mikhail Sikorsky made a significant contribution to the study of history and culture, creating a unique museum complex – Pereyaslav-Khmelnitsky State Historical and Cultural Reserve. In 1999, the reserve got the status of National Institution and became known as National Historical and Ethnographic Reserve «Pereyaslav».

For his many years of work and contribution to the development of the Museum of Ukraine M. Sikorsky received a number of state awards: Honored Worker of Culture of the USSR; winner of the State Prize of the Ukrainian SSR. Taras Shevchenko; Knight of the Order of Grand Prince Yaroslav the Wise of the 5th degree; Order of Bohdan-Khmelnitsky of the third degree; Honorary Member of the Academy of Architecture of Ukraine; Laureate of the Republican Prize of D. Yavornitsky; Prize winner of Vernadsky; Honorary leader of the Jewish Council of Ukraine; Hero of Ukraine, with the presentation of the Order of the State for selfless service to Ukraine in the field of preservation and perpetuation of the cultural and spiritual heritage of the Ukrainian people, scientific and educational activities.

Till now, his personality continues to attract attention. Mikhail Sikorskiy spoke with many people (colleagues, scientists, public and statesmen). This is confirmed by documents (postcards, telegrams, letters) from M. Sikorsky's personal archive, which show a wide range of connections and suggest that Sikorsky was a remarkable authority.

Letters and telegrams of the highest rank of civil servants deserve special attention among the collected mail correspondence. Partially, M. Sikorsky's correspondence is considered in the article by T. Grudevich [1]. Telegrams from ex-presidents and the Speaker of the Verkhovna Rada of Ukraine arouse the equal interest

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<sup>1</sup> National Historical and Ethnographic Reserve «Pereyaslav», Ukraine



1. Dear Michael Ivanovich! Please accept my sincere congratulations on being awarded the title of Hero of Ukraine. I highly appreciate your many years of tireless efforts to preserve and promote the historical and cultural heritage of the Ukrainian people. It is a truly invaluable contribution to the revival of the spirituality of the nation, strengthening of faith in the future of Ukraine. I wish you good health, long years of active life, new achievements for the benefit of our Motherland.

Sincerely yours, President of Ukraine V. Yushchenko. 03/12/2005

2. Dear Michael Ivanovich! I sincerely congratulate you on your appointment of a life-long state scholarship as a prominent cultural figure. This is a testament to the appreciation of your many years of great work and a significant contribution to the development of Ukrainian art.

I wish you good health, kindness and happiness for many years to come.

President of Ukraine L. Kuchma. 90 years of the twentieth century.

3. Highly respected Mikhail Ivanovich! From the bottom of my heart I congratulate you on the joyful holiday of the Holy Resurrection of Christ. In the year before 2000 – the anniversary of Christ's Easter, the festivities are especially marked by the dreamy hope of spiritual rebirth and goodness, the triumph of justice and the spring renewal of life. May the hopes come true – for Happiness and Health, for peace and harmony, for joy and prosperity to you, your relatives and loved ones to the whole people of Ukraine.

Sincerely yours, President of Ukraine Leonid Kuchma. 90 years of the twentieth century.

4. Dear Michael Ivanovich! I heartily congratulate you on your birthday. Your significant contribution to the preservation of the historical heritage of cultural and artistic monuments of Ukraine. Active citizenship and high authority naturally inspire a sense of respect. I wish you good health, well-being and kindness.

Sincerely yours, Volodymyr Lytvyn, Chairman of The Verkhovna Rada of Ukraine. 10/13/2004 [2].

The telegrams from the Ministers of Ukraine are worthy of attention:

1. The Honorable Mikhail Ivanovich! The Ministry of Culture of Arts of Ukraine sincerely congratulates you on awarding the President of Ukraine with the Order of Bohdan Khmelnytsky. We wish you good health, goodness, happiness, new achievements in the name of enriching the national culture.

Minister of Culture – Ostapenko. 9/29/1995

2. Dear Michael Ivanovich! I sincerely congratulate you on Fatherland Defender Day! We honor all those who defended their homeland and defended their independence in bloody battles. Curiously bowing to your deed, we are deeply aware that it is the duty of present and future generations to carry the banner of the Great Victory, to care for a worthy present, to build a peaceful, prosperous State. Your invaluable experience and strong word, dear veterans, are especially valuable today. I sincerely wish you and your loved ones good health, family happiness, peaceful heaven!

Yours faithfully, the Minister of Health of Ukraine – M. Polishchuk. 2005

3. Dear Michael Ivanovich! 60 years ago, when today a blossoming apple-pink spring came to earth and such a long-awaited peace. Thousands of front roads and brotherly graves are left behind for your friends – fellow soldiers, who put their lives on the Victory Altar. An earthly bow and boundless gratitude to you, Victory Soldiers, heroes who, in the difficult times of war, during the difficult post-war years, made sacrificial love for their native country and people. I warmly congratulate you on the holiday of Victory! Happiness to YOU, goodness and peace.

With deep respect, Prime Minister of Ukraine Yulia Tymoshenko. 2005 [2].

The telegrams from the People's Deputies of Ukraine are interesting:

1. Dear Michael Ivanovich! Please accept sincere congratulations on the title of Hero of Ukraine! Your quiet unbreakable and heroic service in the field of preserving and perpetuating the cultural and spiritual heritage of our Ukraine has long become a legend and an example for future generations. I wish you the health of creative longevity, the opening of new museums on the cherished Pereyaslav land.

Academician of NAS of Ukraine,

Member of Parliament of Ukraine Mykola Zhulinsky 18.03.2005.

Dear Michael Ivanovich! Monitors of the Kyiv region and all of Ukraine congratulate you on being awarded the title of Hero of Ukraine. We wish for new achievements, museums, health and happiness.

P. Tolochko, Chairman of the Association, Member of Parliament of Ukraine. 2005

3. Dear Michael Ivanovich! I sincerely congratulate you on Happy New Year! Merry Christmas! May the New Year of 2004 fulfill your brightest dreams and hopes and good luck in good works. I wish you and your relatives good health, harmony, happiness and love.

Sincerely yours, Chairman of the Board of the Intellectual Cooperation Fund «Ukraine – XXI Century», Member of Parliament of Ukraine – Bogdan Gubsky.

4. Dear Michael Ivanovich. We sincerely congratulate you on the title of Hero of Ukraine. It is a worthy assessment of your personal contribution to preserving the spirituality of the heritage of the Ukrainian people. We wish you good health for years and decades to come to fruition. Let the warmth of human gratitude for many years of ascetic activity in the name of the development of the native state warm the heart.

With deep respect and love for you, Member of Parliament of Ukraine (1989-1991), Deputy Chairman of the Council of Ministers of the USSR – Orlik M.A.

5. Dear Michael Ivanovich! I sincerely congratulate you on your birthday! I wish good health, good luck, prosperity and well-being. Let success, stability, optimism and hope be your constant companions.

Yours sincerely, Member of Parliament of Ukraine Kirill Polishchuk. 13.10.2001 [2].

Thus, M. I. Sikorsky is a distinguished personality, and his career, professional activity, and significant museum and scientific achievements are of interest to the international community. The telegrams that are presented in this article are worthy of attention and make it possible to insert in the biography some information that reveals its relationship with high officials of the Ukrainian state.

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## FORMATION OF THE PEREYASLAVSKY SCANSEN: IDEA COMMUNICATION AND PRACTICE IN INTERNATIONAL SPACE

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Monumental and museum work in Ukraine in 1960-1970's of XX century. characterized by a wave of mass interest in Ukrainian culture and the spread of the progressive idea of creating ethnographic museums of a new type – open-air museums, commonly called scans.

The first such museum in Ukraine was the Museum of Folk Architecture and Life in the Middle Dnieper region in Pereyaslav-Khmelnitsky, Kyiv region, which is one of the richest treasures of original folk architecture and life of the inhabitants of the Dnieper villages of the 19th – beginning of the 20 th. The museum is a part of National historical and ethnographic reserve «Pereyaslav».

It is one of the largest ethnographic museums in the country. 185 objects are exhibited in it 124 of which are architectural monuments of the XVII-XX century of local and national importance. According to the number of monuments among the post-Soviet countries, it is second only to the National Museum of Folk Architecture and Life of Ukraine in the village of Pyrogovo near Kiev (275 sites) and the Lithuanian Museum of National Life in Rumshishkes (189 sites).

An ancient village occupying an area of 24.2 hectares is, situated in a picturesque area on the outskirts of the city on a low hill, which is surrounded by the valleys of the rivers Popivka and Trubezh. It offers a magnificent view of the city, a wide and beautiful panorama of the Dnieper cliffs and floodplain meadows.

The museum presents a wide variety of peasant architecture (monuments of residential and economic, public and sacral purpose), a collection of tools, household items, articles of craftsmen.

Formation of the museum began in 1958 with the creation of an ethnographic exhibition on the territory of St. Michael's Church. A fragment of the interior of the

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<sup>1</sup> National Historical and Ethnographic Reserve «Pereyaslav», Ukraine

Ukrainian peasant's house was recreated in the refectory room, and the first architectural monuments (pantry, windmill) were installed in the yard. A large collection of agricultural implements, drawn vehicles, potter's and tanner's workshops complemented the exhibition. At this time the idea of creating a fully fledged open-air ethnographic museum arose.

The museum was opened in 1964 and was dedicated to the 150th anniversary of TG. Shevchenko. In honor of the memory of the poet's stay in Pereyaslav region, it was decided to create a park with the area of 5 hectares and an ethnographic museum.

Unlike other similar museums, which have a large territory, the Pereyaslav scansen is quite compact, everything in it is, placed logically in chronological order. The architectural and ethnographic complex includes 12 separate thematic museums that form an interconnected complex with the scansen. They look organic because they are housed in authentic buildings.

In the process of formation of a scansen in Pereyaslav-Khmelnytsky, Kyiv region (Ukraine), its founders (M. Sikorsky, M. Zham, E. Ishchenko) collaborated with Ukrainian, All-Union and foreign institutions, prominent socio-cultural, public and scientific figures that had a positive influence on the establishment of scientific positions, the implementation of the concept in practice.

The Deputy Chairman of the Council of Ministers did particularly much for the museum – he helped to get land. The prominent figures of science and culture of Ukraine were involved in this case: architects V. Zabolotny, Y. Aseev, S. Vergovsky, poet and academician M. Rylsky, ethnographers I. Gonchar and K. Guslysty, judge of Shevchenko E. Kyryliuk, art historian V. Danylenko, Russian architect and restorer R. Opolnikov.

In the summer of 1960, M. Zham visited the State Museum of Ethnography of the Peoples of the USSR (Leningrad, Russia, Order No. 24 of July 31, 1960). The exposition of this museum is dedicated to the everyday culture of the peoples of Russia and neighboring countries (Ukraine, Belarus, Baltic States, Central Asia, Transcaucasia). In the halls of the Ethnographic Museum materials that tell about the occupation of the population, construction and arrangement of housing, features of clothing, holidays and ceremonies are presented. Here household items, tools, ritual attributes are exhibited. M. Zham was tasked with working out materials related to the Ukrainian peasant life and establishing cooperation with the ethnographic department of Belarus, Ukraine, Moldova.

In 1962-1964, scientists of the Pereyaslav-Khmelnytsky Historical Museum collaborated with scientists of the Institute of Arts, Folklore and Ethnography of the Academy of Sciences of the Ukrainian SSR on the compilation of the «Ukrainian Historical and Ethnographic Atlas». Workers of the State Museum of History in Kyiv provided considerable assistance, in particular, they provided some of their materials for display.

Close cooperation has combined the Pereyaslav museums with the Museum of Ethnography and Artistic Craft of the Academy of Sciences of the Ukrainian SSR in Lviv, especially with D. Figol and K. Mateiko. The family archives of the author of this article have preserved the letters addressed to these scholars by M. Zham. Lviv's

colleagues introduced M. Zham to a well-known Czech ethnographer, director of the Moravian Museum in Brno, Dr. L. Kuntz. Moravian Museum is one of the oldest and largest museums in the Czech Republic. In 1963 L. Kuntz began the work on the preparation of a scientific collection on the subject of the creation of open-air museums in the world. He learned from his Lviv colleagues about the scans in Pereyaslav-Khmelnitsky, and he asked the Pereyaslav museums to offer an article about the museum. It was published in 1966 in the journal MUSEUM, with the support of UNESCO [1, p. 187-188].

The creation of the first Ukrainian scansen became known in the scientific circles of the neighboring republics and Europe. At the beginning of 1961 Pereyaslav museums workers were invited to participate in the work of the All-Union meeting of ethnographers, which was held on June 5-17, 1961 on the basis of Latvian Etnogrāfiskais brīvdabas muzejs. It is one of the largest scans in Europe, founded in 1924. It is located on the shore of Lake Jugl in the outskirts of Riga. On the territory of 84 hectares there are 118 residential, commercial and public buildings, built in the XVII-XIX centuries in different historical regions of Latvia. Pereyaslav was represented at this meeting by the head of the ethnographic department M. Zham. He acquainted the audience with the history of the creation of the first ethnographic exposition on the basis of the St. Michael's Church in Pereyaslav-Khmelnitsky, noted that the possibilities of closed premises of the church and a small courtyard for displaying monuments of folk architecture and creating interiors are extremely limited and in connection with this he outlined the immediate plans – the creation of a scansen in the outskirts of the city.

In April 1966, a working group was formed at the Bokrijk Museum (Hake, Belgium), composed of the heads of open-air museums under the official name of the Working Society of European Open-Air Museums. A. Tsiplius was commissioned to prepare a guide to the scans of the world. From the director of the Moravian Museum (Brno, Czechoslovakia), Dr. L. Kunz A. Tsiplius, became aware of the existence of an open-air museum in Ukraine, in Pereyaslav-Khmelnitsky. Therefore, he asked M. Zham to send the materials to the directory, in particular, to fill out a form about the museum.

In September 1966, the directors of the Scansen museums gathered at an international symposium on topical issues of open-air museums in Romania. Pereyaslav museums workers couldn't attend the international symposium in Romania. Only in 1984 M. Zham visited the scansen in Bucharest, and on September 23, 1970, the Honored Artist of Ukraine, the winner of the Shevchenko Prize, G. Sinitsa, presented the museum a book by Gerge Foksch, «Bucharest Museum Village» (Bucharest, 1958), in which there were a lot of posts and thematic clippings from newspapers and magazines about this museum.

The second international symposium on topical problems of the Scansen was held on 23-26 September 1967 in Switzerland, in Brintz. On July 24-28, 1968, a regular conference was planned in the German town of Cologne. M. Sikorsky and M. Zham were invited to attend this meeting and the extended ICOM Congress. To obtain permission to travel abroad, M. Sikorski addressed the Ministry of Culture of the

USSR, stating that it would be useful to get acquainted with the structure and principles of organizing the oldest open-air museums in Europe, to find out how important European museums are, and they have not resolved problems yet. However, the trip failed.

In 1962, an acquaintance handed M. Zam a copy of the Polish newspaper «Standar Molody» for November 27 with the note «Open Air Museum». It mentioned plans to open several open-air museums in Poland in the fields of architecture, archeology, ethnography near Warsaw and in Chersk. In October 1966, M. Sikorski managed to visit Poland and evaluate the achievements of his Polish colleagues in the creation of the Scans. In December 1970, with a view to sharing his experience, M. Sikorsky visited Czechoslovakia, in November 1976 – Sri Lanka and India. The Pereyaslav scholars followed closely the creation of the Lithuanian Museum of National Life in Rumshishkes (founded in 1966), which reflects the traditional rural life of the Lithuanians of the 19th and early 20th centuries of four historical regions of Lithuania. M. Zham planned to visit it in 1972, but failed.

In the end of the 60s of the XX century, in Pereyaslavsk scansen the first organizational works were done, the full exposition was formed. At that time, his project had no precedents in Ukraine, so the path to the realization of this idea was difficult and long. Foreign experience in creating open-air ethnographic exhibitions was especially useful, as the museum practice of Ukraine still lacked theoretical knowledge, polished methodology, clear principles of museum studies, international standards, and good work experience. The approaches of Pereyaslav museums to this new, methodically and practically not developed business, were creative and original. The experience of its founders was useful for creating other museums of folk architecture and life in Ukraine.

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## **AT THE ORIGINS OF GERMAN CLASSICAL ARCHEOLOGY: ADOLF FURTWÄNGLER**

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Possessing versatile and deep knowledge in his field, distinguished by amazing energy and productivity, conducting all his research on the basis of a broad historical horizons, Adolf Furtwängler (1853-1907) for 33 years of his scientific, in the full sense of the word, work, was able to enrich classical archeology with a number of

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works, both large and small in volume, but always interesting and lively in content. Without dwelling on the mass of Furtwängler's articles scattered over various periodicals and collections, articles devoted to the publication of new monuments of classical antiquity, a new explanation of the monuments previously known, we only note those works of Furtwängler that are most important as in the breadth of the task assigned to them, and as the importance of the issues discussed in them [1, p. 79].

In 1876, Furtwängler, who was then 23 years old, published a small work entitled: «Der Dornauszieher und der Knabe mit der Gans». In it, taking the famous statues «The Boy Removing the Splinter» and «The Boy with the Goose» as the starting point of his research, Furtwängler is trying not only to sketch out the history of genre sculpture from the Greeks, but also to come to a definition of what a genre is in art in general. Already in this youthful work by Furtwängler, his characteristic features were manifested: the desire for a broad historical statement of the question, courage in resolving the task left and the absence of any admiration for authorities.

The participation of Furtwängler in the campaign of the Olympic excavations and his special studies with the bronzes found during the excavations, caused the appearance, in 1879, of Furtwängler's new work again, of a more or less, general nature, although based on detailed preliminary work: «Die Bronzefunde aus Olympia und deren kunstgeschichtliche Bedeutung». In this work, Furtwängler presented the history of the development of ancient Greek art in bronze from the VIII to VI centuries BC, and especially valuable in this work was an indication of the influence that oriental art had on Greek archaic, especially in its decorative motives. This work was a prelude to that monumental publication of the Olympic bronzes and other small findings in Olympia, which was published in 1890, as the fourth volume of the general publication «Olympia». And in this work of a descriptive, cataloging nature, Furtwängler again lays the foundation for the historical principle: to show the main trends of Greek culture on Olympic bronzes [1, p. 80].

Furtwängler's stay in Greece in the late 1870s resulted in two publications in collaboration with Leszke dedicated to Mycenaean ceramics: «Mykenische Tongefäße» (1879) and «Mykenische Vasen» (1886). In these publications, the material that was of great interest at that time to the scientific world, under the influence of Schliemann's excavations, was first published and brought into the system. And if the authors of these works, as it turned out later, due to Cretan finds, were mistaken, Mycenae and Argolis were considered the main center of Mycenaean culture in general, nevertheless, the classification of Mycenaean ceramics proposed by them remains, in its main foundations, still valid today.

From 1880 to 1894 Furtwängler was the curator of the Berlin Antiquarium, and during this time he worked hard to replenish his collections, as well as to catalog them. In the period from 1883 to 1887, two large volumes appeared, describing the Saburovsky collection, with an introduction containing research work on some issues related to the monumental monuments of the Greek afterlife. Classes in the collection of vases of the Antiquarium led Furtwängler to be published in two volumes of «Beschreibung der Vasensammlung im Antiquarium» (1885), and carvings of the same congregation brought to light «Beschreibung der geschnitten Steine im

Antiquarium» (1896). Both the first and second catalogs are again built on a historical basis, with the most serious attention paid to a stylistic analysis of the described monuments and their groups [2, p. 877].

By the end of Furtwängler's stay in Berlin, there appeared the appearance of his composition, which on the part of some provoked fierce attacks on the author, on the part of others was enthusiastically greeted. Exactly «Meisterwerke der griechischen Plastik» (1893), also translated into English (Masterpieces of Greek sculpture, London, 1895). The main idea underlying this work can be briefly expressed as follows: since Brunn, who outlined the main features of the history of Greek art in his works and gave characteristics of Greek artists, since this could be borrowed from the news of ancient writers, scholars are usually content to repeat what Brunn did, and only from time to time they add to the finished fabric the decoration of one or another of the selected art monuments. Furtwängler's «Meisterwerke der griechischen Plastik» of Greek sculpture. Since the originals of Greek art, with very few, albeit brilliant, exceptions, have reached us only secondary or even third-rate, it is necessary to turn to the most careful study of the surviving copies, and among them try to find copies of famous originals, using, on the one hand, literature – information about artists and their works, and on the other hand, referring to the comparative stylistic analysis of preserved copies. It is hardly possible to doubt the justice of the main idea expressed by Furtwängler. But questions and perplexities of a purely methodical nature arise: first of all, it is necessary to prove that the Roman copyists only copied famous originals; then it is necessary to establish how the copyists treated the originals – slavishly or more, or less freely; finally, stylistic analysis is always, involuntarily, largely subjective. Furtwängler with great courage, but at the same time and with no less apologetic overcomes all these issues. He painted a brilliant picture of the development of Greek sculpture in the 5th – 4th centuries, but far from everything in this picture is equally convincing and thorough; bright colors are visible, but the exact drawing is not felt. But even with due skepticism to the general construction «Meisterwerke der griechischen Plastik», if you consider a lot of them unproven and exaggerated, still there are many positive results (of which the most brilliant is the search for a copy of Athena of Lemnos Phidias), a lot of observations that facilitate the way for further research [2, p. 878].

In 1894, Furtwängler moved to Munich. The first 6 years of his stay in Munich were dedicated to him, among other works, to the final processing, perhaps of the largest and most mature work, which he had been doing for 15 years. It is his «Die antiken Gemmen. Geschichte der Steinschneidekunst im klassischen Altertum» (1900) in three volumes, of which the first contains 67 tables that reproduce 3,600 plots of gems, the second contains a description and explanation of the tables, and the third gives a history of the development of the art of carving on precious stones from distant eras to the time of the late empire. Furtwängler, faithful to his historical research method, introduces gems into the general history of classical art in this work and simultaneously explores a number of questions of a more general nature, such as the nature of Mycenaean culture and the subsequent archaic era, the role of Ionia in this era, and Etruscan art. In this regard, the third volume is, by its nature, a supplement to «Meisterwerke», where many



issues of classical art are raised, mainly in the fifth and fourth centuries, but where there is almost no research on earlier eras.

From 1901 until the end of his life, Furtwängler's main interest was focused on excavations in Aegina, among which death also caught him. Furtwängler was not able to complete the description and research of all the results of the excavations. In a large volume that appeared in 1906 under the title «Aegina. Heiligtum der Aphaia» Only the results of excavations of that famous temple, the sculptures of the pediments of which were opened in 1812 and are now stored in the Munich Glyptothek, are compared and investigated. During the excavations, Furtwängler managed to find new fragments of pediment sculptures, many other monuments and, finally, thanks to one of the inscriptions found, to establish the name of the mysterious deity of Afaya, to whom the temple was dedicated. All the data obtained during excavations, with the involvement of, of course, and previously known material, Furtwängler used to recreate the history of the shrine of Afaya, from its most ancient times until the first decades of the fifth century. Furtwängler paid special attention to the pediment sculptures of the temple. The Furtwängler offers a new reconstruction of them, along the way gives an outline of the development of Greek pediment compositions, discusses in detail the question of the art of Aegina sculptors. And here again there are a lot of detailed comparisons on a common, widely taken, historical basis [2, p. 879].

Furtwängler's other great work, undertaken by him in collaboration with the artist Reichhold, remained unfinished, «Griechische Vasenmalerei. Auswahl hervorragender Vasenbilder» (1900) with explanatory text. This monumental publication laid, one might say, the basis for the study of the history of vase painting among the Greeks. And if the publication «Griechische Vasenmalerei» was completed and equipped with the introduction promised by Furtwängler about the general development of vase painting, then we would undoubtedly have a full history of vase painting, written probably more or less subjectively and not without exaggeration and hobbies, like everything that came from the pen Furtwängler, but the story is lively and informative [2, p. 880].

Furtwängler was known to the general public mainly as the first whistleblower of one of the grandiose fakes of the beginning of the twentieth century: acquired by the Louvre and which became a kind of celebrity for Tiara Saitafern. And if N. I. Veselovsky was the first in the press to say that tiara was a falsification, then Furtwängler was the first to prove it (in the Cosmopolis magazine for 1896 and in the appendix to his studios, released the same year under the title Intermezzi Furtwängler, however, has the honor of proving the falsity of the bronze statuette of Apollo in the collection of Count Strogonov in St. Petersburg and a number of other fakes. Having spent his entire life in direct contact with ancient monuments, having traveled all the museums of the old and new worlds, having reviewed a lot of private collections, Furtwängler acquired a «sharp eye» in recognizing the genuine from the fake and when the French reproached him for recognizing the tiara fake after a 15-minute inspection, Furtwängler laughing, remarked that he had only n minutes to recognize the falsification. With his works, Furtwängler introduced into scientific use a huge number of monuments, until then either completely unknown or not attracting

much attention. With his interpretation of them, he significantly contributed to the deepening and expansion of stylistic analysis, which has now become the main basis of any classical archaeological research both in Germany and abroad.

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## HISTORIOGRAPHIC MATERIALS FROM THE RESEARCH OF PYSANKARSTVO IN POLTAVA REGION

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Pysankarstvo, as a component of traditional culture, at the end of the XIX – beginning of the XX centuries existed throughout the territory of Ukraine, and the study of archival documents on this topic allows us to more fully disclose its development in the 20s of XX century in Poltava region. After all, the 20-30s of the twentieth century are characterized by a negative attitude of the Soviet authorities to religion and folk rites, customs and beliefs in general.

An unusual belief was recorded by P. Kovbasiuk in Poltava region. It concerns the conduct of the peasant economy. Namely, what needs to be done at Easter so that cattle are kept. After all, family welfare depended mainly on the state of the economy [1, ark. 54]. In his notes we find rare words of the Easter greeting poem, which was voiced by the Chumaks (salt traders) when they went to the houses to chrystosuvatysia (exchange a triple kiss as an Easter greeting ) [2, ark. 13 st.-14].

The celebration of Radonitsa and the use of red Easter eggs are mentioned in the message of M. Belokon from the farmstead of Sypatino of Malo-Pereschepynsky district of Poltava region [7, ark. 265].

From the collected and sent materials to the Ethnographic Commission by Cowba Michael from the village of Aleksandrivka in Poltava region we also see the facts of the existence of pysankarstvo in the village. In the entries of 1929 to the national calendar, the author, telling about the celebration of Easter, drew and sent some samples of eggs that existed in the village. It is noted that the little boys went from home to home on Easter and congratulated versely on the holiday, as well as played with Easter eggs [8, ark. 178-178].

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In his answers to the folk calendar, I. Voloshenko writes that Easter bread (pasky), eggs, etc. are blessed. Easter eggs are painted with the paint which people buy, and the shells are dug into the ground «so that the blind man does not destroy the potatoes» [8, ark. 55 zv-56]. The correspondent also tells about children's games with Easter eggs «v katka» and «bytky». Among the materials of the storage unit 312 there is a black-and-white image of two Easter eggs. They were sent to the ethnographic commission by A. Tretin in 1928 from Globino of Kremenchug district. The author noted that the ornaments on them are called «crosses» and «belt». On both of them there are inscriptions «X. B.» (Christ is Resurrected). One figure really shows the cross [8, ark. 111].

The materials of S. Strilchenko from Kremenchuk region point out that at Easter children played «v bytky», young children went to the houses to exchange a triple kiss as an Easter greeting and at the same time told poems [3, ark. 33-34]. The author also covers the process of coloring Easter eggs and making Easter eggs, noting that for this purpose onion peels, branches of poplar, maple and other plants were used [3, ark. 47]. S. Strilchenko also did not ignore the church rite of taking out the Shroud on Friday before Easter, indicating that the church was attended by many people and when kissing the Shroud the priest was given eggs. The correspondent also noted such a moment: as someone collected a lot of eggs, the women usually crumbled and dried them finely, and then threw them into the soup so that they would not go bad. There were such people, as the author writes, who sold them in cities at the market [3, ark. 36]. On Radonitsa, as indicated in the note, «three loaves and a dozen eggs» were taken for the priest [3, ark. 43].

In the materials from Poltava we find the belief that «on Maundy Thursday you can't paint eggs...and boil them», because «chickens will squeak» [4, ark. 38], and the blessed egg should be thrown into the water for the drowned people [4, ark. 39]. Information about the beliefs associated with eggs, what dishes were taken for the blessing, as well as the celebration of Easter, the division of the blessed dishes between the cattle and Easter greetings are found in the records made by M. Khrapal in the village of Bobrovnik in Zenkovsky district [4, ark. 62], in the unit materials about the celebration of Easter in the village of Malaya Rudka are also stored [4, ark. 66]. The material from Zhuravka village written down by K. Kozubenko, a student of Poltava Institute of Public Education, is quite informative. The respondent notes that «on Friday and Saturday they paint eggs, bake kulichi» [4, ark. 75], «on Easter at dawn the guys go khristosuvaty, for what they are given eggs or candies and bagels, children play navbytky and in pokotyushky» [4, ark. 76]. The author also points out that «the night before the second day the guys go home» oblyvaty (to pour on). They go into houses where there are adult girls, and they are presented with Easter eggs and they go further. It is worth noting that K. Kozubenko points out that no one can explain this custom, what it means, and «now pouring is understood as simple rural begging» [4, ark. 76].

The records of students from Malo-Pereschepinska school in Poltava region contain information about the chrystosuvannia of children on Easter (the exchange of a triple kiss as an Easter greeting), the poems that sound at the same time, it is noted

that for this they are given Easter eggs. It is indicated that both krashankas and pysankas were prepared for Easter [5, ark. 99-100]; samples of poems pronounced at the time of chrystosuvannia are also given in the material from the village of Kustanovo in Novosanzharsk region. The author Scriaga A.D. also notes that children play with Easter eggs «na vbytky» [5, ark. 103].

The custom and beliefs that it is necessary to wash in water with a consecrated red egg to be beautiful all age, was also in the village of Chernukhi [6, ark. 124-124].

One of the respondents recorded congratulatory poems (khlystivky), in the village of Kishinets, Dikan district of Poltava region. The author noted that guys up to 14 years old chrystosyiutsya (exchange a triple kiss as an Easter greeting ) on the first day of Easter [9]. As for the Easter verses and their notes, having analyzed the known materials, we can say that this phenomenon was obviously spread throughout Ukraine. After all, they are mentioned in the works of researchers of the Western Ukrainian culture under the name of ryndzivky. They existed in a slightly different form in Polissya.

Thus, it can be stated that pysankarstvo was quite common in Poltava region in the 20s of the twentieth century. It preserved its original traditions in the common ritual traditions of the local inhabitants.

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**MUSEUM OF FOLK LAND TRANSPORT OF MIDDLE DNIEPER AREA  
OF THE NATIONAL HISTORICAL AND ETHNOGRAPHIC RESERVE  
«PEREIASLAV»**

**Luidmila Shkira<sup>1</sup>**

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The museum of the Folk Land Transport of the Middle Dnieper area, opened in 1993, represents a unique collection of vehicles of the nineteenth and twentieth centuries. The ideological inspirer and active seeker for vehicles was M.I. Zham.

It was under his leadership that a team of scientists collected exhibits and at the same time deepened knowledge about the material and spiritual culture of Ukrainians. As a result of fifty years of activity, Kiev, Poltava, Chernihiv, Zaporozhye, Sumy regions were surveyed, but most of the material was collected in Pereyaslav region.

In the center of the pavilion there is an observation path with different types of pavements – ground and paved with wood road, as well as pavement. Vehicles are systematized according to specific and constructive differences, functional purpose and traction force. The cartage (runner and wheeled) transport, is divided into household, industrial (hourse and ox transport), festive and passenger transport, is exhibited. A collection of hourse and ox harnesses is presented. In the complex with the transport units there is a production unit for manufacturing and servicing of vehiclts: a forge, a wheelman`s shop, and the place, where rims were steamed.

The main vehicles on land in Ukraine, were sleds in winter and carts in summer. The Slavic word that means sleigh derives from the wold that means a snake. The prototype of the oldest transport were draggers, the original form of which were cut down trunks of small trees, in them, as is in a hole, harnessed horses transported cargo. In Ancient Rus, riding on sleighs was considered more honorable than on wheel transport, so they were used during celebrations. Over time, on the flexible poles people began to fasten cross-bars, which already resembled sleds. Their construction was identical, the main components of them were two runners in which pegs were inserted, and «planks», which were put on them. There could be two or more planks, depending on the pegs, and on the box that was placed (made of boards or wicked). For Ukraine, horses and oxen sleigh were common, which in turn were divided into ore-horse (the animal were harnessed in the shafts) and two-horse ones (harnessed to the pole). Volk vehicles differed in size. For the manufacture of sleds, masters used the natural curvature of wood and processed it: steaming in a steam room and bending on the machine tools. Both the horse and the ox, as the means of transportation could be forged (according the length of the runners iron plates – were sewn). The wealthy peasants had special sleighs – the festive, so-called sleigh peaks, in the northern regions they were called «sledge-gliders», they were light, with thin

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<sup>1</sup> National Historical and Ethnographic Reserve «Pereiaslav», Ukraine

runners. In the exposition there are one-, two-, three-, six-seat sleds. They were used for the fair, wedding trips, children's sledding.

Household sleighs – almost every owner had them. They transported hay, sheaves, manure, firewood and other loads.

A sleigh without a back, but with a curved front and lateral poles, widely diverging from the front and increasing the size of the platform. Used for the transportation of light goods.

Cart – known on the territory of Ukraine since the 5-th century B.C. Its first forms were wheels made of logs. Varieties of carts depend on their chassis, that is, the connection of the axes with the help of wooden bars – poles or logs.

The cart consisted of front and rear parts which were connected with a pole. The gearbox had a slightly smaller diameter of the wheels, which contained such parts: hubs, spokes, bent rims. On the axle a «bar-pillow», or a «nap», and on the top of it also a «loose pillow» were put on.

The exposition presents a scattering cart, whose rear and front wheels are joined by a «pole». It was intended for the transportation of wood, logs.

Garba served for the transportation of corn and light pottery. The cart has a ladder box. With a pole oxen and horses were harnessed.

Olympic chariot (quadriga) – was used in 1980 for the transportation of Olympic lights during the XXII Olympic Games.

Britchka («Bida») – a wooden-metal passenger carriage for one to two passengers.

Kotiga – a hut of branches on wheels, in which all the goods of shepherds, guards of the tubers were located.

Byndug – with a strong, wide and long platform for the transport of barrels, boxes. Owners of these vehicles were called «Bynduzhnyks».

Grabarka – has removable boards and a narrow long platform that provides quick and easy unloading of loose materials: sand, earth.

In the 90's of the twentieth century researchers and restaurateurs of the reserve: M. Nerasko, M. Kichenko, F. Darda, V. Moskalenko, M. Svitko, Y. Kalinovich reproduced the Ghumak's cart, which reminds its main constructions, but has significant differences, big, strong, it was used for transportation for long distances, has a high solid box, decorated with carvings, covered from the top with an ox skin. In its manufacture, special attention was paid to the axis and wheel: the rims were made wide so that they poughed less in viscous soil. They were pulled by two or four oxen. The exhibition also presents the spring forms of transport of the beginning of the 20-th century.

Twentieth century: Beztarka – for transportation of grain with a solid box of stretched boards. Side – a «window» with a lifted board.

Cypsy's cart – (kibitka) – housing of the Gypsy family on wheels.

Fire Pump – a fire extinguishing device, linyka – a cart-platform for the transport of passengers and light goods.

Tachanka – the origin of it is associated with the word «tauricana» – the type of wheeled vehicles, which was used in the south of Ukraine. It had a couple or more

horses, and the crew consisted of two or three people. The springs made it possible to move quickly through a dirty road and virgin, soil.

Used in national liberation competitions in Ukraine in 1917-1921 for close combat. A small, Phacton – a light four-wheeler made in the city of Pereiaslav by the master Nikifor Gusakov in the early 20-th century.

Sharaban – an open four-wheeled crew with transverse benches for easy and fast ride.

The attention is paid to things of road life, thanks to which visitors create a picture of living reality.

The exposition is complemented by the original paintings by Yury Grigorovich Legenky «The Way is a Fate of the Ukrainian People», which are skillfully executed on the walls and include fragments of songs.

The Museum of the Folk Land Transport of the Middle Dnieper is collecting, preserving, studying, exhibiting and promoting the creation of human hands that are connected with the history and practical development of technology and machinery. Therefore, visitors have the opportunity to get acquainted with interesting artifacts that will help them deepen their knowledge of the traditional Ukrainian culture and see vehicles that are no longer used in modern life in the XXI century.

## **COLLECTION OF MONUMENTS OF FOLK WOODEN ARCHITECTURE OF THE MUSEUM OF FOLK ARCHITECTURE AND WAY OF LIFE OF MIDDLE NADDNIPRIANSCHYNA OF THE NATIONAL HISTORICAL AND ETHNOGRAPHIC RESERVE «PEREIASLAV»)**

**Mykola Shkira<sup>1</sup>**

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Ukraine is extremely rich in the cultural and spiritual treasures that the people have treasured gathered over a thousand years of history. However, not all of them managed to survive, some of them came to us only in legends, photographs, or were simply destroyed by time. Some of them were fortunate enough to be preserved to this day.

One of such important elements of Ukrainian ethnicity is the original museum complex, which reproduces the true reality – the Research Branch of the Museum of Folk Architecture and Life of the Middle Dnieper region of National Historical and Ethnographic Reserve»Pereiaslav», which construction started in 1964.

It is a significant research and cultural and educational institution covering extremely wide time frames: the development of the material and spiritual culture of

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<sup>1</sup> National Historical and Ethnographic Reserve «Pereiaslav», Ukraine

the ethnic groups that inhabited the territory of Ukraine from the late Paleolithic period to the middle of the twentieth century.

Investigations of individual issues of construction of the first open air museum in Ukraine, were covered in the works of M.I. Sikorsky, E.F. Ishchenko, M.I. Jam, G.I. Koziy, D.T. Shvydkyi, G.M. Buzyan, M.G. Makhinchuk, O.V. Kolibenko, Yu.V. Avramenko, T.V. Grudevich, N.G. Tkachenko, V.M. Tkachenko, O.M. Zham, Yu.S. Figurny, M.V. Shkira and others. In the collective monograph dedicated to the 90th anniversary of M.I. Sikorsky: «Mikhailo Ivanovich Sikorsky: Creator of History and Keeper of Time», the history of the creation of the Pereiaslav National Historical and Ethnographic Reserve, search for individual objects of material and spiritual culture, archaeological sites, etc is covered [1].

Pereiaslav skansen was created with taking into account the experience of the best ethnographic museums in the world, as an effective element of preservation and study of Ukrainian ethno-cultural traditions in the conditions of historical challenges of the twentieth century. One of the main founders of the Open Air Museum was Mikhailo Sikorsky (1923-2011).

In the area of 24.2 hectares, 108 monuments of folk wood architecture of the 18th – early 20th centuries are exhibited, two sacral monuments of national importance, more than 20 objects have been reconstructed: archeological, residential, commercial and industrial. Two man-made ponds were created and the arboretum was planted.

The exposition of the museum of the Ukrainian village includes twenty yards and residential complexes, which tell about the life of the peasant family of the late 19th – early 20th centuries.

A special form of organization and functioning of the exhibitions are workshops, storerooms, clubs, outbuildings that allow to recreate in a visual way the life of the population of the Middle Dnieper region of the second half of the 19th – beginning of the 20th centuries.

They are characterized by a narrow specialization (comb-maker`s, weaver`s, gil-maker`s, potter`s, tan ner`s homesteads, homestead of a middle peasant and that of a wealthy peasant and a munufacturer).

A special form of organization and functioning of the exhibitions are workshops, storerooms, clubs, outbuildings that allow to recreate in a visual way the life of the population of the Middle Dnieper region of the second half of the 19th – beginning of the 20th centuries. Among the public buildings of the village there are churches and schools, shops, taverns, andinns. The main exposition is complemented by 13 museums housed in the monument complemented of folk architecture ov in specially built pavillions.

Particularly popular with visitors are the restored archeology monuments unearthed on Pereiaslav Dnieper area and materials of interesting archeological researches from the territory of Ukraine: stone sculptures and funeral boxes of the Kemi-Oba culture; anthropomorphic stelae – the first monumental stone images of people; Polovtsian sanctuaries and burial mounds etc. Attracting tourists to reconstruct the oldest dwelling in the Middle Dnieper, with using the bones of a mammoth (Dobranichivka



Late Paleolithic) site; an early Slavic dwelling and wooden architecture of the times of Kievan Rus.

In the archeological department of the exposition there are rare wells-logs, metallurgical furnaces, pottery and more. Sacred monuments have a special impact on visitors: the Church of the Intercession of the Blessed Virgin Mary from the village. Of Ostriyky of Bilotserkivskyi district, Kyiv region, 1606, (the interior of the Orthodox church has been reconstructed in the cult building); bell tower from eighteenth century from the village Bushevo Rokytne district of Kyiv region; the house of the church guard from the beginning of the 19th century; St. George's Church from the village, of Andrushy, Pereiaslav-Khmelnytskyi district, Kyiv region; Cossack churches from the village of Sukhyi Yar of the Stavyshe district and the village of Pyshniki, Skvyra districts of the Kyiv region, stone and wooden crosses from the cemeteries of the Cossack villages of Pereiaslav Region flooded by the waters of the Kaniv Reservoir. The attractive 15 windmills and two watermills, which are located in the museum-village exposition one by one and in groups, satisfy the tastes of modern tourists.

One of the main directions of the activity of the institution is the exposition work, which largely determines the subject of collecting funds and the order of study of museum objects. The main objective of the exhibition is the demonstration of materials that have a solid meaning load. Researchers of the museum conduct quarterly monitoring of the monuments of folk wood architecture, creating plans for the reconstruction and repair of the facilities. The Research Branch of the Museum of Folk Architecture and Life in the Middle Dnieper region, as a tourist mecca of Ukrainian autochthony, arouses people's interest in cultural heritage; helps to understand the value of the spiritual heritage of the people; promotes a better understanding of the historical, socio-economic, cultural, ethnic processes in Ukraine by visitors; shapes the national consciousness of the younger generation. The experience of the Scansen builders can be used to create new exhibitions, recreation areas, new museums. It is thanks to the responsible and professional activity of the restorers and scientific staff of the Pereiaslav Scansen that this outstanding center of museum work will have a great impact on the further development of the Ukrainian state and the Ukrainian political nation.

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## **BELTS OF THE PEREIASLAV AREA OF THE XIX – FIRST HALF OF THE XX CENTURY (BY THE MATERIALS OF THE NATIONAL HISTORICAL-ETHNOGRAPHIC RESERVE «PERIASLAV»)**

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In museum collections, special attention is paid to things that are of everyday use, but not always understood in our time. In the age of innovative technologies, powerful industrialization and the creation of large transcorporations, we want to look back into the past and understand how in the old days most things of use were made at home by themselves, with the help of not sophisticated instruments and mechanisms, attaching great importance to ornaments, a sign system that included a large number of signs, symbols, motifs, and was a true charm.

One of the important elements of human civilization was traditional clothing, it was distinguished by sophistication and adapted perfectly to the living and climate conditions. Historically, traditional forms of tailoring and manufacturing of household apparel and household goods have been passed down from generation to generation and supported by the common opinion of the community. The main spinning fibers of the Ukrainians have long been flax, hemp and wool for a long time.

The stock collection of Pereyaslav National Historical and Ethnographic Reserve (hereinafter referred to as NHER «Pereyaslav») has a large group of «T» – exhibits, fabrics collected in the 1950s and 1990s, in different regions of Ukraine: shirts, belts, outerwear (summer, autumn, winter), shoes. The collection was formed rather spontaneously, only a part of the description of the objects tells about the masters, the names of the samples, the manufacturing techniques and the place of residence [1].

Favorite motifs are stylized bunches of grapes, stars, nightingale eyes, periwinkle, cuckoo, hops, and others. The pattern weaving technique allowed us to vary the combination of three colors of yarn – white, black, red and create many geometric patterns – simple or toothed strip, rhombuses, squares.

The collection of belts consists of over five hundred female and male artifacts of the 19th – first half of the 20th century, collected in different regions of Ukraine. Conditionally they can be divided into two groups – knitted and woven.

The largest part of the collection was collected by museum workers in the 60-80s of the twentieth century in Poltava and Cherkasy region, a large number of belts were discovered and purchased in Chernihiv and Kyiv region, especially in the collections of belts made in Pereyaslav region (about one hundred units).

In the nineteenth and first half of the twentieth century, homemade woolly peasant belts, home-dyed in bright red, yellow, green, beet, orange, pink, and raspberry, were widespread in all regions of Ukraine, including the Pereyaslav Region.

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<sup>1</sup> National Historical and Ethnographic Reserve «Pereiaslav», Ukraine

The poorer part of the population wore everyday unpainted belts, and even just a hoop or rope. The color often depends on the material, some of the studied artifacts have a natural color of wool, white, gray, brown and black.

Belts and edges were made at home, color and pattern were selected for other items of clothing. Most of the collected textiles use artistic framing and complex symbolism: triangles, rhombuses, rosettes, stripes, floral ornaments, petal flowers, leaves, etc. that were typical of folk clothing.

Museum items have local and regional names of symbols, which is an important material for the scientific processing of artifacts. The ends of the belts and edges are ornamented equally, although there are separate instances where the pattern is different: on the one side – vegetable, on the other – geometric. Belts differ in size. As a rule, the waistband can be double-cropped, the average length of the belt is 200–220 centimeters. In the region under study, hand-woven, home-dyed wool belts adorned at the ends of dots and tassels predominated.

In the edges, bright colors were used more often, geometric ornamentation dominated in decoration: stripes, rhombuses, triangles with local names. Among the rarities objects of bright red should be highlighted.

In addition to homemade, there were extended belts made by urban artisans. Beginning in the second half of the 19th century, home-made belts were replaced with factory ones. In 1902, a Zemsky weaving workshop was opened in Pereyaslav, Kyiv region. Here tapestries, towels, tablecloths, belts, edges and so on were made. In 1917, an art and industrial school was established at the workshop, which in 1929 was reorganized into a textile art studio. During the occupation, the artel, did not work, but resumed its work in 1944 and was named after him Bohdan Khmelnytsky. From the middle of the twentieth century there was a wide demand for ornamental men's ties, blouses, dresses, belts, tablecloths, curtains, bed linen, etc., which were made at the factory of art products B. Khmelnitsky in Pereiaslav-Khmelnytskyi. Favorite motifs of belts and edges of the factory of art products – stylized ore bunch of grapes, «stars», «nightingale», «periwinkle», «cuckoo», «hops» others.

The pattern weaving technique allowed us to vary the combination of three colors of yarn – white, black, red and create many geometric patterns – simple or toothed strips, rhombuses, squares.

A considerable part of the collection needs attribution – a set of scientific measures by which authorship is defined, a certain school, a certain family to the subject belongs, the time of creation of the object and the characteristics of the artifact (material, technique, size, color, source of income, purpose, chronology) are specified and geography). Only a small part of the material that can be presented without repair and restoration is well preserved and exposed. Therefore, the selection of objects that require special storage conditions, photo-fixing – is an important part of museum activity.

Only a small fraction of the material that can be presented without repair and restoration is well preserved and exposed. Therefore, the selection of objects that require special storage conditions, photo-fixing – is an important area of museum activity. A detailed study of ornamentation, coloring, techniques of making belts

stored in the stock collection of the National Historical and Ethnographic Reserve «Pereiaslav» is important not only for fashion designers, but also for anyone involved in the important work – the revival and preservation of the artistic and cultural heritage of the Ukrainian people.

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## **PHILOLOGICAL SCIENCES**

### **CORPORATE JARGON IN THE INFORMAL DISCOURSE OF MILITARY SERVICES**

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Today, as the Russo-Ukrainian war is continuing in eastern Ukraine, the attention of society is drawn to the military. The linguistic situation in the military is of interest to linguists. However, the informal vocabulary of the military, which appears in the sociolect, remains out of the linguists' attention.

The purpose of our research is to investigate one type of sociolect – the jargon of soldiers, peculiar to groups of people with a special character of activity and subculture, complex and multidimensional, with a clear internal structure and ritual expression, corporate values and norms.

Military jargon is formed under special conditions.

First, there are socio-occupational groups in the military environment with some differences and characteristics that belong only to them, however, they do not exist in isolation but affect one another. Structurally, the Armed Forces of Ukraine consist of conscript and contract service (soldiers, sergeants, ensigns, officers) and civilian personnel. Organizationally, the Armed Forces are divided into separate species and genera. Therefore, within the military sublanguage, for example, the sublanguage of the Land Forces can be distinguished, as well as the sublanguage of mechanized troops, etc. In addition, we distinguish the professional language of teachers and cadets of higher education, as well as even of a separate military unit. Accordingly, we can talk about the existence of both common military jargon (understood by most members of this society), and the jargon of certain socio-professional groups (say, jargon of tankers, gunners, etc.).

Secondly, the speech culture of soldiers is formed in a fairly regulated environment. People engaged in military affairs, especially cadets and conscripts, live quite an isolated life and communicate mostly within the unit, staying in one company of people around the clock (training, housing, food). Therefore, corporate jargon in informal discourse, as a consequence of close communication, penetrates into all spheres of life and promotes the rapprochement of military members who used to be in different social groups.

Thirdly, the number of native speakers of military specialty is quite numerous, and is only increasing due to hostilities in Eastern Ukraine. That is, we can talk about the mass use of military jargon and its spread in spoken language.

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Obtained material (selected from fiction, magazine and newspaper periodicals, radio and television programs, documentaries and feature films, Internet discourse, conversations with the military) allowed us to establish that the jargon is heterogeneous. At one time L. Stavitskaya expressed the right opinion that «any society cannot inherently be socially homogeneous; it is divided into social, corporate groups with its sublanguage, which, on one hand, defies the literary standard, and, on the other, produces its own self-sufficient linguistic micro-world, indifferent to the standard and to other socio-linguistic groups» [1, p. 54]. The jargon reproduces the specificity of the professional language in which it is used as a means of internal group language communication.

The use of military jargon is due to:

- economy of speech means (need for reduction of words) («Makar» – Makarov pistol; «Saushka» – self-propelled artillery unit);
- traditions that have developed in the military sphere («payka» – the amount of food given out in the canteen; «triohsotyi» – wounded in battles);
- the possibility of secreting information: («multyk» that is translated as «cartoon» – universal camouflage color);
- the desire of the military to belong to a particular subculture with a special sublanguage.

The jargon of the military is constantly growing and diversifying. The majority of jargon is related to topics concerning the basics of professional activity, although the military life of soldiers and officers is also widely reproduced in the jargon.

For example, lexemes are often used to denote:

- military equipment («karandash» which means «pencil» – a rocket projectile from hail; «Pokemon» – a modernized Kalashnikov machine gun; «mukha» which means «a fly» – a hand anti-tank grenade launcher, «beha» – infantry fighting machine);
- military ranks, positions and professions («Polkan» – Colonel; «Starliey» – Senior Lieutenant; «Kap», «Kapitoshka», «Two Lieutenants» – Captain; «Batko» which is translated as «Father» – Unit Commander; «Contrabas» – contract officer; «Bobry» which means «beavers» – engineers involved in the construction of wells, trenches and other structures);
- service life (for soldiers: «Dembel» – demobilized; «zapah» meaning «smell» – before taking the oath; «karas» that is translated as «crucian» – served six months in the Navy; «godok», «cherpak» meaning «ladle», «phazan» which means «pheasant» – served a year; «did» that is «grandfather» – served from 1.5 to 2 years; «duh», «zelenyi» which means «green», «pidguznyk» translates as «diaper», «salabon», «salaga», «synok» meaning «son», «udav» – served the first 6 months of conscription);
- military and domestic activities: («kashlo» – any kind of porridge; «drib 16» – barley porridge; «drib 8» – «fine barley porridge; «balabasy» – volunteer treats; «biluha» – soldiers' underwear; «boyovka» – combat clothing; «organize a PGD» – remove all beds from the sleeping area and make general cleaning).

Testing for the viability of military jargon occurs in a live speech. As a result of the armed confrontation, some of them were actualized, such as «zelenka», «sushka», «dvohsotyi», others became a part of the spoken language, or even are included into general dictionaries. However, there are new developments in the jargon that will soon disappear from the active vocabulary of Ukrainians, along with the phenomena they denote.

The jargon is essential for the full life of each language. The only necessary thing for it is to be formed within its own language. As Yuriy Shevelyov noted: «Jargon and slang are and have long been the soil from which the living juices come to this language, the soil where its life flows smoothly. It is well-known that modern Romance languages came from «vulgar» rather than normative Latin».

In our work we use the term «military jargon», under which, following Korovushkin V. P., we consider «a lexical microsystem that covers all the set of military jargon» [2, p. 57]. According to Kharchenko E. V., military jargon is a corporate language «the language of professionals in one narrow field» [3, p. 59]. Zakharchuk O. A. defines military jargon «as an open, moving layer of vocabulary» [4, p. 224].

In our view, military jargon is a sociolect that functions within the corporate culture of servicemen and serves as their informal professional communication.

Military-professional jargon is a secondary name for an object or phenomenon and has a counterpart in the literary language. Also the definition of Boyko B. L. is of great importance for us: «military jargon acts as a secondary name for what has its name in the normative literary language of statutes and regulations, in the texts of factory specifications for military equipment» [5, p. 97].

Thus, military jargon, formed in special conditions and having certain features, is one of the active ways of fixing military-professional activity and is necessary for the proper functioning of the professional language.

We see a further perspective on the study of sociolects in the language of the military. The illustrated material collected during the study can be used in sociolinguistics classes, stylistics of the modern Ukrainian language, as well as to serve as a compilation of the vocabulary of the military jargon.

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## DECLENSION OF MASCULINE NAMES AND DECLENSION OF HARD GROUP IN MODERN UKRAINIAN LITERARY LANGUAGE

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**Formulation of the issue.** The morphological paradigms of anthroponyms – names of individuals – are included in the inflection system of lexical and grammatical categories of the noun. Compared with appellatives, in the declension process they reveal many specific features. The inflectional paradigm issues of the number of classes and subclasses of nouns were studied by I. I. Kovalyk, Yu. K. Redko, P. P. Chuchka, L. P. Kalakutska, A. A. Zalizniak, L. T. Masenko, V. O. Horpynych, I. M. Zheliezniak, N. P. Dziatkivska, L. G. Skrypnyk, S. I. Holovashchuk, S. L. Kovtiukh, O. M. Kashtalian and others. Despite the long-standing tradition of studies of word-changing paradigms of anthroponyms, in modern domestic linguistics there is no comprehensive description of the distinctive forms of Ukrainian proper masculine and feminine names, taking into account extra- and intralingual factors.

**The relevance of the study** is due to the need for the systematic analysis of the morphological paradigms of Ukrainian names of individuals and the identification of the number of EPCs (elementary paradigmatic classes) of anthroponyms of the first declension of the hard group to indicate males.

**The purpose of the article** is to analyze inflectional paradigms in the singular and plural of Ukrainian proper male names and their variants, taking into account the necessary factors. Realization of the goal involves the following tasks: 1) consider the influence of morphological name categories on the selection of case endings of the studied subclass of anthroponyms; 2) establish other criteria for determining inflectional paradigms of proper masculine names; 3) characterize highlighted EPCs of the I declension of the hard group.

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**Presentation of the main material.** In Ukrainian language, the modern first declension of nouns is made up of feminine as well as masculine and dual gender with inflection **-a** after a solid phoneme (spelling **-я** – after soft) in the nominative singular and substantive with magnifying suffix **-иш-**, «if they express feminine gender» [1, p. 197].

The analysis of the system of factors that determine the distinct paradigms of Ukrainian surnames, in particular the anthropolexemes of the first declension of the hard group, and their EPCs are presented in the monograph S. L. Kovtiukh, O. M. Kashtalian «The Inflectional Paradigmatics of Ukrainian Surnames» (2012) [2, p. 45–62].

The following criteria are relevant for the distinctive paradigms of Ukrainian proper masculine names of the first declension of the hard group: nominal inflection type; generic attribution (marking by the category of masculine gender) belonging to the category of creatures-personalities; the uniformity of accentuation paradigms (the same fixed emphasis or only on the basis in the case forms of the singular and plural, or at the end) the formation of complete paradigms; community of case endings; the choice of the inflection of the genitive plural (**-ів** or zero); **-о** ending in the singular vocative; the presence of doublet forms in the plural accusative; morphological phenomena at the base of lexemes associated with inflection, namely: the alternation of hard and soft phonemes, hard rear-lingual with soft front-lingual whistling, loud phoneme /o/ with zero.

In our card files, 86 lexemes have been attested for the designation of male names of the 1st declension of the hard group, recorded in the lexicographic works «Proper names of people» (2005) L. G. Skrypnyk, N. P. Dziatkivska and «Dictionary of Ukrainian Names» I. I. Triiniak (2005). Among them are 28 full official anthroponyms – *Микола* [4, p. 77], *Савка* [4, p. 96], *Хома* [4, p. 108] and others: *А скільки сонць ми зустрічали, сусіде мій Миколо Чалий?! (V. Marsiuk). Савка вийшов із своєї хатки і дивився на нас як намальований. Він продовжував з Савкою свою розмову, образливу і гірку для нас. – Савко! – крикнув Платон до сусідньої хати. – Ходім, Савко (O. Dovzhenko). Будемо як Хома Брут, тільки над ним один гроб літав, а над нами буде багато, з космічним свистом (L. Kostenko). 58 variants of anthropolexemes are verified to indicate unofficial forms of proper names – *Вовка* (від *Володімир*) [4, p. 48], *Жора* (від *Георгій; Єгор; Юрій, Юрко*) [4, p. 51], *Йоська* (від *Йосип, Осип (Йосиф)*) [4, p. 65] and others: *Вовка* зачерпнув довбанкою теплового узвару (V. Blyznets). Після розмови з *Жорою* у Віктора на душі лишився не вельми приємний осад (A. Kurkov). Всім нашим вулицям сповна він дав блискучі імена: і Маркса, й Леніна, й Артема, і *Йоськи* Сталіна зокрема... (V. Marsiuk).*

For the case paradigms of Ukrainian proper masculine names of the first declension of the hard group in the singular nominative case is characterized by flexion **-a**, in the genitive case – **-и**, the dative case – **-і**, the accusative case – **-у**, the instrumental case – **-ою**, the local case – **-і**, the vocal case – **-о**, in the plural nominative case – **-и**, in the genitive case – zero / **-ів**, dative case – **-ам**, accusative case – zero (\* **-и**) or **-ів** (\* **-и**), instrumental case – **-ами**, local case – **-ах**, vocal case – **-и**. It is worth paying attention to the fact that the accusative case of the plural

masculine names of the 1st declension of the hard group is characterized by doublet forms, homonymic with the word forms of the genitive case (*Грішок, Йоньок, Олекс*) and the plural nominative forms with the preposition **у (в)** (*податися в Грішки, мітити в Йоньки, прагнути в Олексі*), which are emphasized by Professor S. L. Kovtiukh [3, p. 50–51].

Considering the relevant factors for distinguishing the paradigms of masculine names of the 1st declension of the hard group, 7 EPCs were identified.

**EPC No. 1 (*Агáна*)** includes anthroponyms *Дíма* (від *Дмитрó*; *Димитріáн*), *Йóва* (від *Іóв, Йов*), *Орéфа, Кóна* (від *Прóкін, Прокóній*), *Ярéма* and others. They are characterized by the fixed emphasis based on the declension forms of the singular and plural sub-paradigms, zero flexion in the form of the generic plural singular (*Вов, Ів, Ром, Стьон, Тім*), zero and **-и** – in the plural accusative (*Варáв (\* у Варáви)*).

**EPC No. 2 (*Акі́ла*)** combines anthroponyms *Васіóта* (від *Васі́ль; Васі́лько*), *Мелéта* (від *Мелéтій*), *Сíла, Сíса* (від *Сисóй*) and others, which are characterized by the same fixed emphasis based on singular and plural forms and zero flexion in the form of the genitive and one form of the accusative plural form: *Ахі́л, Ген, Микі́т, Кузьмі́н*. The alternation of hard / soft phonemes is verified in the dative and local singular: */д/ – /д'/(Ю́да – Ю́ді, на, у (в), при, по Ю́ді), /л/ – /л'/(Ваку́ла – Ваку́лі, на, у (в), при, по Ваку́лі), /н/ – /н'/(Яці́на – Яці́ні, на, у (в), при, по Яці́ні), /р/ – /р'/(Ю́ра – Ю́рі, на, у (в), при, по Ю́рі), /с/ – /с'/(Оле́кса – Оле́ксі, на, у (в), при, по Оле́ксі), /т/ – /т'/(Лесіóта – Лесіóті, на, у (в), при, по Лесіóті)*.

**EPC No. 3 (*Гарáха*)** includes such names with the fixed emphasis from all forms of declensions: *Матіóха* (від *Матві́й (Маті́й, Матя́ш)*), *Серьо́га* (від *Сергі́й*), *Тимóха* (від *Тимофі́й, Тимі́ш, Тимко́*). The genitive plural is characterized by zero inflection (*Гарáх, Тимóх*), the accusative plural by zero and **-и** (*Серьо́г (\* у Серьо́гу)*). The alternation of consonantal phonemes */х/ – /х'/(Матіóха – Матіóсі, на, у (в), при, по Матіóсі), /г/ – /з'/(Серьо́га – Серьо́з-і, на, у (в), при, по Серьо́з-і)* is verified in the dative and local singular.

**EPC No. 4 (*Ві́тька*)** includes names with fixed emphasis in singular and plural: *Ві́тічка* (від *Ві́ктор, Ві́кторій, Ві́кторі́н*), *Грі́шка* (від *Григорі́й, Грі́гір*), *Микі́тка* (від *Микі́та*), *Коль́ка* (від *Мико́ла (Микола́й, Никóла)*), *Чи́пка* (від *Ники́фор, Ничі́пир*), *Оле́жка* (від *Оле́г*) and others. In the form of genitive plural, the analyzed anthroponyms have zero flexion: *Вóвочок, Кóтьок, Прóшок, Рóмок*. Alternation of consonant phonemes */к/ – /к'/(Гу́рка – Гу́рці, на, у (в), при, по Гу́рці, Дені́ска – Дені́сці, на, у (в), при, по Дені́сці, Іллю́шка – Іллю́шці, на, у (в), при, по Іллю́шці)* occurs in the dative and local singular. In addition, the alternation of the vowel phoneme */о/* with zero in the genitive and accusative plural cases is verified, since in the anthroponyms of this class in the final segment of the base there is the coincidence of two consonant phonemes (*Ваню́шки – Ваню́шок, Гéнки – Гéнок, Кузéмки – Кузéмок, Па́вка – Па́вок, Я́шка – Я́шок*).

**EPC No. 5 (*Кузьма́*)** includes one anthropolexeme that has the fixed emphasis on ending in the declension forms of the singular and plural sub-paradigms. The form of the genitive plural is characterized by flexion **-і́в** (*Кузьмі́в*), for the accusative plural – **-і́в** and **-и** (*Кузьмі́в (\* у Кузьмі́)*).

**EPC No. 6** (*Лукá*) includes to one of anthroponym with fixed emphasis on flexion in all cases. In the form of the genitive plural the lexeme has the ending **-íB** (*ЛукíB*), in the form of accusative plural **-íB** and **-и** (*ЛукíB* (\* *у Лукú*)). In the dative

and local singular there is alternation of the consonant phonemes /к/ – /ц'/ (*Лукá* – *Луци́*, *на, у (в), при, по Луци́*).

**EPC No. 7** (*Хомá*) combines lexemes *Томá*, *Фомá* that have the pronounced flexion in the singular and the emphasized basis in the plural. In the form of the genitive plural the flexion **-íB** (*ХóмиB*) is attested and in the form of the accusative the flexions **-íB** and **-и** (*ХóмиB* (\**у Хóми*)). The nominative, accusative, and vocative plural cases are characterized by associated forms with emphasized ending (*два–чотири Фомí*).

**Conclusions.** The article analyzes the factors of determining the anthroponyms' morphological paradigms for the designation of masculine names of the first declension of the solid group and identifies 7 EPCs. The system of morphological paradigms of Ukrainian proper masculine and feminine names requires comprehensive and detailed research, taking into account the latest approaches in linguistics.

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## ON THE BIBLICAL EXPRESSIONS FUNCTIONING IN THE MODERN SPANISH MEDIA DISCOURSE

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The readership in the countries that have a long Christian history – such as Spain – tend to easily recognize the biblical expressions in a text, therefore their use in the media can be pragmatically explained.

The Spanish literature traditionally distinguishes between the following types of media: the press, propaganda, commercial advertisements, and *public relations* information, the main goal of each is to form the addressees' certain opinion or state.

The Spanish mass media fall into three types of information data: pure information (news), editing data, and drafts, with each possessing their own style.

The Spanish media discourse analysis makes it possible to characterize it as highly pragmatic, which is particularly seen from the wide usage of marked vocabulary units.

In general, idioms are very pragmatically efficient by «ensuring emotivity and expressivity by means of figurative motivation. They are more efficient means of expressing emotivity than words, because idioms, reflecting the image of situation, build up a microtext within a text» [1, p. 41].

Kunin O. points out the following functions of the phraseological units: nominative, stylistic (figurative-expressive, emotional-expressive, language concession function), cumulative (generalization of the nation's life experience, realized in speech as a piece of advice, warning), directive (educational), pragmatic (direct impact on an addressee, realized within a context), text-building (realization of the phraseological units linguistic peculiarities, which enables them to structure the text as its linking elements), and summarizing [2, p. 177].

A Spanish linguist Alberto Zuluaga distinguishes between the constant functions (*funciones inherentes*) of idioms (do not depend on the context) and variable functions (*funciones no inherentes*) [3, p. 634]. The researcher points out five constant functions: phraseological, distinctive, connotational, figurative, and poetic-playful. Phraseological function is characteristic of all phraseological units and consists in simplification of the message formation, as well as its reception and decoding, which makes communication more efficient.

Let us analyse a set of examples of the biblical expressions usage in the modern Spanish media discourse. The analysis includes the examples of non-occasional usage, but pragmatically conditioned: each of the biblical expression (as well as any other phraseological unit in general) possesses a neutral equivalent (descriptor – according to a glossary by Cherdantseva T.) that could substitute the former in the text:

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*En la guerra política que se ha levantado, el PP insiste en su papel de oposición y echa tierra sobre los gobiernos socialistas (Cambio 16) [4].*

One of the Gospel scenes shows a madman following Jesus Christ and throwing dirt at him. The Spanish phrase *echa tierra sobre / a uno* definitely has negative connotation, because according to the biblical context such behaviour is characteristic of those who spread slander or persecute the men of God. The use of the biblical expression that arouses the reader's negative associations in relation to the party becomes explicit, considering the fact that the magazine favours the left powers.

The majority of media's policy obviously consists in following a certain formal objectivity in the information delivery, therefore the author's personal evaluation of that or other event or character is to be the more disguised, the more ambiguous attitude is shown towards them by society. But if society's consensus of opinion is firm, then the journalist can express their thoughts directly.

Thus, the following example includes a part of the paroemia referring the reader to an image of «a wolf in sheep's clothing», which doubtlessly has a negative connotation:

*«Tened cuidado con los falsos profetas; vienen a vosotros disfrazados de ovejas, pero por dentro son lobos rapaces».*

*Es precisamente esa moderación estratégica la que ha llevado a PSOE y PP a referirse a Beiras como un candidato «que se ha vestido con la piel de cordero para engañar al electorado» (ABC) [5].*

In addition to the biblical expression with a negative connotation there is an explicitly shown negative attitude to the nationalistic party representative who deceives his voters.

The majority of linguists divide the phraseological transformation into semantic (literalization, semantization, realization of semantic two-dimensional nature etc.) and structural (compression or substitution of components, prolongation of the idiom, reordering of components etc.) [6, p. 263].

Let us look at several types of the biblical expressions contextual transformations that include the most wide-spread forms of occasional transformations.

#### *The biblical expression's constituents' substitution*

In order to achieve a certain pragmatical goal the journalists sometimes expose biblical expressions to an «artistic» processing by substituting some original components to give the expression a new meaning, but preserving the original connotation at the same time:

*En cuanto a eso de los hombres, pues qué quieres que te diga, un poquito sí que nos gusta crear falsas ilusiones, para estar en el candelero y porque **no sólo de pan vive la mujer**, aunque éste no parece el caso (Marie Claire, edición española) [7].*

The idioms often remain unchanged, though the context behind them is aimed at the reader's positive feedback and smile, hence a tricky ending appears, disposing of the biblical expression's original meaning and its sacredness: «**No solo de pan, afortunadamente, vive el hombre: también está la mortadela de aceitunas**».

#### *The biblical expression's constituents' prolongation or shortening*

The biblical expressions are often transformed by adding separate components. The idiom's structure is intentionally widened by the author, which results in its being more expressive, emotive, and figurative.

The article *España: el PP o la nada* (El País. 02.03.2014) in the Spanish newspaper *El País* is dedicated to the results of the ruling Popular party session that ended up with a motto «Either the Popular party or nothing». The author of the article ironically compares the Popular party with the «Kingdom of God» (*el reino de los Cielos*), which is opposed by the «outer darkness» that implies a person existing without God, for «God is Light» (1 John 1:5). The same is proved in the following author's reference to one of the main Roman Catholic Church's postulates *fuera de la Iglesia no hay salvación* – *Extra Ecclesiam nulla salus* (Latin «Outside the Church there is no salvation»).

#### *Semantic transformations of the biblical expressions: literalization*

In the process of literalization the direct meaning of the idiom dominates, which is the basis for its figurativeness. The original meaning of a phrase is more often juxtaposed to its idiomatic meaning.

The article about a tragic destiny of the beauty contest winner *Miss, una corona de espinas en Latinoamérica* bears in its title a biblical expression *corona de espinas* (crown of thorns), a symbol of suffer, grief, and severe ordeals. Thus literalization is realized: the Queen of beauty's crown appears to be a crown of thorns for the girl.

To conclude, the use of idioms is one of the most expressive means in the Spanish media discourse. The author's biblical expressions are an integral part of the context, which allows the journalists to evaluate a certain event or phenomenon that happen in the modern world, and thus making the text more emphatic, emotive and expressive, or, on the other hand, more vivid, laconic, and simple.

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## THE APPLICATION OF WEB-QUEST TECHNOLOGY AT TEACHING FILOLOGICAL DISCIPLINES

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Modern education is faced with the task of finding new types and forms of educational activities organization. Teaching should develop independent critical and creative thinking and promote self-study. To this end, many teachers have long been using project technology engaging Internet resources. But the large amount of information on the network and its quality not only simplifies the process of work on the project, but also complicates it. One of the possible solutions is Web Quest technology. In addition, the use of this technology can help students to form their personal learning environment.

It is worth considering the theoretical study of Web Quest technology, the prospects of its practical application and the possibility of using information resources of the Internet and integrating them into educational process.

Modern educational technology in universities is a scientifically grounded and normalized system of forms, methods, tools and procedures used for organizing and carrying out joint educational activities of students and teachers [1, p. 11].

Educational technology is a system of interrelated activity of teacher and students, based on a specific concept in accordance with the principles and interrelated goals, content, methods, teaching aids. Educational technologies are developed by pedagogical science and are introduced into the pedagogical practice of higher education in order to increase the efficiency of educational process, the development of professionally and socially competent personality of future specialist.

The problem of development of pedagogical technologies of higher educational institutions has been covered in the works of Ju. Babansky, V. Bepalko, P. Galperin, P. Erdniev, L. Zorina, M. Klarin, L. Land, I. Rachenko, A. Rivin, N. Talyzina and others.

Pedagogical technology is a set of means and methods of reproduction of theoretically grounded processes of education and upbringing that allows successfully to realize the set educational goals [2, p. 28]. Pedagogical technology consists of prescriptions of activity methods (didactic processes), conditions in which these activities should be embodied (organizational forms of learning), and the means of carrying out these activities.

Today, the task of any teacher is not only to equip students with modern knowledge, but also to teach students to acquire this knowledge independently, to be able to assimilate them, relying on what has already been learned, that is, to facilitate further learning. Self-motivated learning can be formed by student's personal learning

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environment (PLE), which consists of a number of web-based tools [3, p. 226]. Web Quest technology is used to achieve these goals, both at school and university teaching practices.

Web quest is considered to be a didactic structure within which a student's exciting search activity is planned through the Internet and other media [4]. Other researchers have classified Web quests as a separate category of educational projects – web projects [5, p. 10]. Web quest is a form of material presentation through tasking, and the solution of the tasks or answers to the questions can be obtained from various sites on the Internet. For the first time, the Web quests method was offered by American Bernie Dodge and Australian Tom March in 1995. The authors classified the tasks into the following types: Retelling task, Compilation task, Mystery task, Journalistic task, Design task, Creative product task, Consensus building task and others. This form of work is aimed at practicing not only the types of speech activity (reading, writing, listening, speaking) but also the development of communicative and speaking skills [6]. Depending on the material being researched the results of Web quest can be presented in the form of oral presentation, essays, own multimedia web pages on a given topic, composed of materials obtained during the work (texts, photos, graphics, video clips, audio materials), electronic multimedia presentations in Microsoft Power Point format. The above mentioned results can be posted on the university's website or within the university's educational network.

Typically, the work on a Web quest starts with a statement of a problem or a creation of a problem, which should motivate the student and stimulate interest in the problem. After introducing the topic, students are offered tasks that are composed by the teacher. To help organize the task the instructor can make references to print sources as well as links to sources on the Internet. All of this provides a purposeful search for the information you need. The Web quest also includes presentation of search results in the form of slides, a web page, a WORD document or any other electronic, printed or oral form. At the end of the Web quest, students are given the opportunity to critically analyze and evaluate their work, as well as evaluate the work of others [6]. The teacher can, in his turn, evaluate the students' search work. In the process of working on the Web quest, the center of knowledge is the student. The teacher ceases to be the main source of knowledge for students. He becomes the person who helps to master the acquired knowledge effectively. He formulates tasks, searches the sources and links on the Internet, performs an advisory role, creates an educational environment at which training takes place within the framework of a creative training workshop.

For philological students, the use of Web quest technology can be useful when studying disciplines of culture-oriented linguistics. For example, when studying the discipline «Culture-oriented linguistics of second foreign languages (French)», this technology can be used for seminars, practical classes or students' independent work. Applying this technology into practice, for preparation of their projects, students use authentic textual material (in French), presented on the Internet and get acquainted with the virtual socio-cultural environment of France, which increases their motivation for independent cognitive activity, develops information culture as a



necessary component of general cultural competences of modern personality, develops the ability to think, creates an atmosphere of cooperation.

An example would be a short-term Web quest: «La cuisine française», under the theme «Culture of France».

*Introduction.* You are a journalist. You have been asked to prepare a material about French cuisine: its history, present times, restaurants, menus, recipes. *Task.* You should research this subject and tell about it to readers who would like to have an idea of French cuisine, its traditions, modern restaurants (their graduation), understanding of the menu, the ability to cook French dishes yourself. *The realization process.* Students should collect the information and photos to the topic; save the text and photos on the computer for final preparation; find the answers to the following points: cuisine history, cuisine of different regions of France, modern cuisine, restaurant menu, Michelin star restaurants, recipes. At the end of the study one should prepare the report and be prepared to answer the teacher and classmates questions. *Information resources.* Students should use the following resources to complete the task: [https://fr.wikipedia.org/wiki/Cuisine\\_francaise](https://fr.wikipedia.org/wiki/Cuisine_francaise), <http://www.cuisinealafrancaise.com/fr/articles/17-histoire-de-la-cuisine>; <http://www.cuisine-france.com/recettes.htm>; <https://www.facebook.com/lerestaurantlaurent>; <http://www.foundouk.com>; <https://savoirs.rfi.fr/en/apprendre-enseigner/culture/la-gastronomie-francaise-coup-de-feu-en-cuisine>; <http://www.cuisineetvinsdefrance.com/16-recettes-de-quiches-qui-sortent-de-l-ordinaire,108884.asp>; <http://www.aufeminin.com/cuisine-sc4.html>; <http://www.marmiton.org>; <https://restaurant.michelin.fr/restaurants/france>. *Evaluation.* The criteria for evaluating the performance of the Web Quest are provided. The criteria may include following: logical presentation of the material, content of the material, language of presentation of the material, contact with the audience, originality. The final stage is the presentation of students work.

Learning, mastering and putting into practice the technology of Web-quest is extremely important because the use of information resources of the Internet and integrating them in the educational process contribute to the formation of key and subject competencies. The acquired competences encourage students to further self-development and self-education, which is the key to their further success outside the university. Web quest technology is a tool for the personal educational environment (PLE), which plays a lasting role in shaping the personality of a future specialist. All of the above factors are of real value and are prerequisites for use in further educational and professional activities of students and are one of the main reasons for high efficiency of work on Web-quest technology.

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## THEORETICAL APPROACHES TO NARRATIVE EMPATHY

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Apart from philosophy and psychology the empathy concept has become widely used in politics, business and education. In the common lexicon it is generally understood as the capacity people have to fully comprehend the minds of others as if they were their own, whereas in academic discourse it is traditionally represented by as many as eight different meanings: «1. Knowing another person's internal state; including thoughts and feelings; 2. Adopting the posture or matching the neural responses of an observed other; 3. Coming to feel as another person feels; 4. Intuiting or projecting oneself into another's situation; 5. Imagining how another is thinking and feeling; 6. Imagining how one would think and feel in the other's place; 7. Feeling distress at witnessing another's person's suffering; 8. Feeling for another person who is suffering (empathic concern)» [1, p. 4-9]. On the one hand, such a variety of nuances in understanding empathy causes the problem of giving its clear, concise and unanimous definition, but at the same time it promotes an active academic interest in further exploring the empathy concept.

Translated from Greek *empathēia* «passion, state of emotion» and *pathos* «feeling»), the word «empathy» first appeared as *Einfühlung* in German philosophy and was associated with a number of aesthetics theorists who played a significant role in its elaboration: Johann Herbart (1776–1841) Johann Gottfried Herder (1744–1803), Karl Kostlin (1819–1894), Novalis (1772–1801), Robert Vischer (1847–1933). However, it was Theodor Lipps (1851–1913) who adjusted this concept for use in psychology for the first time. Today empathy is primarily regarded as a psychological process of «feeling what the other person feels, understanding the other from a distance (telepathy), or more generally to understandingly engage in other people's lives» [4, p. 20].

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The introduction of the word *Einfühlung* into the English language is traditionally attributed to a German-trained psychologist E. Titchener (1867-1927) who translated *Einfühlung* as «empathy» in 1909, yet, by this time the British writer and aesthetics theorist Vernon Lee (Violet Paget) had already used this term in a lecture given in London in 1895.

The idea that empathy has significance and contributes to creating a discourse which is capable of guiding the reader's feelings in the narrative occurs frequently in the twenty-first century research papers, however, the most detailed theoretical grounds in this respect have been recently developed by Suzanne Keen. In her book *Narrative Form* (2015) she defines narrative empathy as «the sharing of feeling and perspective-taking induced by reading, viewing, hearing, or imagining narratives of another's situation and condition» [3, p. 155] and singles out some of the narratological categories which are extensively employed by authors with a view to making an emotional impact on the reader, and include actants, narrative situation, matters of pace and duration, settings.

Depending on the addressee-orientated perspective, the researcher introduces the notion of strategic empathy with the help of which authors attempt to direct an emotional transaction through a fictional work aimed at a particular audience, not necessarily including every reader of the text. Keen identifies such types of strategic narrative empathy as *bounded*, *ambassadorial* and *broadcast*, and claims that «bounded strategic empathy operates with an in-group, stemming from experiences of mutuality and leading to feeling with familiar others»; ambassadorial strategic empathy «addresses chosen others with the aim of cultivating their empathy for the in-group, often to a specific end», broadcast strategic empathy «calls upon every reader to feel with the members of a group, by emphasizing common vulnerabilities and hopes through universalizing representations» [2, p. 224].

The concepts suggested by Suzanne Keen enable researchers to detail the questions about empathy that philosophers, psychologists and literary critics pursue as well as further explore the representation of empathy in literature, and investigate specifically what empathy invoked by novels do to readers and for readers.

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## STRATEGY AND TACTICS IN LINGUISTIC PARADIGM

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The peculiarity of the communicative-pragmatic approach to advertising discourse should be considered an analysis of strategies and tactics used by the compilers of advertising messages. Modern linguistics borrowed the terms «strategy» and «tactics» from the theory of military planning, in which strategy is defined as the art of conducting a war or a large-scale operation in general, and tactics – an integral part of the military art, covering the theory and practice of conducting specific operations [6]. The ultimate goal of any advertising messages is «aggressive», the advertiser organizes the perception of the message so as to capture the attention of the addressee and gain the sympathy of his ideas. By analogy, we can say that advertising (speech) activities are organized strategically by copyrights.

There is no coincidence that the term «strategy» has gained a statement and numerous interpretations in the scientific linguistic literature. The strategy is interpreted as:

- a plan for the optimal implementation of the communicative intention, which determines the combination of speech means [9, p. 130];
- a sequence of speech actions organized according to the goals of communicative interaction [8, p. 172];
- peculiar planning of the process of speech communication, depending on the specific conditions of communication and personalities of communicants [10, p. 54];

In our opinion, the most relevant for the English advertising discourse is the interpretation of a communicative strategy as a complex of speech actions aimed at achieving the overall communicative purpose of the speaker. Based on this definition, we have come to the conclusion that the strategy is the basic notion of communicative-pragmatic analysis of the advertising discourse.

Some scholars define a more specific language term – «speech behavior strategy», «speech strategy», «communication strategy», «discursive strategy», «manipulative strategy». Communicative strategies are explored by scientists from different perspectives, focusing on various aspects. In the philological literature the following approaches to the analysis of communicative strategies can be distinguished:

- linguistic and stylistic, according to which the strategy is considered as «content element of the text», a creative implementation of the plan for constructing speech behavior. In the center of attention are author's strategies for creating the text, textual characteristics of the strategies, compositional structure, stylistic organization [11, p. 199].
- linguistic and pragmatic, according to which the strategy refers to a complex of speech actions, aimed at achieving a communicative goal, or the method of structuring speech behavior in accordance with the communicative purpose of the

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participant in communication. From this position, the strategy serves as a kind of super-task of speech and is considered through the prism of the basic concepts of linguistic pragmatics – a communicative goal, an intention and an act [3, p. 54].

- psycholinguistic, according to which the strategy is defined as the exchange of intentional wishes of the interlocutors, which contributes to the emergence of the psychological basis for speech influence, as a way of organizing speech behaviour in accordance with the plan, intention of the communicant, as well as the implementation of this plan by influencing the intellectual, volitional, emotional sphere of the addressee [1, p. 88].

- sociolinguistic, according to which the research of strategies is to determine the linguistic and socio-cultural knowledge necessity for communication, depending on the cultural, subcultural, situational specificity of interpretation [12, p. 13]. In our opinion, from this position the nature of speech communication is influenced by social factors, and therefore the social status of communicator acts as an important criterion for the selection and implementation of the strategy.

- cognitive, according to which the strategy is understood as a cognitive processing of discourse, which results in a mental conception or as a «cognitive process in which the speaker correlates its communicative purpose with a concrete language expression, comprehends the situation through interpretive schemes that promote the development of alternative ways of doing things and achieving goals» [4, p. 192]. From the standpoint of this approach, the strategy can be interpreted as a certain mental operation associated with processes of generation and perception of the discourse.

Despite the diversity of aspects of the research of communicative strategies, all of them point to the presence of teleology, the conditionality of the communicative goals of the participants in communication. For our research, we have defined the basic definition of communicative strategies from the standpoint of linguistic pragmatics, the core of which is the theory of speech acts, and the basic notion is a communicative act characterized by purposefulness, intentionality, addressability, and the presence of a communicative purpose.

The interpretation of a communicative strategy through the prism of linguistic stylistic (as a stylistic implementation of the plan for constructing the addressee's speech behaviour) and cognitive (as involving cognitive processes for correcting the picture of the world of the addressee by the addresser, which is necessary in the conditions of advertising communication) is also relevant.

At the same time, it is advisable to combine the psycho– and sociolinguistic aspects of the strategy, because an advertising message cannot be explored outside of the society and without taking into account psychological factors.

Taking into account all aspects of communicative strategies, we define this concept in linguistic coverage: the communicative strategy of the advertising discourse is a general line of the advertising message, in which linguistic and paralingual means are aimed at achieving a pragmatic goal.

There are different definitions of «communicative tactics». Tactics are defined as a separate tool for implementing a common strategy [5, p. 45-46], a speech action that

corresponds to a certain stage of the implementation of a communicative strategy, a system of actions that ensures the effective implementation of the strategy [3, p. 110], a set of local rhetorical techniques and behavioral lines that correlate with the local goals of interaction [4, p. 116].

The tactics are also understood as the communicative steps that contribute to solving the strategic task under the control of the appropriate strategy. Communicative steps are represented by a set of speech actions used to implement one or another strategy [7, p. 8]. We consider the most relevant definition of communicative tactics as a concrete line of advertising interaction, a set of practical steps in the form of linguistic and paralinguistic means that ensure the effective implementation of the chosen strategy.

It should be noted that in modern linguistics there is a problem of the differentiation of communicative strategy and tactics, since the same medium can serve both strategy and tactics of speech behaviour [3, p. 22]. The division of communicative strategy and tactics is proposed through opposition – theory / practice, according to which the communicative strategy is a set of pre-planned theoretical steps that are realized in the process of a communicative act and aimed at achieving a communicative goal. Tactics is understood as the set of practical steps in the process of speech interaction [2, p. 11]. We adhere to the point of view that communicative strategy and tactics relate as a general phenomenon to a partial, communicative tactics acts as an instrument for implementing a particular communicative strategy.

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**PSYCHOLOGICAL LANDSCAPES IN THE NOVEL  
«SHESTYDNEV, OR THE CROWN OF OSTROH'S HOUSE» P. CRALUK**

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The writing of a landscape by the writers in the world of fiction makes it multifunctional. The landscapes, except esthetic representation of the view, can be a part of a plot (influence on the course of events) or be non-narrative element, is intended to developing the psychology of the character (as an indirect form of the psychologism).

The thought about the proportion of comparisons of the nature (literary landscape) and human world is emphasized by Yuriy Lotman: «A macrocosm of the landscape connects metaphorically with a microcosm of the human person and human society» [3, p. 478]. It means that the nature is a source of knowledge, worldview, human being and, as a result, artists. The same thoughts about epic creativity we can find in the work «The World of Fiction» by Grigoriy Vyazovskiy. The scientist said that «the landscape in the epic text always subjectifies, even as the writer described it objectively. In other words, the landscape is guided to the artistic revelation of the special aspects of the illustrated action, recreation of the psychological states and processes which characterize emotional and mental world of the characters by the author» [1, p. 109]. As you can see, it would be mistaken to think about the literary landscape just as a copying of reality because it enriches by the functions during the process of artistic comprehension.

The presentation of Petro Craluk's novel «Shestydnev, or The Crown of Ostroh's House» (2014) became a qualitatively new level of development of the landscape in historical Romance philology. The reader takes a position of a bystander of creating the portrait of the main character Vasil-Konstantin Ostroh (1526–1608) during six days by the painter Ivan. The famous Ukrainian prince narrates about his past life at the time of the dialogue with the painter, remembers the important events, reflects about the topical issues and pools the experience. The novel «Shestydnev» is absolutely psychological and this characteristic changes greatly its form. Among the ways of psychologism in this text, we emphasize the landscape which not only reflects the inner state of prince, but also shows from his consciousness, in other words, becomes subjectively perceived.

A unique **landscape-introduction** can be seen in «The Preface» of the novel, when the prince notices, talking with Ivan: «*–It is winter now. Everything is so white – like the white hoar on my hair. The roads froze, everything covered with the snow. At this time, it is good to get on the sledge and go on a journey*» [2, p. 127]. Representation of winter season and using such figure of speech as a comparison

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emphasize the advanced age of Vasil-Konstantin (82 years old). The confirmation of this fact we find in «The Slavic associative dictionary» where depicts that the word «old» associates with the winter [5, p. 227]. The main character feels the approach of his death, because of that the mention about the journey gets special sense. Firstly, it is unreal trip through the roads of the spent life, due to the self-reflection. Secondly, it is actually the way to the another world.

The using of **the idyllic landscapes** in the text explains by the fond memories and feelings of the main character. One of such value memories for Vasil-Konstantin is the town of his childhood Turiv. He describes the views of this city in the novel [2, p. 128]. The same picture of the nature in emotional load appears in the mention about the village Derman by Vasil-Konstantin where he found the inner harmony: *«Unusual place. When I travel from Ostroh to Dubn or vice versa – stop here. Feel a strange power. Where does it come from? From those forests which cover the hills of Derman? From sources, which splash under them? Or is it the Holy Trinity Monastery, funded by my father?»*

– *Love staying here in autumn, when the yellow colors inflame like a fire at Derman wooded hills. And it enveils all peace and quiet slumber. <...> – Sometimes it seems: it is right here – between these mountains, which are glad the human eye, valleys, sources, streamlet, – God lives. There is the paradise»* [2, p. 261]. The village become a specific mental haven for the main character, and, as a result, the warm colors dominate in the landscape. They create the feeling of harmony. Depicting the nature compares with the most perfect place – the paradise.

**The landscapes-parallels**, which you can find in the novel, are used for the contrast, which according to Yulia Sergeeva «as usual emphasizes the inner derangement of the main character, selfishness and vanity of his passions which compared with the greatness and calmness of the nature» [4, p. 88]. Touches of the spring season during the scene of his long-suffered niece Galshka's dying set in Ostroh's memory [2, p. 173]. Another realization of the opposition of the spring-death we observe, when the prince become a bystander of the execution of his favorite child Severin Nalivaiko by the Polacks: *«It was good day. Sometimes the chilly wind came on. Everything breathed by the spring. It was unbelievable that the life of the young fearless knight will be over now»* [2, p. 318].

The spacious **landscape-imagery** pays a special focus which is in-depth psychologically and has bright pessimistic shadows. During the bloody battle for the heritage of his father-in-law Tarnavskiy and the actions of the Union of Lublin, the main character remembers that *«it was crazy autumn. The sky was becoming cloudy, pouring the ground by the cold raining. The wind was blowing, throwing the raining drops in a face. Weight of the clouds burden the soul. And soul was crying like the heavens. I want to hide somewhere – from the unfriendly world, the autumn cloudiness, the naked dark trees with shivering lonely leaves in the wind. I hid. I hid together with Sofia – in the castle of Tarnav. We sat near the big fireplace. The fire was flaming. And it was good, warm, chilly. «Does a person need a lot?» – I said inexplicably and spread my hands to the fire. Sofia made no reply. She just lean her cheek against my shoulder. ...And what a fall for us – cold, rainy... We warmed each*



other» [2, p. 224]. This landscape is a presentiment of the nearest death of prince's wife. Reproduced picture of the nature compares with the inner state of Vasil-Konstantin. The details of the describing with emphatic visual, phonic and touching feelings show the psycho mood of Ostroh.

The presentment of the crucial Lublin and Brest Unions (1596) for Ukrainian people the author realizes using **the depressing landscapes**. The Seim (parlament) in Lublin, which declared the forthcoming of new government – United Commonwealth of the Kingdom of Poland and the Grand Duchy of Lithuania, was provided with the pictures of winter [2, p. 221] in mind of the main character. The author of novel opens out a misconception between the lords (power holders) in capacious form, but he does not describe the actions. The prince's memories about Brest Union also connects with the warning signs of nature: « – *It was that sad autumn, when the Uniates made the Union. And the winter was sad. Everything was not right. <...> ...I was going into the carriage – good, with all facilities. I was surrounded by my devoted servants. But even such journey was difficult for me. My old body hurt, my thoughts were all jumbled together. And what is more – there were disagreeable views out of the windows of my carriage. The snow has already melted. But it was not time for the grass. The ground and trees seemed black. And the sky seemed dark, too. The son Alexander was riding somewhere near me. Finally, we drove through the Visla – it was also dark and disagreeable. I looked at its waters – it seemed that they covered me. The horses whickered anxiously. I heard something bad at this whickering*» [2, p. 251–252]. This landscape foretokens about future dissension of Ukrainians because the Union divided the people into the Orthodox Christians and Greek-Catholic people.

P. Craluk's penmanship as a writer consists in the attraction of **the landscapes-fantasy (whimsey)** to the structure of the text, when the characters think about nature of their homeland, being in captivity. The fiance of Galshka, DmitroSungushko, talked to the horse as to an alive person and described it the homeland [2, p. 155]. Father of the main character, Konstantin Ostroh (1460–1530), who after military defeat as a slave, went to Moscow, prayed to Holy Mother, wishing to see the beauty of his homeland once more: «*Take me away, Holy Mother, from these evil lands. Bring me back to my lovable motherland. I want to have a drink from its sources. I want to have heard plenty of the forests sounds. I wanna fall on the ground, bury my face in the grass...*» [2, p. 196]. So, the landscapes-fantasy perform compensatory function. By the aid of them, characters represent in their consciousness those things, which they cannot see in the real life, caused by certain conditions.

Among the special aspects of the poetics of the novel we can emphasize **the elements of landscape** which perform the function of the estimating of the place and time: August [2, p. 134], autumn in the way to Ostroh [2, p. 149], February in Turiv [2, p. 173], the beginning of the spring at the streets of Lublin [2, p. 221]. The writer represents in the consciousness of the main character all four seasons (summer – autumn – winter – spring). It helps to depict the memories of the last more authentically, give them the factuality and visuals. The semantic charge of that element connects associatively with four periods of Vasil-Konstantin's life (spring is

a symbol of youth, summer is the stage of the highest peak of power and energy, autumn is an adulthood and winter is the old age and death).

So, the noticeable thing in the novel is the accentuation P. Craluk's appeal to the representation of nature, especially to the various types of the landscapes and their particular elements. The main task of such method we see in the author's desire to represent the inner world of main character. In other word, the landscape is an indirect shape of the psychologism. For achieving of this task, the writer uses a lot of methods (visual, phonic, skinny, olfactory and taste sensations, coloristics, comparison).

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## TYPES OF LINGUISTIC ENANTIOSEMY

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The appeal to enantiosemy is caused by the fact that modern discourse demonstrates its common usage. Discursive errors are often caused by wordplay and enantiosemy for specific effect. On the one hand, it is a mistake of meaning interpretation, on the other hand, it is made by the author intentionally.

Enantiosemy is a lexical-semantic phenomenon in which one polysemantic token has structurally opposite semes. It is evident both in language and in speech on the basis of opposition, contrast in the framework of various differential semes as part of sememes, but there always must be one common seme, attests to the word polysemy such as: *Ukrainian* **nozučamu** – 1) to borrow something from someone; 2) to lend something to someone; *French* **aucun** – 1) nobody, nothing; 2) someone, anyone, everyone; *English* **sibling** – a brother or a sister. Enantiosemy makes many problems

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that could be attacked by the modern approaches of cognitive science, pragmatics, psychology, etc. Therefore, today it could be considered as a discursive and cognitive phenomenon.

The enantiosemy phenomenon has recently been the subject of linguo-semantic investigations. For the first time, this linguistic phenomenon was described by V. Shertsl in 1883 – 1884 in the work «On words with opposite meanings (or on the so-called enantiosemy)». He gave the name to this phenomenon: from the Greek «enantios» – means the opposite and «sema» – means the sign. Some aspects of this problem in different linguistic cultures were studied at one time by many scientists (K. Abel, L. Bezsonova, L. Bulakhovskyi, V. Chervonozhka, T. Fedorenko, B. Haneev, Ya. Helblu, V. Ivashchenko, R. Maier, T. Nedelke, I. Pete, V. Prokhorova, O. Shmelov, I. Smushchynska, O. Taranenko and others), however, it still requires a thorough and scrupulous analysis.

V. Shertsl himself considered enantiosemy to be an unproductive phenomenon, a lack of language to contend with, and «the more ancient the language is and the more primitive the people are, the more common this phenomenon is» [2, p. 259]. In particular, the linguist pointed out that this phenomenon is extremely rare and inhibits language in the way of its development. However, modern European languages, including French, testify to the opposite.

The sememes that form the enantiosemy are different: 1) one is used nowadays, the other is outdated, so the usage ambit was narrowed; 2) both semes are actively used in the language; 3) both semes are outdated. Although enantiosemy, in fact, is considered as «anachronism», an element of ancient languages, the French language inherited this phenomenon from Latin, where it was also quite often observed, for example: *Latin affectio* (*Frech affection*) – 1) devotion, love, tenderness; 2) ailment, illness; *Latin certus* (*Frech certain*) – 1) defined, installed; 2) of some kind, certain. When analyzing a historical text, for example, we have to take into account the meaning that was before, but not the modern.

Therefore, it raises the problem of understanding the meaning of a statement that largely depends on the context (broad / narrow linguistic / extralinguistic), so enantiosemy is often non-language, but speech, and even discursive.

Today our matter demonstrates the existence of different enantiosemy types. In our work, we use a classification developed by I. Smushchynska based on a dialectical principle of opposition. According to the researcher, the French enantiosemes can be divided into the following types: 1) linguistic – speech enantiosemy; 2) complete – incomplete; 3) absolute – relative; 4) logical – affective; denotative – connotative; 5) substantive, adjective, verb, adverbial, pronominal, exclamatory; 6) lexical (lexemic) – phraseological; 7) lexico-semantic, syntactic, discursive; 8) lexical – grammatical; 9) stylistic (is peculiar for both literary and colloquial French language, term systems, French slang); 10) synchronous – diachronic; 11) intralinguistic – interlingual [3, p. 450–451].

In our sample, a quantitative analysis of enantiosemic tokens demonstrates a sufficient number recorded in French vocabularies (Le Petit Robert (1)), linguistic enantiosemy is represented by the letter «A» that gives 56 examples of enantiosemy;

letter «B» – 102 examples; letter «C» – 109; «D» – 43 [1]. Thus the analyzed matter shows not «pure», but speech enantiosemy. For example: *agaçant* – 1) which is annoying; 2) seductive, embraceable; *charmant* – 1) charming, alluring; 2) unpleasant. That is, the denotative value often remains the same, and the evaluative or emotionally expressive connotation changes. Such enantiosemes are usually figurative and expressive, so they are often used in fiction, journalism, colloquial language and contribute to a pragmatic influence on the reader or interlocutor: *que le diable te patafiole!* 1) God bless you; 2) the hell with you! Theonymy meaning of the enantiosemic lexical unit is expressed through the context, but it is also removed through it. Often the commentary, the remark, the author's words that introduce the direct speech clarify the word meaning, so enantiosemy is not a serious problem for communication, since all lexical units are neutralized by the linguistic situation or the context.

Therefore, in our point of view, this linguistic phenomenon of our time is more considerably to be appropriated in abovementioned field, which requires careful linguistic research.

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## SUBSTANTIVATION AS THE MAIN MANIFESTATION OF THE MORPHOLOGICAL AND SYNTACTIC METHOD IN THE CREATION OF ZOONYMS

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Various aspects of the creation of onyms in a morphological and syntactic way have been explored over the last decades by such Ukrainian linguists: M. M. Torchynskyi [9], T. I. Poliarush [7], Gh. L. Arkushyn [1], S. L. Kovtiukh [5; 6], O. L. Kryliuk [6] and other.

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However, the word-forming features of the zoonymia of the Kirovograd region have been partially studied, in particular proper names resulting from the transition of one grammar class to another, which determined the relevance of our study.

Different parts of the language serve as a basis for creating zoonyms in the Kirovohrad region. In the Ukrainian language the names of animals are homonymous with adjectives, verbs, numerals, interjections however, as noted by S. L. Kovtiukh, «passing into substantive other parts of the language not only undergo transposition of grammatical categories, including gender, number and case, but also acquire semantic and grammatical categories of the noun: beings / no-beings, proper and common, specific and abstract, material names» [5, p. 6]. So due to the transition of other lexical-grammatical classes into nouns the signs of the real parts of the language are lost, and actually the zoonyms (derivative words) acquire grammatical and paradigmatic features of the noun. In Ukrainian zoonymika the morphological and syntactic way of generating names is represented by transition to nouns.

The morphological and syntactic method produced 434 zoonyms, which is 11.2% of the total amount of material that was collected in the study area.

Adjectives pass into nouns with such meaning: a) colors of animal hair: *Білий, Сірий, Рудий (Ріжсий), Вишнєвий, Синюватий, Тёмна, Бұрий*; b) character traits: *Скажєний, Лютий, Дікий, Брудна, Буйний, Бістра* (local *швидка*), *Прудкий, Добра, Ласкава, Розумна, Хитра*; c) physical or physiological characteristics: *Великий, Малий, Здорова* (by value – large in size – local); d) features of the appearance of the animal: *Пухнастий, Чубата, Жирна, Тендітна, Босій, Горбатий, Картава*, this group also includes complex names: *Довгоніга, Довготелєса, Крутолоба, Криволатий* and other; e) the owner's attitude towards the animal: *Любима, Краций*; f) age characteristics: *Юний, Юна*.

394 names were formed based on the transition of adjectives into nouns (zoonyms), which is 91.2% within the morphological-syntactic way.

Particularly noteworthy are the nicknames of the participle origin *Гуляща* та *Замазана* (what means dirty). Such formations are the result of the first conversion of participles into adjectives and the subsequent transition into nouns [2, p. 8]. Therefore, the scheme of the transition of the participle into the noun (zoonym) is following: stray animal by nature (participle) → stray cat (adjective) → the name of the animal is *Гуляща (Stray)* (substantive).

There are nicknames of verb origin among the studied material. Such names are preferably given to dogs. This is mostly a verb in the form of the imperative: *Доганяй, Гуляй, Шугай, Літай, Угадай, Давай, Залитай, Ханай, Вій* etc. This is primarily due to the command that is given by the dog owner most often. For example, the primary function of a hunting dog is to catch up a bagged or frightened beast, so they have nicknames like *Доганяй, Ханай* and other. Attack dogs are given such nicknames: *Нападай, Вій, Шугай, Карай*, that are related to their main function in the yard. In total we recorded 15 such units (3.4%), including 13 dog names and two animal names: cat *Чухай*, hamster *Рій*. The names of these animals are motivated not by the owner's order, but by the name of the action that animal usually does.

Linguist N. V. Dubova claims, that the nickname *Дунáй* and similar are popular amongst hunting dogs because they resemble a verb in the prescriptive form, like an «energetic» verb [3, p. 148]. We found them among zoonyms of Kirovohrad region: *Кудлáй, Алабáй, Будулáй*. Such nicknames may have dual motivation, for example, the nickname *Кудлáй* is chosen by similarity to similar names of dogs of one owner, at the same time the second is external motivation (by the characteristic properties of the animal's hair).

Examples of the transition of quantitative numerals into nouns – proper animal names – are rare. Morphological-syntactic transformation undergoes only a quantitative numeral *one*, for example goat *Одíн*, nutria *Однá*, chicken *Годнá* (local).

Ordinal numbers also may transform in nouns, mainly the numeral the *first* (in various forms, dialect among them). Such nicknames can be applied to any animal (cows, sheep, goats, dogs, etc.) that are the firstlings. This fact then is a motivational incentive for naming the animal: *Пéрша, Пéрва* (local), *Пéршый, Пéрвий* (local). We fixed a single name derived from the ordinal numeral the *second*: *Дрýгий*. M. I. Siusko points out in this regard that such nicknames are interpreted mainly as tags zoonyms, but not as facts, which are conditioned by the order (sequence) of the animal's appearance in the world [8, p. 292–293].

Another motivational incentive is the orderly action of the animal, for example, the chicken *Пéрша* got its nickname because the first one sat on eggs (this name is temporary). Sometimes sporadic nicknames are also motivated by other ordinal numbers, such as a spider *Тринáдцята*. We collected 10 units in total – 2.3% within the morphological and syntactic mode of creation.

As a result of the transition, the interjections sporadically perform the function of zoonyms. Traditionally in Ukrainian linguistics the notion that onomatopoeias belong to exclamations or are a group of words adjacent to them «but do not fully merge with them, since they express neither emotion nor will» [4, p. 308]. Most scientists support this view (M. Ja. Pliushch, L. I. Matsko, V. O. Horpynych, A. S. Kolodiaznyi and other). I. R. Vykhovanets refers interjections to the sentences [10]. According to K. I. Horodenska and I. R. Vykhovanets, the onomatopoeias are related to sentences [11, c. 386]. In our work we endorse the traditional notions regarding this issue, so we distinguish two groups of zoonyms derivatives for which are:

- a) interjections (*Ю-хý-у, Гéй, Прýсь, Цю́бу, Óх, Óй*);
- b) onomatopoeias (*И-á, Хрý-Хрý, Цín-Цín, Прý-у, Гáв, Мя́в, Мé-а*).

There are 13 linguistic units in total, that represent 3% of the total number of onyms formed by the morphological and syntactic method.

So, substantivation is the main manifestation of the morphological and syntactic method in the creation of zoonyms. According to a compiled and organized file cabinet, different parts of the language can be transformed into nouns (proper animal names). Typically these are adjectives. It is less productive to transform other parts of the language: verbs, numerals, interjections, including onomatopoeias.

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## THE IMPORTANCE OF ONOMASTIC ANALYSIS IN THE STUDY OF LITERARY WORKS

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In the system of general theory of artistic speech, which is characterized by versatility, a variety of creative approaches to the literary texts and idiostyles of their authors, from the second half of the twentieth century was actively developed one of its important branches – the theory of literary onomastics, which was initiated by significant works of the scientists Yu. O. Karpenko, V. M. Mikhailov, O. V. Superanskaya, etc. The onomastic researches will always have scientific relevance, novelty and perspective, since the studying of proper names is inexhaustible in the illimitable ocean of the world literature.

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Proper names and literary work are the links of one lexical system created by its author to realize his conception. Therefore, the studying of the onym space of a specific literary work, the analysis of onym functions which are striking, powerful features of the author's penmanship, are very important to understand the unique linguistic view of an author's creative imagination.

In his work «About the Language of Fiction» (1959), V. V. Vinogradov emphasized: «The language of the playwright, the language of the lyricist, the language of the novelist – are different in their semantic structure, stylistic tasks, in their constructive principles. These differences are largely dependent on the specific properties of different genres of verbal-artistic creativity and different types of artistic language» [1, p. 21].

In the article «Some Problems of Literary Onomastics» (1988), T. V. Nemirovskaya proposed a scheme of division of literary onymia by genres of a literary work: 1) onymia of poetry, or poetic onomastics, – lyrics, poems, ballads; 2) onymia of prose, or artistic onomastics, – stories, novels; 3) onymia of dramaturgy, or dramatic onomastics, – comedies, dramas, tragedies [3, p. 112-113].

With regard to the typology of poetic onymia, Yu. O. Karpenko in his work «The typology of poetic onymia: M. Bazhan, B. Pasternak, P. Tychyna» (1992) emphasizes the lyrical principle (the figurativeness of proper names, their phonetic instrumentation), the epic principle (the significance of proper names, their direct, not figurative use), the humorous principle (the combination of not combining, the focusing on laugh), as well as the lyrical (changeable and colorful like a rainbow) or epic (powerful and monumental like a tower) principles of choice and use of proper names [2, p. 19].

O. I. Fonyakova considers poetic creativity as one that represents the maximum freedom of search, the principles of the name usage and the ways of its transformation: the freedom of associative approximation and comparison, the creation of a new form and meaning in context, the searching for new ways of incorporation into the context, the creation of semantic versatility and diffuseness of artistic semantics of proper name. In the poetic text, onym always undergoes a certain transformation, depending on the author's purpose, capable of focusing the reader's attention like no other means of lexical nomination, because the range of his connotations is unusually wide [4, p. 81].

The dynamic nature of the semantics of the onyms, their ability to accumulate all forms of information refers to the named objects, made them extremely attractive, especially in poetry, a means of figurativeness [4, p. 222], creating brief metaphorical contexts [4, p. 77]. The great importance of proper names in the creation of artistic time-space, inherent in one form or another to all literary works, is well known. In poetry, it is especially growing: both laconic and more precise [2, p. 19].

The onomastic investigations include the method of description and its main techniques: observation, interpretation, generalization; a basic functional and stylistic method for studying literary onomastics is applied, which involves a broad involvement of contextual analysis. The use of the statistical method helps to



generalize the data obtained during in the systematic analysis, and to confirm reliability thereof.

The main purpose of the onomastic research on literary onomastics is to analyze the onymic content of a literary work, that is, the functional loading of proper names, their participation in the creation of an artistic whole, the peculiarities of usage of onyms in literary works.

The studying in the field of literary onomastics involves the following tasks:

- 1) identification and systematization of proper names of all onomastic classes used in writer's works;
- 2) establishing the frequency and variability of each proper name in the works;
- 3) identification of onymic changes and variations recorded in different editions of the studied works;
- 4) interpretation of the functional loading of proper names and consideration of each onym in particular;
- 5) defining the specific features of proper names in the context of works, their expressive and stylistic role, the relationship between the genre of the work and proper names;
- 6) comparison of features of onyms' usage in the novels of a writer or a poet.

So literary onomastics investigates the role and problems, mechanisms, stages of studying proper names in the work, analyzes the role of proper names in creating a unique artistic world of the literary work and in revealing the creative idea of the author. Among the **unresolved** problems in literary onomastics is the definition of the boundaries of onomastic vocabulary in the literary work, since they have been very blurred in the individual-author's speech. There are also differences in the description of onyms' semantics and functions. Thus, the study of the functioning of onomastic vocabulary in the language of fiction (novels, verses, stories) is a voluminous and complex subject. It is stated that without the analysis of proper names, these central knots of artistic work, a real understanding of the text, its deep, subtext content layers is simply impossible. As it is known, the poetonymosphere (system of proper names) of an artistic work is the only solid cemented by the author's component of a work, which in the finished work of changes does not undergo. Each one is in its place, harmonizes with other onyms, working together for an artistic whole. But from the work to the work, depending on the literary direction, the depicted events, philosophical and outlook guides of the writer the poetonymosphere is definitely changing. There are no two identical works of one writer which would have the same system of proper names. Each work has its own system of proper names, which is unique and peculiar, as the literary work itself. The more skillful a writer, the more brightly he inserts onyms into his artistic canvas.

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## **PEDAGOGICAL SCIENCES**

### **HISTORICAL PHASES OF HIGHER MEDICAL EDUCATION DEVELOPMENT IN GREAT BRITAIN**

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The issue of scientific-theoretical and practical training of future professionals in the field of medicine improvement is one of the most burning questions in the international and national professional education domain.

In order to make the modern Higher Medical Education (HME) in Ukraine competitive, to achieve the international standards, it is necessary to reform it making an extensive analysis of the past, getting profoundly aware of the experience of historical development of HME in Ukraine and abroad.

It is worth noting that the study of the nascent phase of HME at the universities of Great Britain and the creative implementation of some advanced ideas of British experience in the field of professional training for medical personnel will allow the modern Ukrainian System of HME to reach the level of the highest standards.

The integrated analysis of some scientific research reveals that certain aspects of the nascent phase and the development of HME in Great Britain were viewed by a number of Ukrainian and foreign scholars. It is O. Lolshyna, who analyses the directions of reformation of the System of Education and Professional Training; A. Sbrueva who highlights the globalization processes in the education domain; L. Riabova who describes the Higher Education Systems of industrialized countries and Great Britain in particular; O. Gogua that defines the role of colleges in the modern Professional Training System; O. Kanivets who investigates the nascent stages of Veterinary Medicine; S. Huk who reveals the particularities of Professional Training in Physical Rehabilitation at universities; I. Palamarenko that studies the framework arrangements of professional training for Family Doctors at Higher Medical Colleges; K. Mahrlamova who provides the complex analysis of theoretical and practical basis of professional training of future doctors at Higher Medical Educational Establishments and so on.

The more profound analyses of the mentioned above scholars' works also proves that the historical periodization process of the nascent phase of Medical Education at Higher Educational Establishments of Great Britain is still developing.

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Thus, the purpose of the article is to define the historical nascent phases of Medical Education at Higher Educational institutions in Great Britain.

Let's seize a look at K. Mahrlamova's points of view on the issue. The scholar, on the premises of T.O. Dornan's studies, suggests her own periodization of medical education formation at the universities in Great Britain. She splits the higher education formation process of the country into few phases:

- 1) XII-XIII centuries – the development of early schools (colleges), the foundation of Oxford and Cambridge Universities;
- 2) XIV – XV centuries – the formation of the main collaborative constituents of English Universities, the foundation of Scotland Universities, the implementation of the first Higher Education reform;
- 3) XVI – XVII centuries – the first Universities' enactments were taken, the University Education managerial role of the church was weaned off, the implementation of the exams to obtain the academic degree was launched;
- 4) XVIII – XIX centuries – the implementation of a sweeping reform in the System of Education, setting entrance and state exams, reforming of the content of professional training were observed;
- 5) XIX century – up to now) – the implementation of the binary system of Higher Education, the modernization of Higher Educational institutional structure, the improvement of content and teaching methods and Higher School reforming are still going on.

What's more, the classification of the nascent phases and the further development of professional medical education in Great Britain, developed by I. Palamarenko, is also under our scientific consideration.

The scholar defines and substantiates five nascent and development phases of the Professional Medical Education in Great Britain since the ancient times up to nowadays. For instance,

- the first stage – an ancient, antique pre-Christian period (the educational aspects of Celtic medicine were embodied by the multifunctional Druid priests, who were transferring knowledge in the process of studying, were forming medical culture, facilitated the acquisition of specific knowledge in certain areas of medical practice);
- the second stage is related to the development of the ideology of medical education (it begins with the adoption of Christianity by Great Brit;
- the third stage – Middle Ages medicine (the main form of medical education at monastery hospitals was transferring knowledge from a teacher to a student, medicine as a separate subject had been taught in Oxford since XIII cent.);
- the fourth stage – the heyday of medicine as a science in the UK begins from the late Middle Ages ( Renaissance and Reformation era – end of XV cent. – beginning of XVI cent.) and lasts up to XX century (the period related to the oldest Medical School foundation in Aberdeen, Scotland, in 1497, London Royal Medical College in 1518, the commencement of licensure for medical practice under the condition of passing the examination, and in the same year the creation of the Royal College of Physicians, the reformation of British Medical Education in 1858);

•the fifth stage – the creation and evolution of general practice – family medicine (since the middle of XX cent. up to now) (National Act on Medical Services was approved (1946), the profession of a doctor was officially added to the National Health Service (1948), Royal College of General Practitioners was founded in London (1952), the First Department of General Practice was created in Edinburgh (1063), system of regular obligatory confirmation of medical qualification for all practitioners was implemented in 2001, «the period of great expansion of Medical Education» dates back to the XXI century – six new medical schools were opened in England and one – in Wales) [3, p. 69–70].

Another classification of creation and evolution of the Professional Medical Education at the Universities of Great Britain is suggested by K. Mahrlamova. According to the criteria of identifying the phases of development of university education for future physicians in Great Britain the researcher refers to the following:

firstly, foundation of new medical schools;

secondly, the emergence of the new legislative support for health education and the bodies promotion;

thirdly, innovations in the process of education of future physicians [2, p. 87].

According to these criteria, she marks out the certain periods of the creation and formation of the system of University Professional Medical Education in Great Britain.

*The first period* (XIII – XVII cent.) – the stage of origin and formation of the system (the beginning of wide use of scientific methods of inquiry (cognition methods,) division of doctors into three categories: general practitioners, surgeons and pharmacutists; introduction of practical training for future doctors at Universities of the country).

*The second period* (XIII – XVII cent.) – system-forming stage (Hermann Boerhaave's doctrine (1668-1738) and the foundation of medical in Leiden at the beginning of the XVIII century, the dramatic changes in the training of future doctors; the expanding list of medical disciplines, the introduction of practical component into training («bedside pedagogy»), taking qualification exams, introduction of licensing for medical practice.)

*The third period* (XIX cent.) – professionalization stage (opening of new medical schools and schools under Universities, autonomy of higher medical schools in drawing up of the educational plans, the standardization of process of studying at these educational establishments, introduction of three innovations: in 1829 it became obligatory for medical students to attend lectures, writing a thesis became the key component of the final examination, in 1842 taking clinical examination was introduced).

*The fourth period* (XX cent.) – the humanization and socialization phase (opening of six new schools: Nottingham (1966), Dandy (1967), Southampton (1969), Cambridge, Leicester (1975), Imperial (1997); pre-hospital training of future doctors and clinical practice represented training for future doctors; they began to create medical groups or committees on ethics at British Medical Schools; new humanitarian subjects were introduced; humanitarian approach of medical education

at universities of Great Britain also comprised: the focus of all physician training was on increasing care about a patient, it means that treatment must become patient-oriented; development of skills of future doctors to take responsibility for medical profession on matters of morality, scientific and medical ethics; to form the understanding of future doctors their connection with the society and care about the health of its members and so on).

*The fifth period* (XXI cent.) – reforming and modernization stage (opening of seven new medical schools four of which in England: Brighton and Sussex Medical School under Brighton and Sussex Universities, Hull York Medical School under Hull and York Universities, Peninsular Medical School under Exeter and Plymouth Universities, University of East Anglia Medical School; implementation of the program for quality assurance of medical education (QABME – Quality Assurance of Basic Medical Education) so on) [2, p. 89–91].

Considering everything, we can arrive at the conclusion that the revealed by the mentioned above scholars phases of HME development in Great Britain lead to understanding of the modern educational development peculiarities and thus let us design the higher medical institutions in such a way that their graduates will be competitive on the international job market.

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## PSYCHOMOTOR DEVELOPMENT OF CHILDREN 5-6 YEARS WITH DOWN SYNDROME BY THE METHOD OF SENSOMOTOR KINESIOTHERAPY

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Today it is proved that one of the main components that characterizes the physical perfection of the body is the level of development of motor function, which is realized in various motor activities. It is associated with all movements. Pathology of the motor apparatus or defects in the development of motor skills limit the ability of a person in daily life, choosing a profession, adversely affecting his health and

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psychophysical development. Optimal motor activity plays the role of a kind of regulator of the development of the child's body, a prerequisite for the formation and formation of the child as a biological being and social entity. Motor function is manifested in the management of the child's motor skills. It provides motor activity, without which the full life of children and their normal development is impossible.

Today, the problem of social rehabilitation of children with Down Syndrome is becoming more urgent, as the number of such children has a steady upward trend.

The study was conducted in the form of group sessions with children 5-6 years with Down syndrome for five weeks at the Center for Social and Psychological Rehabilitation of Children and Youth with Functional Disabilities. Classes were held twice a week. The study involved 10 children aged 5-6 years. During the study, all classes were conducted by a kinesiotherapist in the presence of a center director, a defectologist (tiflopedagog), a social educator, a practical psychologist, and parents [1].

According to the proposed method, the kinesiotherapist is engaged in improving the sensorimotor integration of mental processes in the child through the implementation of locomotor acts, manipulation of objects, «recognition» of events occurring both inside and outside the child's body. This is complemented by optimization of the affective sphere of the child. The basic idea of the proposed set of special exercises and techniques is to increase the recognition of people, their movements, individual objects in the environment, as well as the phenomena of social life by improving the overall functioning of the child's psyche.

During the implementation of sensorimotor kinesitherapy in the child at the same time 4 configurations are updated:

- the experience of one's body;
- experience of the object;
- experience of interaction with the teacher;
- holistic attention – combining the attention of the child and the kinesiotherapist aimed at performing joint activities.

When conducting physical education classes by the method of sensorimotor kinesitherapy, it is recommended to follow a certain pace of training. For example, at the stage of grinding, kneading and sorting the pace is slow, and all other exercises are performed at an intense pace, without pauses between them. Particular attention is paid to the rhythm of the exercises.

Classes last about 50 minutes on average. This time can be reduced to half an hour when vegetative reactions and signs of affective overload occur. Classes are held with a constant score of up to ten to create a steady rhythmic sound structure that accompanies the exercise.

The last 10 minutes of the lesson are devoted to singing, designing, collecting large puzzles and other tasks, aimed mainly at updating cognitive functions. This is due to the fact that after the motor exercises in the child increases mental tone, and at this time optimal tasks that are aimed at developing the cognitive sphere and improve the emotional background. Children with marked negativity after motor exercises are more easily involved in joint activities aimed at the interaction between the teacher and the child.

According to the method of sensomotor kinesiotherapy, exercises for physical education are classified according to the target orientation: exercises for optimization of the tonic component of motility in a passive way; exercises for the development of visual-motor coordination; exercises to integrate early postures and movements into more complex coordination; exercises for the development of the cognitive sphere.

Consequences of the influence of conducting classes according to the proposed method: reduction of functional hypotension, increase of diversity of activity, development of communication, development of general motor skills, development of fine motor skills, development of great motor skills and coordination of movements, perception of speech, improvement of work of the apparatus of articulation, self-care.

Thus, the results of the use of the sensomotor kinesiotherapy technique in physical education classes demonstrate that it is an effective tool for improving the psychomotor functions of children aged 5–6 years with Down syndrome [1].

Children became better able to navigate space and to understand their own bodies, to respond more quickly to environmental changes and adapt to them. Their cognitive level increased, motor abilities improved (children became more motor-agile, movements became clearer, components of impaired movement coordination became smaller). With children it became easy to negotiate, to carry out more complex joint activity. The time of completion of any task (both physical and mental) and the degree of active participation in it have increased several times in comparison with the initial indicators.

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## PECULIARITIES OF TEACHING LATIN PHONETICS IN THE FRAMEWORK OF E-LEARNING: STRATEGIES AND PRACTICAL TIPS

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It is believed that Latin is a dead language because there are no native speakers and the language remains unchanged. That's why proper reproduction of letter-phoneme matching and other phonetic peculiarities are impossible. However, today Latin is a

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basis of scientific terminology, international nomenclatures and is widely used in medicine, pharmacy, law, the Catholic Church, etc.

M. Covington states, «The ancient Roman pronunciation wasn't accurately reconstructed until about 1900. Before that, scholars in every European country pronounced Latin as if it were their own language. With English, this gave particularly comical results because English pronunciation had undergone drastic changes at the end of the Middle Ages» [1].

There are four ways of Latin pronunciation: reconstructed ancient Roman; northern Continental Europe; «Church Latin» in Italy; «English method». Speaking about any terminology and Latin as its basis, M. Covington recommends using «the northern Continental pronunciation for unfamiliar scientific terms, since it resembles many modern languages and is, in fact, the pronunciation used by Copernicus, Kepler, Linnaeus, and other scientific pioneers» [1]. Ukrainian researches R. Dombrovskiy and N. Revak add that «modern Latin reading norms appeared in European countries in XIX<sup>th</sup> century, but such a pronunciation is only relative and implies a degree of approximation to the real pronunciation of the Romans. The reconstruction of the classical pronunciation requires very careful preparatory work, besides, the peculiarities of Latin pronunciation are reproduced only within the conditions offered by the native language sound system» [2, p. 214].

As O. Nybakken considers, «Not all the difficulties encountered in the study of a science are inherent in the subject matter; many are due to the terminology used. In some areas of science, the student may spend a year or more in becoming acquainted with the terminology» [4, p. 1]. Traditionally, in Ukraine, there are two semesters or one semester (usually the first year of studies) dedicated to Latin and its terminology at the non-classical higher educational establishments (medical, pharmaceutical, law, polytechnic, theological, etc.). During the academic year students learn peculiarities of Latin phonetics, grammar, syntax, and terminology according to the chosen field of science. In this research, we will highlight some strategies and practical tips for teaching Latin phonetics in the framework of e-learning.

As a rule, the academic staff explains Latin reading and stress rules in the form of a semi lecture using a blackboard, tables, and textbooks. However, today, in the era of e-learning, the mentioned way of teaching loses its positions because students wait for interesting and interactive methods of teaching more and more often.

According to a guide for designing and developing e-learning courses «E-learning methodologies», «e-learning is the use of computer and Internet technologies to deliver a broad array of solutions to enable learning and improve performance» [3, p. 3].

The main advantage of e-learning is to involve as many students as possible, especially when they

- geographically dispersed with limited time and/or resources to travel;
- busy with work or family commitments which do not allow them to attend courses on specific dates with a fixed schedule;
- located in conflict and post-conflict areas and restricted in their mobility because of security reasons;

- limited from participating in classroom sessions because of cultural or religious beliefs;
- facing difficulties with real-time communication (e.g. foreign language students or very shy students) [3, p. 9].

We assume teaching Latin phonetics with the help of e-learning as one of the strategies during the Latin lessons. Thus, there is a need to use simple learning resources and interactive e-lessons as types of e-learning content.

Simple learning resources are uninteractive ones, because students can only read or watch them, and can be represented with

- documents containing all the information concerning reading and stress rules in Latin;
- flashcards with Latin alphabet, Latin letters that correspond to certain phonemes, words divided into syllables (that are usually counted from the end to the beginning of any word), stressed and unstressed suffixes with examples, etc.;
- PowerPoint presentations with Latin reading and stress rules;
- videos with phonetic content. Academic staff can find it either on YouTube or on specialized websites. E.g.: the Latin alphabet. The pronunciation of vowels, diphthongs, consonants, and Greek letter combinations. <https://www.youtube.com/watch?v=c65HZp6hl3Q> – for Ukrainian students; the Latin alphabet – vowel pronunciation <https://www.youtube.com/watch?v=LwtgVwJlJto> – for foreign students with the English medium of instruction. Moreover, one can actually make a video;
- audio files with phonetic content, e.g. Latin aphorisms or proverbs with certain phonetic peculiarities can be recorded on a CD or DVD, flash device. Students can listen to them several times and repeat them.

The most common approach for self-study e-learning is Web-based training consisting of a set of interactive e-lessons. An e-lesson is a linear sequence of screens which can include text, graphics, animations, audio, video, and interactivity in the form of questions and feedback. E-lessons can also include recommended reading and links to online resources, as well as additional information on specific topics [3, p. 11]. For example, there is a possibility to create a course on Latin phonetics on the edX platform (<https://www.edx.org/>). The course may be a supplement to the information given during a lesson.

Moreover, if students have doubts concerning reading terms, they can use such web page as <http://graecolatini.bsu.by/htm-different/latin-translit.htm>. The matter is that this page provides users with main rules concerning transliteration (transcription) of Latin words, prepared by an associate professor K.Tananushko, and an online program that transliterates (transcripts) a Latin word due to the settings «Tradition», «Classic» or «Medicine».

So, today Latin is a language of scientific terminology despite it is not on the rise as English. That's why one should teach Latin phonetics properly. Note that Latin phonetics is introduced to Ukrainian students within the mother tongue. It means that the Latin letters are pronounced as close to the Ukrainian phonemes as possible.

Conventional methods of teaching are giving way to e-learning that is regarded as the integration of electronic technologies within learning process both in a classroom and outside it. Thus, simple learning resources and interactive e-lessons dedicated to the Latin phonetics can help students acquire better phonetic competence and master it.

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## THE FEATURES OF TOLERANCE IN PARENT-CHILD RELATIONSHIP

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At all times, since antiquity, the problems of the family have concerned leading scholars, artists and philosophers. The family as a living system changes not only under the influence of socio-economic conditions, but also due to internal processes of development. At the present stage of society's development, new problems that arise cause the destabilization of vital functions of the family and reduce its adaptation ability to new conditions.

One of the challenges of family education is the violation of parental tolerance. The mental and physical health of the person is closely connected with the parent-child relationship. Family conflicts not only disorganize, destroy family unity, but also serve as the basis for the accumulation of the deviant behavior of the child. By virtue of the children's rights discrimination, they lose own fundamental freedoms and individuality, as a result they have an emotional disturbance, feelings of constant anxiety and deviations from the norm in behavior of different characters. Unfortunately, adults often do not notice the prospects of parent-child relationship complexification, do not assess the degree of their influence on personal formation and development of their children.

Family – the institute of education, in which the foundations of human morality are laid, the attitudes towards the surrounding are formed, and the evaluations of their actions are adjusted. Naturally, school has considerable educational potential, but

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family and individual characteristics of the child are the two main determinants of a person's social formation [4, p. 46].

Accordingly, the level of modern culture generates a task for parents to learn the ways how to resolve conflicts with their children based on the principles on tolerance. A strong family with their own traditions and tolerance in relationship between its members counteracts the negative environmental impacts. For instance, parental understanding and attention antagonize the propaganda of violence and cruelty in social media. The attentive adult's attitude to the views, interests and hobbies of their children has a positive effect on the process of social formation of the younger generation.

Tolerance is a complex and multifaceted concept. Tolerance is communication and freedom of thought, conscience and belief, harmony in diversity, virtue that makes it possible to achieve mutual understanding between people, parents and children through peaceful conflict-free relationship [1, p. 20].

In order to teach a child tolerance, it is necessary to consider that children are mirrors, reflecting the characters and relationship of their parents. Primarily, parents should be tolerant to themselves, and only in such a case they will be able to form a value system in their children, which is based on such general concepts such as: compromise, mutual acceptance and tolerance, forgiveness, nonviolence, compassion, understanding and empathy.

Tolerance in parent-child relationship acts as a certain setting for the perception and understanding, it is built on mutual respect for the interests, values and positions of all family members. This feature implies the ability of parents to have an effect on child's personal development and behavior through the prism of family relationship.

Another feature in parent-child relationship is the rejection of adults from the monopoly of «knowing the truth» in dealing with emerging issues. «Truth» is always on the parent's side and «mistakes» are made by children – this position characterizes existing family relationships as total intolerance.

J. McDowell believes that parents' tolerance begins with their marital love, understanding and respect between them. «The most important thing you can do for your children is to love one another» [3, p. 22]. According to this statement, parents should be «heroes» for their children – those whom children would like to be. «A hero is a father or mother who exhibits such a character, such sensitivity, honesty, consistency, that allow them to become a role model. You must become a hero for a child in order to prepare him or her to a fulfilling life in today's unhealthy, hostile world» [3, p. 23].

Following by parent's example children can learn how to be responsible, disciplined, truthful and honest. In no case parental duties can be reduced to guidance and punishment. Instead, parents should focus their efforts on the other side: to think how and for what they can praise, encourage, and support their child. No matter how busy parents are, there should always be time for children, no one and nothing can be more important than children.

Tolerance in parent-child relationship does not require the rejection of one's own views, values and ideals. Tolerance in relationship between family members involves

the combination of resilience as the ability of children and adults to realize their personal views with the respect to each other.

Moreover, an important characteristic of tolerance in parent-child relationship is the joint analysis of family member's actions, which are discussed and evaluated.

In Declaration of Principles on Tolerance, verified by the member states of the United Nations Educational, Scientific and Cultural Organization, on meeting in Paris at the twenty-eighth session of the General Conference, from 25 October to 16 November 1995, in Article 1, paragraph 1.2. defined: «Tolerance is not concession, condescension or indulgence. Tolerance is, above all, an active attitude prompted by recognition of the universal human rights and fundamental freedoms of others. In no circumstance can it be used to justify infringements of these fundamental values. Tolerance is to be exercised by individuals, groups and States» [2, p. 12]. Considering tolerance in relationships between family members, one of the characteristics of tolerant relationships is the active interaction between their members based on mutual respect and support.

It is necessary to listen to the child's thoughts and to agree with him or her, to be able to forgive and to apologize to the child. That is the most difficult moment, but at the same time the most important, since children have a heightened sense of justice [2, p. 14].

Tolerance is also the ability to make arrangements without destructive conflicts. The phrase «destructive conflict» means confrontation that causes «enemy» moral or physical harm. In everyday life it is impossible to avoid conflicts of interests, desires and thoughts. Therefore, it is important to rebuild the conflict into a constructive dialogue by engaging the child to talk about existing contradictions and to make compromise decisions.

Tolerance in parent-child relationship means to respect, acceptance and understanding of the rich diversity of cultures of the world, forms of self-expression and ways of manifesting human individuality. The main methods of upbringing tolerance in family circle are: family activities, conversations, support in different situations and in solving problems, respect, motivation and trust.

To draw the conclusion, one can say that tolerance is not an individual quality, but a total of interrelated personality traits. Tolerance in the parent-child relationship helps to listen and understand each other better, to accept people with their uniqueness, to understand everyone's rights and different visions of the world.

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## STRATEGIC PARTNERSHIP IN FOSTERING INTERNATIONAL VET COOPERATION

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The present paper deals with the problem of the international cooperation development between European VET institutions and Ukrainian vocational educational establishments. Czechowska, L. (Czechowska, 2013, p. 48) draws our attention to the fact that in a professional Thesaurus the most commonly used interchangeable terms are: strategic partnership, strategic alliance, strategic cooperation, close partnership, special relations/particular relations.

It should be mentioned that in the area of international politics the term *strategic partnership* (Blanco, L. F. 2016) is viewed as a label and mechanism of differentiation and hierarchization; (ii) as a normative instrument to advance a 'structural foreign policy' and (iii) as a constitutive speech and positioning act.

The focus of our attention is Latvia / Ukraine Strategic Partnership and the principles of its successful implementation in the sphere of vocational education and training (*VET*). Strategic Partnership (here *SP*) of Latvian and Ukrainian VET professionals is fostered to support the development, transfer and/or implementation of innovative practices as well as the promotion of joint initiatives in cooperation, peer learning and exchanges of experience at the EU level. We agree with Czechowska, L. (Czechowska, 2013, p. 42) that a determinative issue here is the parallel maintenance of institutional exibility and long-term exceptionally close relation between transnational VET partners.

The Strategic Partnership between Rīgas Tūrisma un radošās industrijas tehnikums (here *RTRIT*) and Regional center of VET education in Chernivtsi oblast (here *NMC PTO*) is transnational, it engages two VET institutions – from Latvia and Ukraine. The SP under review is formalized in bilateral agreements, which include transnational VET policy coordination, professional discussions aimed at building up bilateral relationships, different multiplier events, etc.

Educational component of the bilateral agreements is aimed at coordinating practical guidelines of the target transnational cooperation:

- educational services transfer, compatibility of programs for the training of skilled workers in the professional sphere of activity;
- Internship-exchange of VET professionals / students within the framework of educational programs;
- academic and methodological support in accordance with the modern trends of European VET education development;

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- implementation of the distance education system between the partners;
- practical training and sharing experience;
- participation in multiplier events, skills competitions, workshops and training camps.

Besides, the content of the target bilateral agreements reckons in the issues of the counties' cultural diversities, economic changes caused by the globalisation, differences in social and political environment.

The budget for the cooperative management and events implementation is capped to 2 participating organisations – RTRIT (Riga, Latvia) and NMC PTO (Chernivtsi, Ukraine). This type of transnational partnership combines school exchange programmes, supporting good VET practices and peer learning. Naturally, the target managerial staff concentrates the SP participants' attention on disseminating innovative ideas, practices and methods as well as intellectual outputs.

The key strategies of the target SP intellectual outputs are: transnational cooperative management, finance logistics, innovative ideas implementation, as well as caring about the quality of VET collaboration, quantity of events and programmes deliberately tailored to the needs of the target SP groups.

The SP in question demonstrates a lot of advantages that prove the ideas of the Erasmus+ Programmes, namely strategic partnership between RTRIT (Riga, Latvia) and NMC PTO (Chernivtsi, Ukraine):

- *strengthens* key competences in initial and continuing VET education including common methodologies for introducing those competences in curricula, as well as for acquiring, delivering and assessing the learning outcomes of those curricula;
- *establishes*, develops and supports the arrangements for the preparation, training and participation of VET learners and staff in international, national, regional and sectoral skills competitions, while working closely together with businesses, VET providers, chambers and other relevant stakeholders;
- *supports* individuals in acquiring and developing basic skills and key competences
- promotes social and educational value of European cultural heritage;
- *contributes to* job creation, economic growth and social cohesion;
- *rewards* European excellence in VET teaching and skills development.

Notwithstanding the foregoing, the VET professionals-partners face some difficulties with coordinating the events of the bilateral agreements. The SP organizers do their best to avoid such 'icebergs' as: sporadic cases of local VET incompetency; possible lack of professional enthusiasm and motivation; difference in technological possibilities; poor financing and logistics; low level of ESP competency, etc.

Therefore, as we see, the target SP is linked to the current priority of Europe 2020 VET strategies [3]. Both RTRIT / NMC PTO VET professionals and students surely gain benefits from their transnational professional cooperation. This type of strategic partnership is flexible and open to being structured in different ways, according to the underlying condition of a bilateral relationship.

Moreover, the innovative Strategic Partnership between Latvian and Ukrainian VET professionals demonstrates their volition to balance and strengthen correlation between the European VET education and global labour market.

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## THE PERFORMING AND PROFESSIONAL COMPETENCE OF THE FUTURE SPECIALISTS IN MUSICAL ART

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The modern requirements for training specialists require a new approach to the content of education, an update of the educational repertoire, especially by means of adding the compositions of domestic composers, ancient and modern masters, as well as the change of the approach to teaching the piano in accordance with the requirements of the modern education.

The future teacher of musical art needs to be able to play the piano freely enough to influence the upbringing and spiritual development of the younger generation through the performance of compositions on the instrument by the means of musical art. It is in the education of a harmonious person that the purpose and content of the profession of the teacher lies.

The purpose of the work is to identify some ways of forming the performing and professional competence of the future specialists in musical art. In this sense, some provisions regarding the complex of elements of musical-creative, musical-analytical, general-pedagogical and psychological context have been considered.

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The determination and scientific substantiation of directions and methods of the effective development of independence and performing-professional competence in music-pedagogical practice were made in the works by A. Alekseyev, L. Barenboim, and G. Tsypin. The musicians-pedagogues L. Archazhnikova, T. Vorobkevych, Gh. Padalka, O. Rostovsky, while developing the multifaceted nature of the profession of the future teacher of musical art, define a wide range of specialists' training by actualizing the development of their independent creative and cognitive activity.

The pedagogical abilities of the future musician-teacher are a complicated complex of different elements of musical-creative, musical-analytical, general-pedagogical and psychological content. Many of the most difficult tasks, the huge number of different music compositions being studied – this is the specificity of working in the piano class. During these lessons one forms views, musical taste, professional skills of the future specialist, his/her creative activity increases, intelligence develops, the love for music is being cultivated [1].

The independent practical work of students has certain didactic goals: to deepen and expand, to systematize and consolidate the knowledge acquired during the classroom lessons; to develop the abilities, skills of independent performing mental work; to promote interest and curiosity in professionally oriented activities; to develop independent thinking; to form volitional traits of character [2]. The achievement of these goals is possible if students have a formed need to acquire performing and professional competence.

The most important for the future specialist of musical art is the activation of cognitive activity and the ability to disclose the content of a musical composition, and for this he/she needs to possess a complex of professional skills: a certain sound production, a cantilena play, a conscious phrasing, a literate pedal use, a developed polyphonic thinking; a competent and logical interpretation of the texture of a musical composition, an apprehension of the composition as a whole and so on [3]. Mastering the skills of performing musical compositions on the piano is not the goal, but only an integral part of the comprehensive training of the future specialist. The profession requires universal knowledge, skills and abilities of a special kind.

In the present context, the main task of the educational and training process is to create the conditions for comprehensive development of a personality and the formation of students' performing and professional competence. One of the main tasks of the piano training is connected with the development of the ability to understand and reproduce the content of a musical composition [4]. Acquiring the experience of working with the note texts of musical compositions of various figurative content, students master the appropriate means of musical expression, feel the logical connection of musical elements, and master the performing techniques, while acquiring certain performing and professional competence [5].

The basic music-didactic principles form the foundation of the developmental learning in the piano class: the expansion of the repertoire for enriching the professional level and experience of the student, increasing the amount of material used in the classes (from simple to more complex); the intensification of the

educational and training process and the development of the student's creative thinking by accelerating the rate of the mastering of a certain part of the educational material (the so-called sketchy study of a musical composition); the peculiarity of the role of the process of reading from the sheet, as a type of the educational activity [6]. In the course of acquiring performing skills, the basic didactic principles of the developmental learning – mastering the maximum of information in the minimum of time – stand out.

The implementation of these provisions into the practice of piano training will help to enhance the students' creative and cognitive autonomy and to form the basis of performing and professional competence [7].

Therefore, teaching the musical disciplines is focused on the formation of highly cultural, widely educated teachers of musical art at preschool and general secondary education institutions, who have the basic principles of performing and professional competence, acquire the perfect instrumental and performing qualities, are capable of revealing the artistic content of musical compositions by means of the corresponding means of musical expression, have the necessary skills to independently work on musical-theoretical material and certain educational and research achievements, are prepared for a thorough mastery of the peculiarities of performance, regularities of designing and application of musical material in the practical musical-pedagogical and musical-educational activities.

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## **SOCIOLOGICAL SCIENCES**

### **JUSTICE IN THE DEVELOPMENT OF THE CULTURAL AND CIVILIZATIONAL WORLD**

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Trust as a characteristic of social relations is based on the mechanisms of cooperation / partnership and competition. In the activity, requests are realized not only at the production-functional level, but also the need for social communications. In the processes of communication, satisfaction of interests and achievement of goals, the most viable socially significant innovations are singled out [1-3]. So, organic development needs to cultivate a variety of forms of bona fide co-operation and competition.

Among the meso-, macro-, micro- and other distinguished levels of interregional relations, interactions between the cultural and civilizational worlds are of cardinal importance. The understanding of justice is based on the basic value-sense complexes of the cultural and civilizational worlds, which have both cross-cultural and specific ones. The search for authentic incarnations of Truth, Goodness, Beauty as lofty ideals always and ahead of time, and lead their cultural and civilizational worlds. Such searches are given to humanity «for growth». Accordingly, from the utilitarian-pragmatic point of view, such incarnations are redundant, excessive, impractical, because they are located in other axes of coordinates [4-6]. When there is no stable external support in the form of a common ideology, a unified culture, a universally recognized science, then one should be tolerant of everything, recognize the right to a dissimilar one. In this context, the very concept of development needs to be updated: in addition to stable and balanced growth, it should be guided by such maxims as solidarity, freedom of choice, beliefs and words, tolerance. The concept of peripheral culture disappears: they are all equal. It's necessary to move from a habit to imposing global standards on extremely diverse cultural worlds to an orientation toward cultivating their own conditions of productivity and long-term stability of life.

At the same time, strategies that carry risks of deterioration in the quality of life of broad strata or socio-demographic indicators must certainly be excluded. Harmonization of individual and social, the balance of the components of openness and closeness, the possibilities of the post-market mechanism and public-private interaction provides for a form of combining the energy of private initiative and entrepreneurship with flexible state regulation. Organizational and managerial transformations once again remind us of the existence of three main dimensions:

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ensuring individual freedoms and human rights, raising the socio-economic well-being and political consciousness. These areas are interconnected, while, for example, a high level of culture of investments in education and science, healthcare and social welfare of workers is an integral feature of the transformation of human potential into a human factor of general development.

Both constructive and destructive ways of socialization / individualization are formed into sustainable ideas about the normative, which are held together by the realization of their Super-Projects, first of all, in forms of cultural and civilizational worlds [7-9]. The productive state of social relations in a knowledge society presupposes the existence of a moral backbone. Its significance, the normative and regulating social relations role increases with the transformation of the paradigm level and in situations close to institutional uncertainty.

Conscientiousness is correlated with public perceptions of justice. The inequality of talents is perceived as fair. On the contrary, an increase in relative impoverishment, an increase in property and unearned stratification factors, manifested in the formation of the famous «two nations» (when life, education and activities of the rich and the poor completely diverge and really lose points of contact), is perceived as unfair. The proliferation of democratic procedures further enhances the importance of the social information plane of exchange. In particular, the effects on social psychology and ideology allow solving the most important tasks in stimulating the desired changes.

Nowadays, the search for answers to the historical challenges of the epoch is all the more in the plane of intersection of the characteristics of nature similarity and friendliness. The global nature of information flows is complemented by regionalism of the cultural and civilization worlds. At the same time, social organization of exchange shifts from the exchange of goods through the exchange of activities to the exchange of skills and knowledge. This is an economy of knowledge, where labour is not a commodity, but a share in the bulk of the resources of business and society, represented by the state. The main source of value is intellectual creativity, not the psychophysical efforts of an employee, the priority of development strategies — the production of knowledge and its effective application; the system creating relations of society is being democratized, consumption is transformed, the economy is becoming socially global, the type of subject, object and tools changes social production structures. The importance and size of the sector of organizing the economy on a non-market basis is increasing (for example, in the state mechanism, the growth of market approaches means the development of corruption). In addition, the novelty of the socio-economic structure lies precisely in the fact that it is often based on special productivity of mental labour, knowledge, which is embodied in the latest technologies [10-12].

The task of organizing relationships now becomes the fullest attraction: pro-social development and creative realization of individual talent (first of all, intellectual). In the organization of «humanized» relations, they try to move away from rigid oppositions between leisure time (creativity) and work time (production), based on the creation of conditions and opportunities for creative self-disclosure in process of

production itself. Thus, spiritual production becomes an important part of socio-economic systems, and socio-cultural intelligence is included in the core of competition. Accordingly, labour relations are becoming more and more prominent features not only of a significant direction of socialization / acculturation, but also a mechanism of self-expression, self-embodiment, realization of ideas about justice in individual and public life, public and private goals / interests.

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## PHILOSOPHICAL SCIENCES

### NON-ACADEMIC EDUCATION IN HUMAN LIFE

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The total filling of the educational space with academic education, which repeatedly imitates and distributes its own produced surprises, can not but lead to comprehension of the problems of the modern globalization processes' Ukrainian objective laws. The specifics of the organization of human life, its morality, everyday educational inclusion into the cascades of communicative models and stereotypes determine the formation of ethno-national consciousness, state patriotism, national dignity and self-esteem. The content and means of non-academic education, which fills a niche that has not absorbed academic education, in new historical conditions can provide the individual a great deal of opportunities for inclusion in political and economic life, to become a factor in the formation of a new Ukrainian personality that is consciously the creator of his state. Education now connects person to the set of potencies for inclusion in various kinds of systems, which are formed according to certain rules of the broad possibilities for innovations and used of interdisciplinary connections, allow creatively to approach the modeling of the structure of their professional work, to conduct a variety of non-standard personally oriented cognitive-educational orientations [3].

The role of education is manifested in how it affects the formation of personality. Many personality traits of man are determined not only by natural data, but also acquired in certain conditions of social life. Education regulates the personality and forms certain qualities. The features of this process depend on the educational environment itself, the structure of knowledge, educational technology and educational processes. Education is intended for the formation of professional consciousness. The most important qualities of a person that are determined by education are the formation of a person's value system, which, as it gains knowledge and skills, enriches and corrects a person's value system. Education combines humanitarian values with the professional, strengthens the effectiveness of certain types of values, motivates the social significance of human activity. The system of interests seeking a result is also influenced by education. Education expands the human capacity in setting goals for its activities and makes it possible and realistic to move towards this goal. This is due not only to the construction of a professional career, but also to the spiritual pleasure of man. Always a person strives for the joy of achieving something. Education changes the quality of human activity, increases its

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intellectual component. Only in the educational process can recognition and effective development of individual abilities of a person. Education, among other things, forms professional skills and skills, and thus determines the possibility and reality of obtaining a profession that plays a significant role in the labor life of a person.

The questions of the formation of modern non-academic education on the background of the established academic is not forced coercion, but a smooth connection of two currents for the purpose of a holistic, organic combination of the advantages of two universals. In Ukraine, non-academic education is currently actively developing, although, unlike the EU, there is no exact number of institutions, the direction of the programs being taught, and the number of people studying. There is also no information about the educational needs of citizens, how to evaluate the results of non-academic studies, to compare with academic. Without evaluation and comparison with the academic one, it is impossible to recognize the results of non-academic studies at the state level.

Non-academic education is in some degree opposed to academic, which does not prevent it from developing and gaining new forms. It rooted its positions in the history of education, becoming an integral part of her, and positioning as a traditional one. Accordingly, the problems of non-academic education of the individual, which do not reject the traditional problems of academic education, are put forward in the foreground. You can postulate these problems using a system-centered approach that is interconnected with a person-centered one. Person can be a center of value, provided that he has fully gained cultural and spiritual assets as regulators of his life [1]. In our opinion, this expression can be supplemented by the fact that the personality is integral if it has found the sphere of self-expression and has mastered all the necessary professional skills and characteristics for creativity in this sphere.

For modern academic education training is not only a priority with the help of perfect models, but also the formation of new knowledge, the creation of ideas about the exemplary, most skilful in education. The main task of academic education is the training of professionals, the creation and development of appropriate professional fields of science, the study of history, the development of theory and practice, on the basis of which are created scientific works that meet the requirements. Accordingly, modern trends in philosophy and pedagogy, academic education, as before, remains relevant and in demand, supported both by the state and non-state institutions. The usual learning can be creative, not torn away from the problems of real life, considered as the preservation of traditions, trends and changes characteristic of mass education. The desire to reject the achievements and new solutions that meet the requirements of modernity, lead to stagnation in educational thought.

Non-academic training is carried out by organizations that bring together people interested in this training. For financial gain in professional activities, questions may be asked that need to be addressed before entering an institution or going to courses. For example, for some individuals, it's interesting at first whether learning will bring real results, whether teachers are practitioners or scholars, why study, so that in the future it is guaranteed not to lose their job. Also, the ability of a person to adapt to a dynamic world, to study throughout his life, to radically change the specialization is

also relevant. New types of education that are constantly emerging may cast doubt on the traditional value of education, interpreting their achievements as the background of dehumanization. So the contradictions between academic forms of education and non-academic, which emphasize that various trends in education may be ambiguous, become actual. A variety of professional training makes it difficult for people to make a real choice. The further development of academic education can take place as a continuation of the traditional and as a departure from the norms and canons of modernization of society.

The process of professional formation of personality in non-academic education is influenced by factors that we can conventionally divide into two types: internal factors – a complex of individual characteristics of the identity, as well as social factors of motivating nature, which in their totality provide the intellectual and psychological formation of the character of the future specialist; external factors, which includes the educational activities of students and factors of the social environment of the individual, affecting the choice of profession. This may be the formation of family traditions, and the requirements of the state and society to certain practical activities, as well as the high social status of this profession in society, the desire to assert itself as a professional in the field of selected activities. There are factors opposite to them, which are also social factors, for example, the inability to obtain academic education, the desire for action, but lack of understanding of the need for certain special skills necessary for the profession [4].

In the future, it is planned to develop mobility of education, where non-academic education will be able to more accurately and guaranteed this task. Personality should have the opportunity to receive several lifelong learning at the same time, both academic and non-academic. One point of view should reflect the desires of different countries in terms of disability. The need for understanding a new conception of such educational and qualification levels as bachelor and master's degree has increased. It means that changes to the two-tier structure are not at all urgent and not obligatory, as the requirements of labor markets in different countries are not the same. Non-academic education may change as quickly as it does not depend on slow-moving state structures. Accordingly, the Bologna educational innovations require an immediate, in-depth renewal of core curricula. The competitiveness of most countries is understood positively as a person with interesting skills in the labor market [2].

The prospects for the development of the educational system of adult international organizations and governments of countries are associated with the development of special strategies and national programs, plans, as well as a consistent state policy in this area. Western governments are assisting in the development of various forms of adult education, understanding the importance of improving the skills of the workforce and matching the educational level of the population with progressive changes in various fields of technology, production, culture in general. The answer to the new professional needs of the economy was the special programs of professional training and retraining of the adult population.

So, non-academic education is a special type of educational activity, which is more oriented towards the acquisition of professional qualities, meets the requirements of



the modernity and tends to deviate from traditional educational institutions. It offers a new educational content that helps people of all ages adapt to transformations in society. By combining goals, principles and result, non-academic education, together with academic, help to maintain the balance of human development, improves the ability to realize the own potential. For this, it is necessary to rally and reconstruct theoretical and practical educational achievements regarding the determination of the personality structure for the search for priority strategies.

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## TOWARDS A METAPHYSICAL NEUTRALITY OF THE NEUROPHENOMENOLOGICAL AND NEUROPHILOSOPHICAL APPROACHES OF CONSCIOUSNESS STUDY

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Current cognitive science, which includes such variety of disciplines as neurobiology, philosophy of mind, cognitive linguistics, computer science etc., tells us that there is no consensus considering the exact connection between brain and consciousness. Everyone agree on the very fact of the existence of this connection. In spite of revolutionary discoveries in neuroscience of the last several decades (e.g. neuroplasticity, neurogenesis, mirror neurons, new understanding of the role of glia etc.), it is obvious that all of them have particular character – the puzzle remains even about the general mechanism of the brain work not to mention the relation of this work to conscious experience.

There are especially many battles considering the so called HPC – the hard problem of consciousness (e.g., Shear, 1997), which is a peculiar modification of classical mind-body problem, the sense of which is questioning of an ontological and causal status of a qualitative experience in relation to neural structures. Chalmers

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(2010), the author of the term HPC, says that there is a necessity of development of a new non-reductive methodology of study of consciousness [1, p. 3-58]. On the other hand, current materialism identifies consciousness with behavior or with some aspects of the processes or structures or functions of the brain, or with a functioning of a system of brain/organism in some specific ecological or social niche, etc. (e.g., [9, p. 53-82]). These are contested by different versions of dualism, emergentism, idealism, sophisticated forms of monism (such as neutral and anomalous), phenomenological approaches (see Westphal, 2016). It is useful to divide all these approaches onto objectivistic those which utilize only 3-d person point of view (let's call them *neurophilosophical*) and approaches that include 1-st point of view (let's call them *neurophenomenological*). We must consider both approaches if we want to construct really non-reductive and coherent theory of brain and consciousness. Such theory cannot be constructed pure mechanistically by adding one thing to another – actually this was the way by which diverse forms of dualism emerged, and as a reaction on them – different types of monism. It was Searle (2004) who indicated, that the mistake was to start counting in the first place [5, p. 88-89]. The problem is that we are talking about very different and yet very sustained phenomena that are incommensurable in a form they are usually encountered with. To begin with the solving of HPC these phenomena must be lead to a common denominator, the thing that is impossible to do with those phenomena directly, out of context, because these phenomena are just sophisticated constructs of some systems of representations and, at the same time, they are products of very specific conceptions and theories, approaches and methods. It would be heuristically useful to reduce all variety of systems of representations and knowledge on this topic to the neurophilosophical and neurophenomenological approaches. In the end, the theory of consciousness, we are talking about, can provide a solution for a consciousness/brain or mind-body problem. This task presupposes the applying of a non-reductive methodology of which the systems method is the most appropriate. Due to the fact that both of the mentioned approaches show themselves as structurally-closed systems with their own languages, subject matters and methods, their integration, if it is possible, presupposes a construction of a metatheoretic system framework. As a presupposition of such integration there must series of tasks be performed. One, we are talking about, is a task of an ontological neutralization of the approaches in question to align them in accordance with the principles of structural ontology, that is inherent to a systems method's metaphysics (e.g., Uemov, 1999). The usage of such metaphysically neutral ontology can be a way of escaping of the useless and disastrous «counting». Our task here is to show inherent possibilities of mentioned approaches to cohere with the principle of metaphysical neutrality.

Neurophenomenological wing of cognitive studies, without rejecting main results of neurophilosophical approaches, insists on non-reductive nature of consciousness. One of the main philosophical sources of this approach is Husserl's phenomenology (e.g., Zahavi, 2017) that has as its basic methodological procedure a so called phenomenological reduction, that, aside anything else, presupposes the acceptance of ontologically neutral phenomenological attitude (*Epoche*). According to

phenomenological philosophy, reality is represented in its relation to the perspective of an intentional act. The existence of an exterior, with regard to consciousness, world is not apodictic. In other words, the world beyond the directness of consciousness, which is realized in the noetic-noematic relations is questionable [4, p. 17-25]. In the end, reality is a construct that is constituted by the intentional acts of intersubjective community of transcendental subjects [10, p. 124-25].

Now let us look at a possibility of an ontological neutralization of a neurophilosophical approach. To accomplish it we can use a trivial example with a visual perception. Put simply, the process of visual perception is described as follows. The distal stimuli (photons, reflected from the surface of an object) during the 3-4 times per second interval contact the retina of an eye (constituting the proximal stimuli), are processed by special nerve cells, after what they proceed via visual nerve (which contains near a million of axons) to optic chiasm, from where nerve impulses transfer to the left and to the right parts of the thalamus. Eventually they find themselves at the occipital part of a cortex where they are transferred from V1 (their condition here correlates with the dynamics of proximal stimuli), through the cortical hierarchy, into secondary and tertiary parts of the cortex, where the «vision» of an object occurs. This oversimplified description of the process borders with incorrect. The problem is that one interesting detail is left out. We are talking about transmitting of nerve impulses through the chains of feedback from an occipital cortex to thalamus and to retina which are ten times more in backward then in forward direction (i.e. from retina to occipital lobe)! [2, p. 56-57; 3, p. 47]. This means that human beings rather guess or predict objects to be seen, than perceive them. Those predictions occur according to a system of invariant patterns of information about the object, with specific aspects of it, distributed in different parts of the cortex [2, p. 56-60; 3]. Seeing a particular object differs when you see it first time in your life or when that object or event is a trivial aspect of your existence. Specific aspects of an object, that you see, are unconsciously recognized by primary zones of an occipital cortex, assessed through the chains of feedback between thalamus and frontal, temporal, parietal and occipital cortex, eventually through the complex chains of categorization, that are based on direct and back relations between thalamus and different parts of the cortex (not to mention «emotional» parts of the brain), an object is categorized and differentiated from a non-object. In the end you can decide (consciously or unconsciously) how to behave in the particular situation. Perception of an object is distributed in different parts of the brain. Given that our neuronal resources are relatively limited, the process of categorization occurs through the system of neural nets in the tertiary zones of the cortex, which provide an invariant processing of neural signals, encode different aspects of the world perceived and impose an encoded sample or invariant when needed. It seems that the brain works under the principle of economy of neural resources. Mostly we are rather dealing with predictions or constructions of an object than with perception of it in a form of mirroring. The system of neural nets, encoding mentioned invariants, molds what can be called the inner model of the world [2, p. 53-66; 3, p. 125-29]. We can assume that this very model is a neural foundation of the assumption of the objective reality,

about which John Searle (1995) speaks a lot. According to his rather convincing arguments there can be no cognition without background presupposition of the objective (independent of our representations) reality [6, p. 177-197]. It is as if we are always dealing with a model of reality, constructed at a neural level, with which our representations are compared. It is naturally to assume that the prototype of that «inner model» is Reality or maybe many Realities or even levels of Reality – this changes nothing. Reality is not so much objective, ontologically speaking, as it should be objective in an epistemological sense. Categorical division into subject and object goes in two directions. In the same way as there can be no subjective without objective or interior without exterior – there is no objective without subjective. That is all attempts of reductionists to omit consciousness, using a subjective-objective (or similar) framework of categories, are hopelessly false from the very beginning. That is why some of them talk a lot about changing of a scientific language, to exclude the very possibility of speaking about consciousness.

Thus we are dealing with specific correlations between principles of neurophenomenological and neurophilosophical approaches regarding problematic nature of the world beyond phenomenological attitude and principled indirectness of data about the prototype of an inner model of the objective world, constructed at a neural level. Such understanding by itself demands rejection of the compromised natural (not neutral) ontological assumptions about consciousness and acceptance of the metaphysically neutral structural-ontological attitude, when study of consciousness is concerned. That methodological stance naturally correlates with a phenomenological attitude of neurophenomenology and with the presupposition of the necessity of objective world of neurophilosophy. This homomorphism is a crucial presupposition of the constructing of the non-reductive theory of consciousness on the metatheoretical system basis, which is our future concern.

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## **CULTURE OF THE XXI CENTURY. : FOOTBALL AS A QUASI-RELIGION IN THE «SECULAR AGE»**

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The modern era can be called «the age of sports», because the latter has taken a prominent place in society. It is no accident that it is a phenomenon of civilized life, one of the important elements of the system of values of modern culture, and in some cases even a mirror of social life.

Sports and physical culture are important elements of modern society, which have enormous potential for a positive impact not only on health, physical perfection, but also on the spiritual world, on human culture, on its outlook, emotions, moral principles, aesthetic preferences. as well as relationships between people, because sport is a cultural practice. According to Fed' V.A., – «cultural practices express worldview traditions in such modes of being as space, time, movement, becoming, and verify cultural creativity in materialization, material subjectivity, artifacts as the object and spiritual» body «of culture» [3, pp. 10–16].

After the last elections to the Ukrainian Parliament, Volodymyr Borodyanskyi, Minister of Culture, Youth and Sports of Ukraine, said: «We are accustomed to regard sport as a sport, but it is part of the culture, a model of behavior and an element of inclusion in society» [1]. This thesis clearly emphasizes the above.

In the study of sports, the analytical focus is on symbols. Both athletes and spectators express some symbolism, hold beliefs, and practice sports-related rituals [4]. In the XX century. There was considerable support for the claim that the sport was at least quasi-religious. It is often associated with certain rites or rituals. There are even theories that propose ritual as the basis of the origin of physical culture and sport – in particular, Reynack's theory or A. Gutt-Man's concept is outlined in his book, «From Ritual to Record.» We will not go into the archives of historical details, but let us recall that the Olympic competitions (games) of Ancient Greece were also part of religious activities.

But in the subject of this report, we would like to focus on one of the most popular sports – soccer (soccer). Football is the second most popular sport in the world after athletics (Association for the promotion of the international movement «Sport for All»). With more than three billion followers in the world, it has more followers than Christianity – the largest religion in the world with 2.2 billion followers (according to recent data, there are now 2.1 billion Christians in the world (World Population Clock)). This stunning statistic justifies the assumption that football has a huge impact on people's social life.

If one researched thoroughly, or at least closely followed, football, he would have to draw an analogy with religion or ask the question: «is football at least a quasi-

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religion?» According to Paul Tillich, a German philosopher and theologian, quasi-religion is an entity with an unintentional resemblance to religion or «a state of fascination with the utmost interest...» [2]. Football is reminiscent of religion in how it gives people a collective identity and purpose, and how they experience it through interacting with others.

Sociologist Emil Durkheim suggests that religion is the only system of beliefs and practices that unites its members into a single moral community, into a single collective identity. Football, similar to religion, also gives people a sense of collective (including national) identity. When they play national football teams, they not only play for the trophy, they play to prove pride in their national culture. For example, the rivalry between the Scottish and English, French and German national football teams is deeply rooted in the historical political battles between these countries. The whole point is to assert your identity.

The same is the situation with club football, which is accompanied by huge fan movements (ultras), which also follow certain rules and have a number of rituals inherent to them. Such thematic groups (fandoms) also have a set of attributes of a certain collective or group identity.

In addition, symbolic interaction is at the heart of football, as is religion. The symbolic interaction theory of sociologist George Herbert Mead argues that the value of objects, events, gestures, and behavior comes from the interpretations people give them (If Sunday was not the day of Jesus' resurrection, it would not be different from other days for Christians). This symbolic interaction is also present in the world of football. Football stadiums are not just regular playgrounds. It is interesting to think that sports stadiums and arenas are reminiscent of «temples where followers gather to worship their heroes and pray for their success» [6, p. 200]. They are often built with a deeper and symbolic meaning. For example, at the European Football Championship 2012 in Poland (Gdansk), the stadium «Energo-Gdansk» was built, which, according to the plan, resembles an amber that has long been mined on the Baltic Sea coast.

The most famous players of the game are immortalized in statues (Cristiano Ronaldo, David Beckham, Pele, Lobanovsky), which adorn the stadiums just as the statues of saints and prophets adorn the walls of most churches. Football stadiums, jerseys, statues and museums are all symbols that reinforce the principles and traditions of the game, increasing its popularity.

In addition, players are not just participants in the game. Their lives are the standards by which football fans lead by example and inspiration. Sociologist Christian Smith [5] is of the opinion that humans have a peculiar set of possibilities and characteristics that significantly differentiate them from other creatures (animals) on our planet. He argues that all people whose actions and institutions are composed, motivated and guided by narrative traditions and moral orders are inevitably dependent on them.

This theory is also possible with regard to the football community. Values such as hard work, sacrifice and passion displayed by players on the field are lessons that parents teach their children and the principles that young children admire. Players, in

turn, become «preachers» who support a public image that reflects certain values of the game.

For some fans, the inspiration and admiration of some football players can turn into idolatry. This is especially noticeable from the football fan base in Argentina, where the church was officially created to commemorate the great Argentine footballer Diego Maradona. In this «Maradona Church» the football player is worshiped as a god. His life is considered a pattern that provides guidance for followers just like Jesus' life for a Christian. This is obviously an extraordinary case of admiration, but it means that football creates a community where people can find goals and opportunities.

Although the game of football is strikingly reminiscent of religion, which may be a consequence of the secularization of society, they cannot be said to be identical. There are bases that are not enough to qualify as a religion. Religion refers to the concepts, rituals, experiences, and institutions that people build on their belief in the supernatural, otherworldly, or spiritual. In football, there is no belief system that is part of the world's major religions, such as Christianity. In addition, he lacks the supernatural formation that is the center of existence of the followers (higher cosmic order). Football fans may have their own religious affiliation, but they do not believe that the game is run by a universal supernatural being. Football may not qualify as a religion, but it largely resembles religion. That is why we can consider it a quasi-religion.

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## **POLITICAL SCIENCES**

### **POLITICAL OR POLITICAL CONTEXT OF THE LANGUAGE POLICY MODEL: TO DEFINITION**

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The concept of «political» is based on a phenomenon such as politics, which is an institutional constructive component of the construction of the historical-political structure of the model of language policy, which must be associated with the legal culture and order, which is the greatest good in the context of intense political struggle between different communities and their cultures. On this basis, the term «political» [politicos] should be understood as cautious, careful, diplomatic, concerning actions, actions, behaviors, etc. [2, p. 485].

The model of language policy in formation and development goes through a certain historical and political path, which is often governed by those who have a different understanding of the culture, language, history, customs, traditions of Ukrainians, and – more opportunities, authority, power, a powerful ideological and military force to control the linguistic and political space of the Ukrainian state. That is, the term «political» comes from the concept of «politics» [French. politique] and is closely associated with it [5, p. 506], including language policy. The dominance of one state over the linguistic and political space of another and the management of its community on the basis of another's language and culture implies, in A. Vysotsky's right mind, «the use of linguistic technologies, which are effective tools for regulating linguistic-political relations that rely on linguistic mechanisms, functioning in conversations and negotiations, in propaganda battles to gain and exercise power. Using technology, language is manipulated as a symbol for achieving unity and loyalty to the new government, forming its legitimacy and ideological guidelines...» [1, p. 138].

Politics, among other things, is the art of the possible, as well as the object and object of the study of political science. It also concerns political regime, political activity and participation, the pursuit of language policy, the formation or development of a model of language policy, and so on. Politics [from gr. the words political – public or public affairs], which arises together with the emergence of the state and coexists with it, is a concept which means relations, views (concepts) and actions in connection with a particular state system; the sphere of activity, the focus of which is the relations and actions related to the conquest, retention and use of state

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power, which is the most important category of policy and content of its activity, which is aimed at regulating linguistic-political conflicts with the help of national interests and values. In particular, M. A. Obushnyi, A. A. Kovalenko and O. I. Tkach are understood as politics of domination and subjugation between the state and its citizens, competition and direct struggle of citizens, social groups over the use of state power in their own interests, interaction and confrontation of public forces in connection with specific actions of state bodies [3, p. 477].

The political science context of the language policy model is a piece of text completed in a meaningful and essential way, which is formed on the basis of evolutionary-destructive, bio-geodeterministic, institutional and other. methodologies linking its parts (contexts) within the whole (model) as a whole organism, which is in continuous interaction in the conditions of periodic statelessness of a certain people, in particular Ukrainian. The term «political» comes from the category of «political science», which, in contrast to the concept of «politics», is a science that studies: politics, its laws of functioning and development of the political sphere of society and political life in the context of power and authority; socio-philosophical and ideological-theoretical foundations, language policy and its models, political relations, political systems, political culture, political institutions, political process, political behavior, etc. Political science is a science that studies the political world, the sphere of human activity, and so on [4, p. 606].

Therefore, based on the above, political science is aimed at analysis, expert evaluation and conclusions. It encourages the study of political systems and regimes, mechanisms for the struggle for power, methods and methods of subordination and enslavement of citizens. Therefore, the study of the political science context of the language policy model should be based not on the political context originating from the concept of «politics» but on the political science, which is based on political science as a science, which studies politics as a sphere of society, its processes and phenomena, and – language policy as an institution, the subject of which is the pattern of its formation and development. Institutions such as the state, its structure, power, its relations, political parties, public and political organizations, movements, their activities, political consciousness of political subjects, their political culture, interest, constructively or destructively influence the formation of the political model of the language policy. interaction, self-awareness, behavior, ideology, etc. Given the history of the formation and development of the Ukrainian state, the political science context of the language policy model is effectively developing and developing at the stages of state independence and independence. During the occupation of the territory of Ukraine by other states, the national context of the language policy model was hampered. In such a case, the model of language policy of the occupation power was imposed on the Ukrainian people by violent methods, which was formed on the basis of language and culture alien to Ukrainians. This happened in the days of domination in Ukraine of Polish, Russian, Romanian, Hungarian and others. regimes that imposed on ethnic Ukrainians their own model of language policy. As a result, the Ukrainian people have inherited a major linguistic and political problem that is part of a shattered identity, political culture, spirituality, unformed national consciousness

and idea. All these and more. the components of the language-political problem are splitting the Ukrainian politicians and the Ukrainian people as a whole by their linguistic-political and regional characteristics.

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## LAW SCIENCES

### SPECIAL PROCESSING TAX MODES: NECESSITY OF DISSOCIATION

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Contemporary tax law and tax legislation have been proceeded from the fact distinguishing two parts – general and special ones, the latter of which is represented by some particular tax payments (corporate income tax, personal income tax, value added tax, etc.). At the same time special approaches to taxation system are distinguished mainly in the form of special regimes and modes, and procedure for taxation of individual tax payments is to be properly formalized in the processional plan.

If scientific basis is taken up as the ground for the study of procedural nature of legal phenomena, modern scholars are increasingly justifying the independence of different types of legal process, and as a consequence the formalization goes there on for new procedural branches of law [1, p.139]. There is also an exception to the tax process, which is inextricably connected to the tax law and serves to implementation it through the appropriate tax process procedures.

Authors of the monograph «Legal Procedural Form. Theory and Practice» righteously note that «the procedural form takes place not only in the jurisdictional (law enforcement) sphere of application of the law regulations, but in some other spheres... Any branch of substantive law brings to life relevant procedural rules... specific procedural rules are needed, for example, in financial, labor, land and other branches of law» [2, p. 44]. In this case any integral part of a process is the procedure for the implementation of procedural legal relations.

Concerning the latter, there is a controversy in the scientific environment regarding the distinction between definitions of «process» and «procedure». Thus, in particular, according to A. P. Hetman «process» and «procedure» are equivalent phenomena not only because of etymological origin of categories like «process» and «procedure» are being identical, but also because the content of these legal concepts are settled by processing (and not procedural or procedurally-processing) norms of activity that have its own sequence and are aimed at achieving any kind of result [3, p. 125-126]. On the contrary, L. M. Kasyanenko believes that the process is being implemented through specific legal procedures and it is advisable to establish for them a special legal value that is to express their essence [4, p. 57].

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Thus, the procedure itself is a sequence of certain actions that has regulatory model of its development and is aimed at achieving certain goals [5, p. 100]. A procedural form (process) is a set of rules for tax procedures defined by the procedural rules of tax legislation, which guarantee clear and timely fulfillment of tax obligations as the main purpose of tax regulation [6, p. 110]. In this regard, M. P. Kucheriavenko notes that tax procedures are a fixed order of tax relations participants' behavior. At the same time, in his opinion, the tax process is a regulated sequence of actions to implement tax procedures. It is expressed through implementation of tax procedures, and implementation of legally significant actions based on the requirements of tax and procedural rules. The tax process is a real activity for the implementation of the order of behavior, which is reinforced by the prescriptions of tax procedures [7, p. 29].

Therefore, tax procedures are the part of the tax process, which are in use depending on the needs of non-jurisdictional form of activity whilst implementation of substantive tax regulations. Tax procedures for individual tax payments quite naturally have their differences, which are related to the peculiarity of a particular payment; but at the same time they must be generally subject to the general tax procedures that determine obligatory order for payment of taxes and fees, filling tax statements, exercising tax control, bringing to justice for violation of tax legislation. At the same time, the existence of some particular tax procedures causes the occurrence of such peculiarities of the tax process as the use of only some particular kinds of procedures, which may not be included into general procedures at some specific stage of taxation, but there are particular tax and procedural complexes for specific actions of taxpayers as well as tax authorities regarding particular tax payment [8, p. 29].

The mentioned above brings us to the conclusion that tax procedures being generally a part of the tax process are in use depending on the needs of the implementation of material tax rules, taking up certain procedures for the purpose set. In this case, the procedures are implemented precisely within the process which directly points out to it as the basis for the implementation of non-jurisdictional procedural activities of taxpayers and tax authorities.

Within this general process some particular processes are distinguished, being characteristic feature both for the entire basis of tax relations as well as for individual tax payments. Thus, the tax process generally covers a number of tax procedures that determine its content in the whole, which in the greater majority of cases of tax process represents the set of general procedures and special ones applied. They are determined by their nature and content (general procedures are regarded to all processional tax relations, and special one is in concern for individual tax payments only, that can be eligible in one case or another). Special procedural tax regimes consist of regimes of some particular tax procedures [9, p. 134].

O. M. Minayeva righteously notes that there are two levels of consolidation of the relevant tax procedures in the Tax Code of Ukraine. First, according to her vision, is about Section II of «Administration of Taxes, Fees (Mandatory Payments)» which contains set of procedural norms that make up a specific denominator for the application of tax procedures in each individual tax or levy. In her opinion, this is the

kind of general part of the procedural block of tax rules. Secondly, all relevant rules for each tax or levy are the particular level for fixation of tax procedures in the Tax Code of Ukraine. The availability of generic structure of Section II does not exclude the procedural peculiarities of realization of the type obligation for the corresponding payment, which is fixed by some sections of the Tax Code of Ukraine, starting from Section III [10, p. 257].

However, each tax payment is characterized by its own peculiarities, and accordingly procedural differences, which are being features to this one only, causing the real necessity for establishing peculiarities for the procedural regulation of certain tax payments. Keeping in mind that there are general and specific procedural regimes within tax legislation, where the latter one covers the very issue of individual tax payments, using tax procedures provided for by current legislation, the necessity for approaches to determine the structure of procedural regulation of such payments is to be raised up.

The limitation for them just up to procedures only seems counterintuitive, because they may be subject to various processes, both general and specific to individual tax payment groups, or only to a single tax payment (tax credit, social security tax, etc.). Taking this into account, it seems quite logical to distinguish the sub-systems within the special tax regime that are inherent in individual tax payments and cover some procedures intended for their procedural regulation. Sub-schemes of that kind may include both separate tax payment and a number of tax payments that have common features as well as their procedural regulation which can be made on a single procedural foundation.

Therefore, there is a need to dissociate particular special processional tax regimes within the special procedural regime, which is to allow to streamline properly the tax procedures used for individual tax payments and to unite the procedural regulation of such payments in order to improve the tax process as it is.

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## INTERNATIONAL CONVENTIONS AND NATIONAL LEGISLATION: USING PRIORITY

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Ukraine, like many other countries, is taking part in the international arena, concludes contracts, ratifies treaties. According to the paragraph 9 of the Constitution of Ukraine, current international treaties, which the Verkhovna Rada has recognized, are the part of national legislation of Ukraine [1].

The Law of Ukraine «About the ratification of International Labour Organization Convention № 132 (revised) of 1970 Holidays with Pay» provides the following: International Labour Organization Convention № 132 (revised) of 1970 Holidays with Pay, adopted by 54th session of General Conference of International Labour Organization on the 24th of June 1970 must be ratified with the following appeal: «Ukraine, according to the paragraph 15 of the Convention claims, that will take all the obligations towards people, who participate in employment in all spheres of economy, including agriculture» [2].

In Republic of Latvia all international agreements, which regulate legal issues, must be approved by the Sejm. While concluding the agreement Latvia can delegate part of the competence from state institutions to international institutions in order to strengthen democracy. Sejm can approve international treaties, which are the ground for delegation of part of the competence from state institutions to international institutions at the conference, where at least two thirds of deputies are present [3].

Latvia is a member country of International Labour Organization (ILO). Latvia has renewed its membership in 1991. Currently there are 42 ratified ILO Conventions in force. ILO has been created as a first specialized agency of United Nations (UN) in 1919 and nowadays it integrates 185 countries. The main target of organization – facilitation the social justice and recognition of international labour laws [4].

According to the paragraph 7 of the ILO Convention № 132 «every person taking the holiday envisaged in this Convention shall receive in respect of the full period of

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that holiday at least his normal or average remuneration (including the cash equivalent of any part of that remuneration which is paid in kind and which is not a permanent benefit continuing whether or not the person concerned is on holiday), calculated in a manner to be determined by the competent authority or through the appropriate machinery in each country. The amounts due in pursuance of paragraph 1 of this Article shall be paid to the person concerned in advance of the holiday, unless otherwise provided in an agreement applicable to him and the employer» [5].

Minister of Social Policy of Ukraine has given their explanation about use of the ILO Convention № 132.

Taking into account provisions of mentioned Convention and the fact, that concrete period of annual leave or its part is harmonized between an employer and employee in case of receiving it on short notice (in connection with family circumstances, health issues, etc.), employee can express his will about receiving wage in terms, determined by agreement between employer and employee [6].

This notion is rather problematic due to a number of reasons.

According to the Code of Laws about Labour of Ukraine:

If an international treaty or a contract, ratified by Ukraine, provides rules, different from national labour legislation, then rules of an international treaty or a contract must be used (paragraph 8<sup>1</sup>).

Conditions of labour contracts, that worsen the legal position of employees, comparing with labour legislation of Ukraine, are not valid (paragraph 9).

Salary for all the period of annual leave is paid no later than three days before the vacation starts (part 4 paragraph 115) [7].

The ILO Constitution regulates, that «in no case shall the adoption of any Convention or Recommendation by the Conference, or the ratification of any Convention by any Member, be deemed to affect any law, award, custom or agreement which ensures more favourable conditions to the workers concerned than those provided for in the Convention or Recommendation (part 8, paragraph 19) [8].»

Thus, part 4 of the paragraph 115 of the Code of Laws about Labour of Ukraine contains peremptory norm, which can't be changed by the parties of labour contract, then a labour contract, concluded by the employer and employee about other period of vacation pay, is invalid.

Chapter 19 of the Law about Labour of Republic of Latvia [9] mentions pays for work. According to the part 69, payments for work terms: ...(4) vacation pay and pays for work before leave are paid no later than one day before leave.

National legislation will take precedence over international convention due to mentioned above norm of ILO Constitution.

There are questions in practice about actual realization of the part 4, paragraph 115 of the Code of Laws about Labour of Ukraine, if an employee wishes (and employer doesn't mind) to take annual paid leave (part of the leave) against leave schedule (family issues, last-minute ticket, unplanned renovation). We consider, that in this case an employer can't be accused in non-compliance of the guarantee about vacation pay in three days before leave, if an employee's appeal is submitted 2 days before vacation. And if an employer cooperates, providing an employee with leave in period

he asks, then vacation pay can be paid in period, different from period of the part 4, paragraph 115 of the Code of Laws about Labour of Ukraine. It is thus useful to harmonize not only the period of leave by the employer and employee but the period of vacation pay as well.

In order to avoid misunderstandings with controlling bodies, we recommend to add the paragraph 115 of the Code of Laws about Labour of Ukraine with the part 5: «In case when an employee and employer reach agreement about taking annual paid leave (part of the leave) against leave schedule and /or more quickly (less, than 14 calendar days before leave), vacation leave is paid in term, agreed between an employee and employer but no later than the next part of the wage».

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## DIFFERENCES IN THE FUNDAMENTAL RIGHTS UNDERSTANDING: DOES THE PROBLEM IN THE EUROPEAN UNION EXIST?

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The social component in the European Union's policy is on the rise. Thus, the Lisbon Treaty clearly has it that the EU wants to have social Europe, and with this in view the following international legal tools will be used: the European Convention for the Protection of Human Rights and Fundamental Freedoms (hereinafter referred to as the Convention) and the European Social Charter. Thus, the EU shall take into account the interpretation of the fundamental social rights in the way suggested by the European Court of Human Rights (hereinafter referred to as the ECtHR).

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The practice of referring to the Convention is not new in the European Union. Before the Court of the European Union developed its own human rights catalogue in the Charter of Fundamental Rights of the European Union (hereinafter referred to as the Charter), it had been using the provisions of the Convention to which it attached great importance while considering respective case types. Thus, thanks to the pragmatic approach of this European institution, the Convention became a particularly convenient tool for protecting human rights, common for all the EU Member States, and played a special role at all the stages of the establishment and development of human rights protection in the EU, having transformed into an important factor of integration processes occurring in Europe. For example, just within the period from 1975 to 1998 the Court of the EU cited the Convention in more than 70 of its judgments [1, p. 645].

In spite of the fact that nowadays the Charter of Fundamental Rights of the European Union is the core element in the system of rights protection at the EU level, the Court of the EU cannot but work in accordance with the legal procedures adjacent to the Community in this field. Moreover, it must interpret fundamental rights in accordance with the constitutional traditions that are common for the EU Member States. In this context it is important that the content and the scope of the fundamental rights in the course of their interpretation by different European institutions do not differ. Efficient dialogue of the Court of the EU with national courts and the European Court of Human Rights constitutes a clear pre-condition for common understanding of the essence of fundamental rights in Europe.

Taking this into account, we are drawing attention to the provisions of clause 2 of Art. 6 of the Treaty on the EU. Under it, the Union joins the European Convention for the Protection of Human Rights and Fundamental Freedoms. Hence, the fundamental rights secured by the Convention and stemming from constitutional traditions that are common for the Member States shall constitute the general principles of the law of the Community.

Though the EU is not an official party to the Convention, the Charter and the Convention co-exist within *acquis communautaire*, with the only difference that the former is applied by the Court of the EU in connection to the actions of the European Union, while the latter – by the European Court of Human Rights in relation to activities of the Member States. However, after 2009, that is after the Charter of Fundamental Rights of the European Union became binding, the Court of the EU still keeps applying provisions of the Convention and the practice of the ECtHR, but only as an additional tool for interpreting provisions of the Charter [2, p.155].

By 2007 the practice of the Court of the EU on the protection of fundamental rights testifies to frequent use of the precedent practice of the ECtHR. And the Court of the EU has stressed the autonomy and priority nature of the legal system of the European Union in the protection of fundamental rights. In particular, in its practice the Court of the EU follows the trend of focusing exclusively on the Charter in cases related to fundamental rights. In spite of this, the Convention has been playing and keeps playing an important role in the legal procedure of the EU. *At the same time, it should be stressed that the Charter of Fundamental Rights of the European Union*

*has also influenced the interpretation of fundamental rights by the European Court of Human Rights.* Such mutual influence can yield synergy between these institutions. And the main goal of cooperation should be improved mechanism of fundamental rights protection in Europe in general. And the practice of the ECtHR should ensure external examination of the commitments of the EU Member States, while the activity of the Court of the EU would serve as an internal element of the mechanism of fundamental rights protection of the EU [3, p. 23-24].

Though the EU joined the Convention only in a declarative way, provisions of Art. 52 and 53 of the Charter fix clear rules for interaction between the Charter and the Convention. To be more specific, clause 3 of Art. 52 of the Charter indicates that if the Charter contains the rights secured by the Convention, then the sense and scope of those rights also correspond to the ones established by the Convention. At the same time, this clause does not envisage any obstacles on the way to ensuring a wider protection of fundamental rights at the EU level than the one established within the Convention. Thus, the necessary accordance between the Charter and the Convention are ensured, as well as similarity of understanding and application of fundamental rights in the multi-layered system of their protection, that now exists in Europe, is achieved. At the same time, there arises a threat for the autonomy of the EU law.

Prior to the conclusion of the Lisbon Treaty, the European Court of Human Rights in a number of its judgments substantiated the doctrine of equivalent protection of fundamental rights. And interference into the field of the EU competence, if the legal order of the Union ensures equivalent protection of such rights, must be limited. The ECtHR is convinced that equivalence of protection presupposes the possibility for appealing acts of the EU institutions, that infringe fundamental rights, in the Court of the EU. And equivalent protection itself for the Strasbourg Court stands for the protection that is commensurate with the one envisaged by the Convention, but not necessarily identical to it [4, p. 6].

The same as the ECtHR, the Court of the EU supports teleological approach that interprets the norms of the law on the basis of the goals set [5, p. 48]. In case with the ECtHR, the core goal of its activity is to ensure observance by the states of the rights provided for by the 1950 European Convention on the Protection of Human Rights and Fundamental Freedoms. And when it comes to the Court of the EU, there are several of such goals, including ensuring of the functioning of the common domestic market and simultaneous observance of human rights. Hence, the need for looking for a balance of confronting interests in each conflict. It would be unfair and wrong to state that human rights are not a priority for the Court of the EU.

To sum up, it should be stated that similar understanding of the content of rights enshrined in the *Charter of Fundamental Rights of the European Union and the European Convention for the Protection of Human Rights and Fundamental Freedoms* is extremely important. Absence of unity may lead to obstacles on the way to implementation and protection of respective rights as well as prevent further European integration.

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## THE IDENTIFICATION OF A LAWYER WITH A CLIENT THROUGH THE PRISM OF VIOLATIONS OF OTHER GUARANTEES OF THE PRACTICE OF LAW

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According to Art. 23 of the Law of Ukraine «On the Bar and Practice of Law» (as of 05.07.2012, № 5076-VI) [1], the professional rights of the lawyer, his honour and dignity are guaranteed and protected by the current Constitution of Ukraine [2], this Law [1] and other applicable laws of Ukraine, in particular: 1) interference with the activity of a lawyer, including any possible obstacles to the practice of a lawyer, is prohibited; 2) it is forbidden to insist and demand (require) a lawyer to disclose any information (documents) that are advocate secrets [3]; 3) it is forbidden to interfere with the legal position of the lawyer, in private (personal) communication between the lawyer and the client, as well as to identify the lawyer with the client [1].

Given the above, it should also be noted that, in recent years, in Ukraine, in view of the political circumstances, lawyers have to defend those guilty of forced crackdown of Euromaidan, persons involved in resonant crimes against members of the Revolution of Dignity, as well as represent different parties in court, in particular,

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persons to whom the provisions of the Law «On Purification of Power» (as of 16.09.2014 № 1682-VII) apply [4], terrorists and separatists, deputies of different levels, and persons subject to public condemnation [5].

In the context of this (as a result of the analysis of the Report of the Ukrainian National Bar Association (UNBA) on the violation of the rights of lawyers and guarantees of the practice of law in Ukraine for 2013–2018 [5]), it is found that today the identification of lawyers with clients takes place not only from the side of people and citizens of Ukraine or the media but also by some investigators, prosecutors, and judges in some cases, who are rather disrespectful to the lawyers who protect the aforementioned persons.

Given this situation, lawyers and legal specialists (experts) emphasize that the Law of Ukraine «On the Bar and Practice of Law» [1] prohibits identifying a lawyer with a client, that investigators, prosecutors, and judges must respect the rights of lawyers and also treat their clients with tolerance and in no way allow the violation of fundamental human rights and freedoms in accordance with the Constitution of Ukraine [2].

At the same time, it is determined that the identification of a lawyer with a client by pre-trial investigation body leads to the violation of other guarantees of the practice of law [5] established by the Law of Ukraine «On the Bar and Practice of Law» [1]. To confirm this statement, let us consider the real situations in this direction.

Thus, the UNBA Report for 2013–2018 [5] states that the provision of professional legal assistance to such clients (the above persons) by some investigators is regarded as the complicity of a lawyer in a crime. This results in that they summon a lawyer for questioning as a witness and in some cases even declare the lawyer suspected of committing a crime. In addition, it is found that in some (individual) cases, investigators also initiate searches of office premises or inspection of housing, other possession of a lawyer and, on the pretext of obtaining evidence of «criminal activity,» withdraw specific documents directly related to the lawyer's activities [5]. Against this background, the professional advocacy community emphasizes the problem of violations of lawyers' rights and guarantees of the practice of law in Ukraine.

Hence the important question: how to comply with the law and what should lawyers do in such cases? And we can also conclude: in the system of providing guarantees of the practice of law in Ukraine, the prohibition of identifying a lawyer with a client is one of the main and important guarantees of a lawyer's professional activity.

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## STATE ADMINISTRATION

### KYIV AS A CITY BRAND IN INTERNATIONAL INDICES AND RANKINGS: COINCIDENCE OR INEFFECTIVE LOCAL GOVERNMENT?

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For today, an effective city brand is a condition of its competitiveness. The brand of the city must correlate with a comprehensive city development strategy approved by the local government. The city brand can be targeted at both external and internal stakeholders, and its effectiveness can be evaluated by the various indicators on which the indices and rankings of cities are formed.

International indexes and city rankings reflect the current level of development of a city and define a comprehensive index by many criteria. The presence of a city in authoritative international indexes and rankings indicates the level of interest in it and is an assessment of its current level of competitiveness in the international context. In turn, the absence of a city in such indexes and rankings is a warning call, as it may indicate that the city's competitiveness is not recognized by certain indicators, making it difficult to attract investment and human resources, as well as positioning internationally.

In order to understand whether the international organizations and analytical agencies evaluate Kyiv as a competitive city in the global international arena, 23 international urban development indices have been analyzed. The most influential and large-scale cities listed include: Global Cities Index and Global Cities Outlook (A.T. Kearney, 130 cities) [2], City Travel and Tourism Impact (World Travel and Tourism Council, 123 cities) [6], Global Financial Centres Index 25 (China Development Institute (CDI) and Z/Yen Partners, 102 cities) [17], The Sustainable Cities Index (Arcadis, 100 cities) [3], World's Best Cities (Resonance Consultancy, 100 cities) [15], 100 Resilient Cities (The Rockefeller Foundation, 97 cities) [1], WCCD City Data for the United Nations Sustainable Development Goals (World Council on City Data, 56 cities) [11], City RepTrak<sup>®</sup> (Reputation Institute, 56 cities) [7] and Global Power City Index (Institute for Urban Strategies, The Mori Memorial Foundation, 44 cities) [21]. Unfortunately, there is no Kyiv in any of the above indices and rankings.

Furthermore, despite holding international image events aimed at developing Kyiv as a brand (such as the 2012 UEFA European Championship, Eurovision Song Contest 2017 and 2018 UEFA Champions League Final), Kyiv is also missing in

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indices that directly analyze city brands: Saffron City Brand Barometer [5], The Guardian Cities Global Brand Survey [13], Anholt-GfK City Brand Index<sup>SM</sup> [19].

In spite of the positive dynamics and increasing the number of foreign tourists up to 1 million 930 thousand per year [16], it is important to note that according to the Top 100 City Destinations (Euromonitor International), Kyiv is not included to the most desirable destinations for tourism, unlike Lviv, which ranks 80th out of 100 cities [18].

Nevertheless, Kyiv is included in some international indexes of cities, which are given in the table below:

#	Index/Survey/Ranking	Organization or company	Year	$\Sigma$	Kyiv
1.	Mercer Quality of Living Ranking [12]	Mercer	2019	231	173
2.	Quality of Life Index [14]	Numbeo	2019	208	172
3.	Cities in Motion Index (CIMI) [4]	IESE Business School	2019	174	111
4.	Global Liveability Index [9]	The Economist Intelligence Unit	2019	140	117
5.	Innovation Cities™ Index [10]	2ThinkNow Innovation Cities™ Program	2018	500	399
6.	European Green City Index [20]	Siemens and The Economist Intelligence Unit	2009	30	30

Key: Year – last available data,  $\Sigma$  – total number of cities

However, there are other points of view about Kyiv as a green city. For example, according to the Normalized Difference Vegetation Index (NDVI), which was created by satellite image processing, in 2017 Kyiv was recognized the «Greenest European metropolis» [8] with a population above 2 million people.

So, Kyiv is rarely mentioned in international indexes and city rankings, which may cause Kyiv to be perceived as a non-competitive city. Local governments and key government officials should pay attention on the absence of Kyiv in international indices and rankings. The issue of Kyiv's inclusion in that indices and rankings should be given high priority, because it also affects the perception of Kyiv as a city brand among the stakeholders.

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## ECONOMIC SCIENCES

### STATISTICAL ANALYSIS OF INCOME LEVEL POPULATION OF UKRAINE

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Indicators of household incomes occupy a central place in the system for determining and assessing the standard of living of people. Income of the population is not only the main source of material and non-material needs for personal development and the optimal tool for measuring the welfare of society, as well as the main source of the formation of purchasing power. Formation of cash incomes is carried out at the expense of labor remuneration of employees, payments from social funds (social transfers), business income, property income, from personal subsidiary economy and individual labor, other income (alimony, fees, inheritance, charitable help, etc.) [1, p. 379].

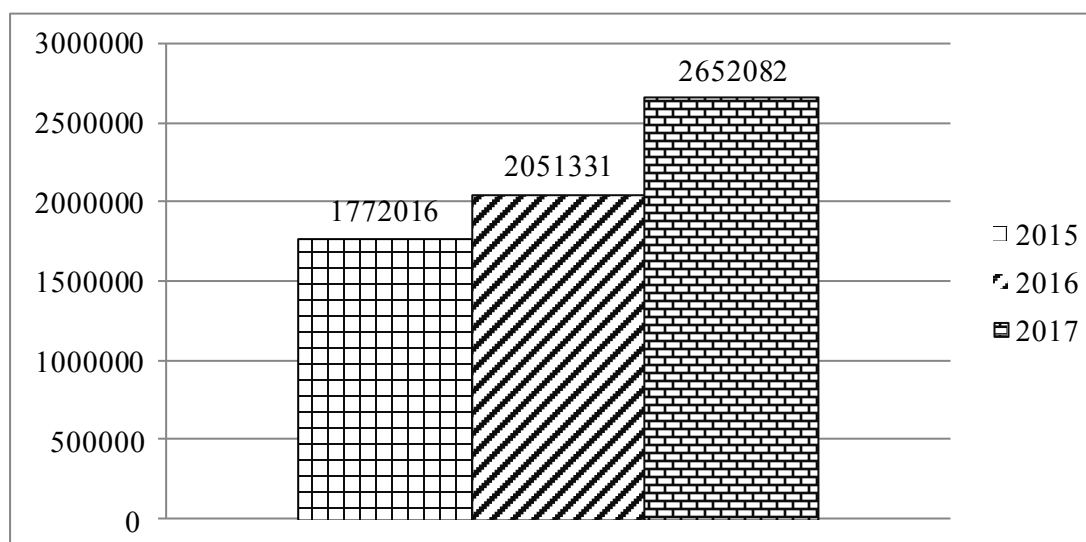
Ukraine is building a socially oriented market economy with an orientation towards European standards. An indicator of the efficiency of such an economy is the high standard of living of the population. Since the main component of the standard of living of the population is the financial situation, and the situation in the field of incomes is characterized by constant social tension, so scientific researches connected with the theoretical and practical aspects of incomes and living standards are extremely important.

The incomes of Ukraine in 2016 compared to 2015 increased by 15.16%, in 2017, compared with 2016, they increased by 29,28% (Figure 1 and Figure 2). In Vinnytsia region, household incomes in 2016 compared to 2015 increased by 17,99%, in 2017 they increased by 31,33%. In Khmelnytsky region in 2016, compared to 2015, incomes increased by 17,91%, in 2017 – 28.15%. In Ternopil region, in 2016, compared with 2015, incomes increased by 18,98%, and in 2017 – 29,59% [2, p. 156].

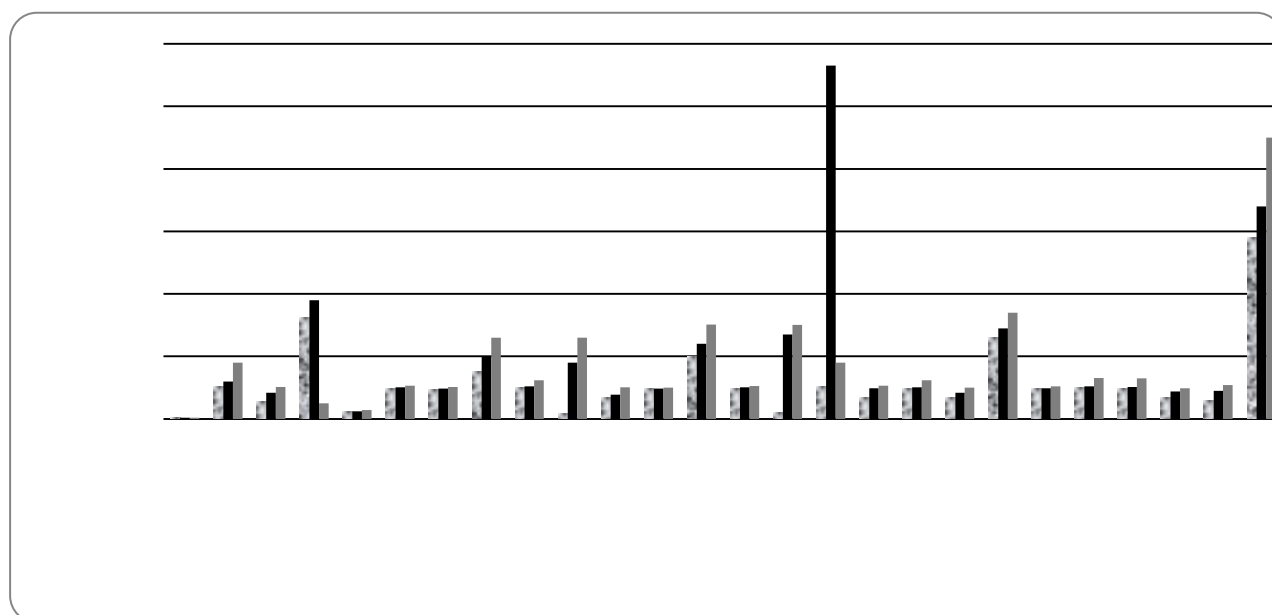
Inadequate legislation, shadow privatization of state property, unreasonable tariffs for most services lead to enrichment of a small number of people and impoverishment of the rest of the population. Therefore, it is necessary to carry out a reasonable and well-balanced policy of regulating the incomes of the population, successfully using the tools available for this purpose. The ability to measure living standards requires, first and foremost, an analysis of the incomes and expenditures of the population, as well as determining ways to increase and overcome inequalities in society [3].

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**Figure 1. The level of income of the population of Ukraine for 2015-2017**

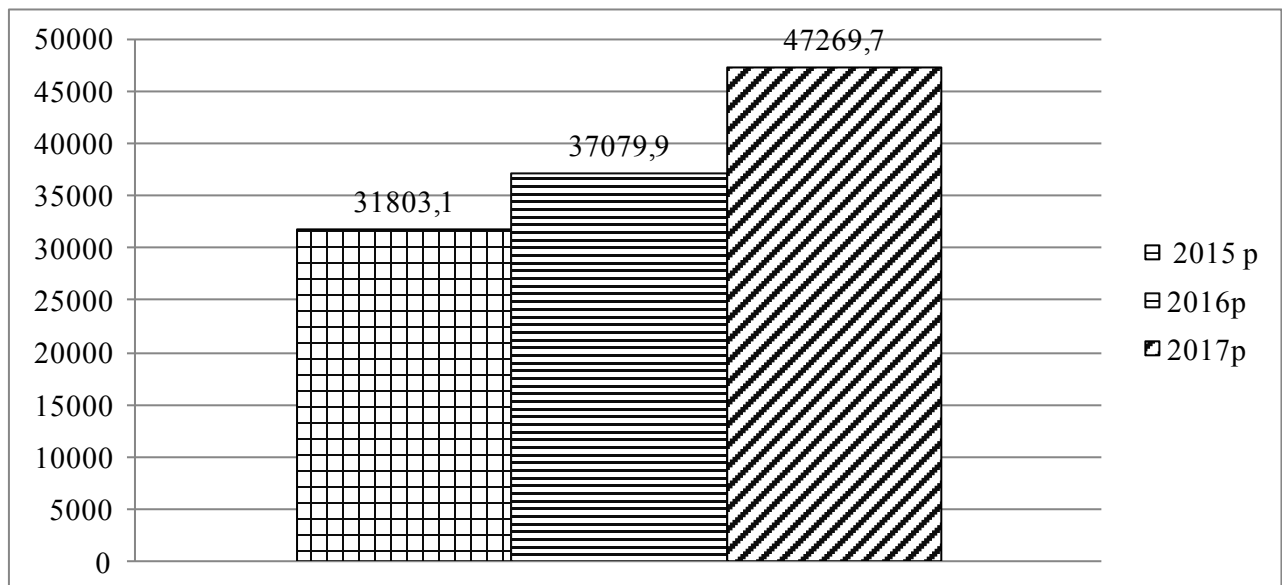


**Figure 2. The level of incomes of the population of Ukraine by regions for 2015-2017**

The current income that can be used by the population for purchasing goods in 2016 compared to 2015 has increased by 17,12%, and in 2017 – by 26,9%. In Vinnytsia region, income in 2016 increased by 20,0%, and in 2017 it increased by 28,9%. In Khmelnytsky region, this indicator in 2016 increased by 18,8%, and in 2017 – by 25,8%. In Ternopil region, disposable income in 2016 compared to 2015 increased by 17,9%, and in 2016 it increased by 27,6%.

The current income per person in Ukraine as a whole in 2016 increased by 16,6%, and in 2017 it increased by 27,5%. In Vinnitsa region, this indicator in 2016 increased by 17,8%, and in 2017 it increased by 30,0%. In Khmelnytsky region, income per capita in 2016 compared to 2015 increased by 17,4%, and in 2017 it

increased by 26,8%. In the Ternopil region, this figure in 2016 compared to 2015 has increased by 17,2%, and in 2017 by 28,4% (Figure 3).



**Figure 3. The level of disposable income per person for 2015-2017**

Real disposable income in% to the previous year by regions of Ukraine in 2016 compared to 2015 amounted to 22,4%, and in 2017 – increased by 8,9%. In Vinnytsia region this indicator in 2016 increased by 19.8%, and in 2017 by 9%. In Khmelnytsky region real disposable income in 2016 increased by 17%, and in 2017 by 7,5%. In Ternopil region, in 2016, real disposable income increased by 17,3%, and in 2017 it increased by 8.8%.

The incomes of Ukraine's population tend to grow. Also increases are available income and real disposable income. In percentages of income increase in the regions is more or less evenly. One of the reasons for increasing the income of Ukrainians can be considered an increase in GDP. Though Ukraine is in a very fragile state and is gradually developing towards the improvement of the economy. Need to improve the policy of income and expenditure, mainly due to increased incomes through pay, with the mechanism of improvement should provide [3, p. 160-162]:

- clarification of the subsistence minimum for the main socio-demographic groups of the population, taking into account regional differentiation and ensuring its functioning as a state social standard;
- improvement of the mechanism of contractual regulation of social and labor relations (by specifying the content of agreements and agreements);
- Adoption of new and improved system of current normative legal acts concerning wages, subsistence minimum, tax system of Ukraine;
- the formation of a clear and stable legal framework for the legal and effective functioning of all business structures, as well as the strengthening of the fight against economic crime and corruption.

The effective social and economic development of society is preceded by the choice of the model of the economic system of the state, which would ensure the rational use of

its financial and material resources, support of the most important strategic industries, ensuring the growth of GDP and, consequently, sustainable growth of the welfare of the population. In the conditions of a market economy, the problem of optimal correlation of market and state regulation mechanisms is central to this task, given the need to ensure, first of all, socially vulnerable categories of citizens.

An analysis of the causes of the current state of poverty in Ukrainian society shows that overcoming it should be through raising the level and quality of life of able-bodied people, and not just the poorest sections of the population. This requires a comprehensive system of measures and appropriate changes in social protection.

The solution to the problem of poverty and low social protection in Ukraine should be related not only to economic development, but also to the existing system of social values, the effectiveness of state institutions, the effectiveness of state governance mechanisms of social development, the effectiveness of cooperation between public administration, local self-government and society, citizens. Without systematic, strategic thinking, it is impossible to implement complex reforms, it is difficult to coordinate mutually-binding components of state policy, to shape the prospects of social development.

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## GDP VS WEALTH: MEASURING ECONOMIC WELL-BEING

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Paul Samuelson, Nobel Laureate, described GDP as «truly among the great inventions of the 20th century, a beacon that helps policymakers steer the economy toward key economic objectives» [1]. This statement was true for more than 60 years for economists all over the world, since invention of its modern concept by Simon Kuznets in 1937. However, the chief architect of the US national accounting system cautioned that GDP should never be confused with economic and social well-being. Despite this, after Bretton Woods Conference in 1944, GDP and GDP per capita became the key indicators of economic progress, used by the IMF, the World Bank,

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and the national accounting systems worldwide. However, times change, and the concepts for new measures of progress have emerged. Modern GDP criticism is generally explained by inconsistency of modern growth theories, facing new economic challenges: poor global economic growth due to increasing social inequality, wage growth slowdown, and emerging global climate risks. The problems with using GDP as a barometer go beyond masking inequality. Invented to complement the estimates of national income, facilitate wartime planning and to estimate the impact of the Great Depression, the GDP figure is a child of the manufacturing age – good at measuring physical production but not the services that dominate modern economies [2]. As the world economy transformed from manufacturing oriented to service and technically oriented, the value of the indicator diminished since it is no longer encompasses «the whole picture». This issue is particularly well described by Robert F. Kennedy in his speech at the University of Kansas, March 18, 1968: «Our Gross National Product...counts air pollution and cigarette advertising, and ambulances to clear our highways of carnage. It counts special locks for our doors and the jails for the people who break them. ... Yet the gross national product does not allow for the health of our children, the quality of their education or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials. ... it measures everything, in short, except that which makes life worthwhile» [3].

The first economist to question whether GDP accurately measures social welfare was Moses Abramovitz (1959). He cautioned that «we must be highly skeptical of the view that long-term changes in the rate of growth of welfare can be gauged even roughly from changes in the rate of growth of output». Abramovitz suggests that economists have normally operated by Pigou's dictum «that there is a clear presumption that changes in economic welfare indicate changes in social welfare in the same direction, if not in the same degree». However, he questions, what is the evidence that economic growth is positively associated with social welfare, i.e. happiness? [4, 5]. In mid-1980s, rapid GDP growth in resource-rich countries raised concern for monitoring wealth, especially natural capital, since the growth was achieved through its liquidation, leading to consumption that created no basis for sustained increase in wealth and human well-being. First steps towards GDP review as inadequate measure of economic well-being were taken in the early 2000s, mainly by Joseph Stiglitz, Nobel Laureate, who raised open discussion by his public call to put an end to «GDP fetishism» [6]. He observed that a business is always evaluated by both its income statement and its balance sheet (assets and liabilities, or wealth). Similarly, the true picture of economic health requires looking at both income and wealth. The economic performance of countries, however, is only evaluated based on national income; wealth has typically been ignored [7]. In 2008, the former French President Nicolas Sarkozy, dissatisfied with the current state of statistical information about the economy and society established the Commission on the Measurement of Economic Performance and Social Progress, or so-called Stiglitz-Sen-Fitoussi Commission. The Commission's report «Mismeasuring our lives: Why GDP Doesn't Add Up?» (2009) provided an extensive critique of GDP, with the two key messages:

«GDP is not a good measure of wellbeing»; «what we measure affects what we do: if we measure the wrong thing, we will do the wrong thing» [8; 9]. In general, current attempts to construct measures to reflect welfare can be divided into:

- *corrective/complementary measures*: national accounts indexes, such as GNP, GNI, GDP per capita to represent different dimensions of wellbeing which cannot be merged into one single metric;
- *alternative measures*: give an innovative interpretation of well-being and build new indicators to represent this concept. These include: the Human Development Index (HDI), the Gross National Happiness (GNH), the Happy Planet Index (HPI), and the Ecological Footprint EF. Each of these indexes include both income and non-income variables such as life expectancy, environmental indicators, measures of inequality etc.

However, as mention L. Chancel and D. Demailly (2015), there is no option to replace GDP entirely: «Beyond GDP indicators only rarely play instrumental role so far. The challenge ahead will be to develop theories and statistical work to enable an instrumental use of Beyond GDP indicators» [10]. In 2018, the World Bank achieved a breakthrough by introducing the comprehensive concept of wealth as a complementary indicator to GDP for monitoring sustainable development and country's welfare. The Changing Wealth of Nations 2018 report covers 141 countries over 20 years (from 1995 to 2014), and provides detailed methodology for estimation of national wealth structural components, i.e. natural, produced, human, and foreign capital [7]. The GDP/Wealth comparison table by key characteristics is given below:

Table 1

### GDP/Wealth comparison by key parameters

No.	Parameters	GDP	Wealth
1	Determination	<i>Economic output</i> : total amount of goods and services produced by country's residents over specific period.	<i>Country's balance sheet</i> : total value of country's stocks with either yields (income) or burdens and drafts (debts, taxation, indemnities, etc.) over specific period.
2	Interpretation	Quantity indicator of economic growth.	Quality indicator of economic and social wellbeing. Shows proportions between structural elements constituting national wealth.
3	Calculation Formula	$GDP (Y) = Consumption (C) + Investment (I) + Government (G) + Net Exports (NX)$	$Wealth (W) = Human\ capital (HC) + Produced\ Capital (PC) + Natural\ Capital (NC) + Net\ foreign\ assets (NFA)$
4	Accounting differences	Analogue to cash flow statement.	Analogue to balance sheet. Takes into account not only wages, but all assets (cash, investment, real estate, other assets) and nation's liabilities (mortgage, student loans, car loans, credit card balances).

5	Relationship to economic growth	Shows the growth of consumption, exports and public spending.	Displays changes in household income and savings rate. Serves as an integral indicator for sustainable development, reflecting the country's overall long-term resource and economic potential in the form of assets.
6	Applicability	Standardized calculation methodology included in SNA.	Absence of standardized methods for determining the indicator, complexity of calculation. Volatility due to dependence on human capital (key structural component).

Source: developed by the author

Therefore, national wealth accounting is crucial for tracking countries sustainability. The World Bank uses wealth and wealth per capita as «to be improved» indicators of sustainability, which can accurately measure economic progress and complement GDP.

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## RELATIONSHIP ISSUE BETWEEN BUDGETING AND MANAGEMENT ACCOUNTING

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At present the development of business processes of the competitive environment causes the urgent need for objective estimation of incomes and expenses not only at the end of a certain time interval, but also before its beginning. The distribution of activity spheres in the national economy has also raised an increased interest in the methods of identifying all reserves of the enterprise development during the planning stage of the production program. The main goal of the economic entities is to open and use these reserves, including the ways related to the development of such management practices as budgeting.

The solution of budgetary problems affects a number of important areas. Firstly, it concerns the problem of increasing competition among enterprises, which is due to the need to obtain additional competitive advantages, for instance, through more effective financial management. Secondly, each enterprise needs to find internal reserves to reduce production costs, justify optimal spending levels, and the need to optimize taxation. Thirdly, the importance of increasing the investment attractiveness of the company is growing. The essence of this aspect is that investors are more likely to finance enterprises with a high level of management organization.

The high interest in the issue of forming the budgeting system within the framework of management accounting is connected, basically with the improvement of the management system. In this regard, the questions of the theory and methodology of a new vision of management accounting techniques attract the attention of both practitioners and well-known scientists of this research area.

The peculiarities of the use of budgeting tools were investigated in the works of domestic and foreign authors. A great contribution to the development of management accounting, including budgeting techniques, has been made by such researchers as: V.V. Burtsev [1], N.V. Ruzhanskaya [6], T.P. Karpova [2], V.E. Khrutsky, D.M. Korkuna [3], O.G. Melnyk [4], V.F. Paliy, A.D. Sheremet, etc.

Among foreign authors published worldwide in this field it must be noted the works of R. Anthony, K. Drury, R. Mann [5], E. Mayer [5], M. Meskon, R. Shank, J. Shim, J. Riggs etc. However, a set of issues related to the peculiarities of the use of budgeting and management accounting techniques, their relationships remain open for discussion.

The strengthening of external and domestic competition caused by the introduction of domestic products into international markets has predetermined the need for deep changes in the management mechanism, which, in turn, can not be realized without increasing the control function of accounting and a real reorientation of the existing accounting models toward the interests of managers.

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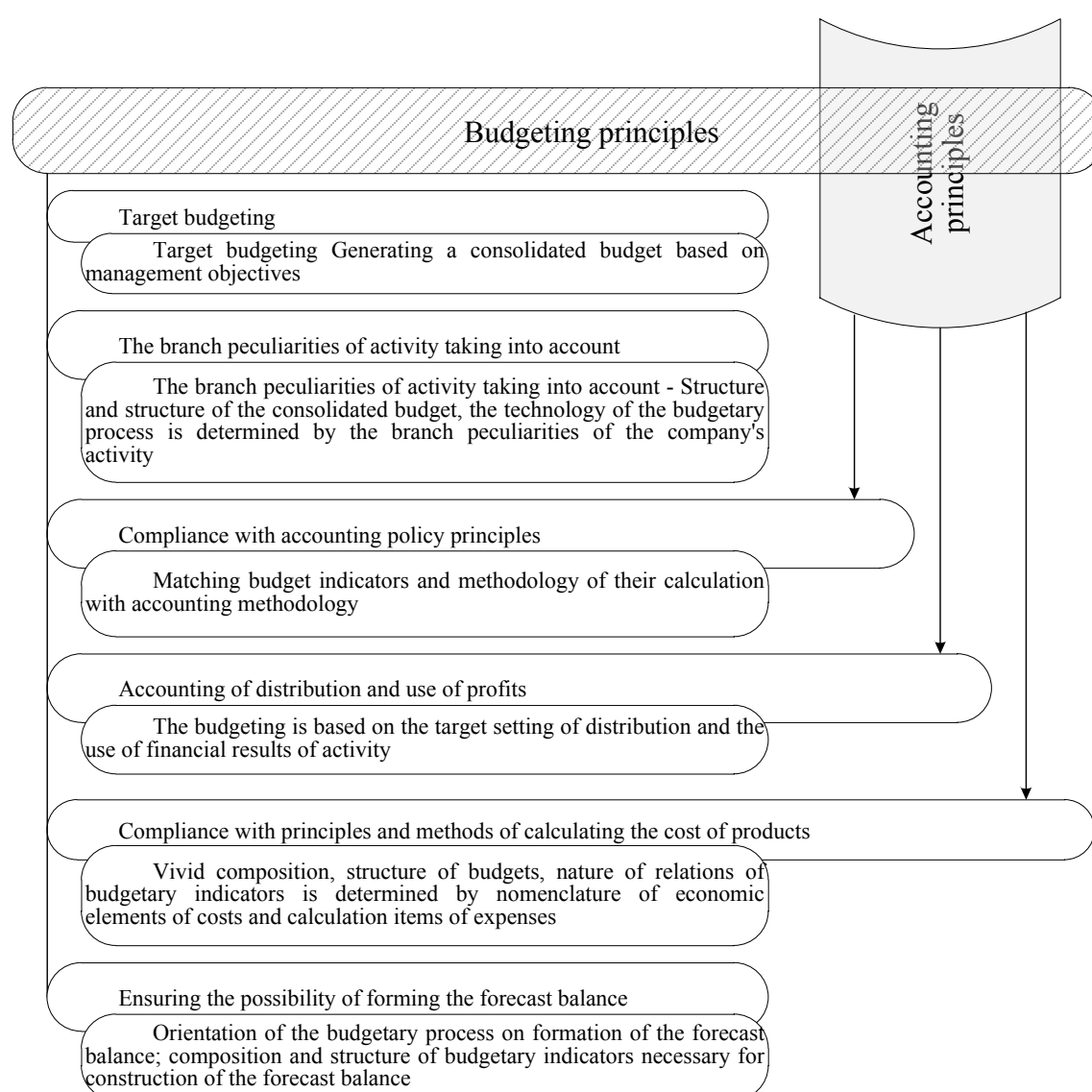
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The monitoring of budget execution is a necessary procedure and is carried out by means of a fact-finding plan. In this case, as the practice shows, the source of the factual information analyzed can be the data of both accounting and operational accounting which is sometimes called management accounting.

A practical approach has often demonstrates that management accounting is defined as a kind of accounting, which in addition is a way to separate income and expenditure by type of product, counterparties, responsibility centers and other analysts.

Management accounting registers built in accordance with the principles of the budgeting system provide information on the actual performance of the budget. For instance, there are budgeting principles [6] based on the principles of accounting for various directions of economic activity and specific objects of accounting (figure).



**Figure. The principles of the budgeting system in accordance with accounting principles**

Source: based on [6]

At the same time, the creation of two parallel accounting systems is not always an effective solution. The most optimal option is to create a corporate management system, when the accounting and control system at the enterprise is unified, the chief accountant is responsible for the organization of all accounting and operational data are reflected in accounting.

However, some researchers also include into the creation of a plan system some significant aspects. There are the regulation of the process of harmonization and approval of management documentation in the company, the creation of an organizational structure and official instructions, etc. Based on this approach, budgeting can be interpreted as a necessary part of management accounting.

Thus, budgeting and management accounting processes are part of one whole mechanism aimed at realization of internal business processes in the enterprise with the purpose of achievement of the set goals of functioning and fulfillment of its mission. Effective management of the market subject in modern development conditions is heavily dependent on the quality and speed of use of these components.

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## DEPENDENCE OF STAFF EFFICIENCY ON STRESS IN THE WORKPLACE

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Stress in the workplace, ranked by the International Health Organization as one of the major disease of the 21st century, was the subject of a report by the International Labour Organization in 2016. Globalization and technological progress are changing both the enterprises themselves and the relationships that arise in the process of economic activity. The global financial and economic crisis of 2008-2009 has led to increased poverty and unemployment. In 2009, global GDP fell by 2.3 per cent and the unemployment rate reached 199 million people. As a result, to remain competitive, many enterprises have moved to optimization measures: restructuring, mergers, outsourcing and contracting, and mass layoffs. These are all factors that, together with others, contribute to the stress of workers. In addition, the occurrence of stress, in turn, affects the economic performance of the company. Several professional organizations are engaged in studying the problem of workplace stress in the world: World Health Organization, The American Institute of Stress, American Psychological Association, etc. In Ukraine, the problem of stress at the workplace has several characteristic features: inadequate to the efforts and time spent on wages, unstable forms of employment, inconsistency of work and skills or knowledge, overtime work, unstable political and economic situation as a result of hostilities in the East of Ukraine, a large outflow of specialists abroad, the lack of a state approach to solving this problem. That is why the uncertain economic losses from the stress of Ukraine's weakened economy further slow down its growth rate. Thus, stress studies from an economic point of view are necessary to create favourable conditions for economic growth.

Any man's life is impossible without stress. Stress is part of our daily experience. In North and South America, according to the 1st Central American Health and Safety Survey, each of the ten workers is continuously experiencing severe stress – 12-16%, depression – 9-13%, loss of sleep – 13-19% of the causes related to working conditions. According to the statistics on injuries and occupational diseases, 14% of the financial assistance for disability in Brazil was due to mental illness, of which 9% were for men and 16.7% for women. Concerning the work-life balance survey, 57% of workers in Canada have experienced high levels of stress in recent years, compared to 54% in 2001 and 44% in 1991 [1]. At the same time, 36 per cent of workers were depressed, 31 per cent had reduced sleeping time, and 46 per cent felt physically unwell. At the same time, the number of people who are satisfied with their lives has decreased from 45% in 1991 to 23%. Finally, no more than 75% of workers were absent from work in the 6 months before the survey, mainly due to

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illness – 63% and emotional, psychological and physical fatigue – 45%. In Chile, stress and depression were reported by 27.9% of employees and 13.8% of employers. In addition, according to the Occupational Safety and Health Association, 21 per cent of the 4,059 occupational diseases in the country in 2012 were related to mental disorders. In the United States, according to a stress survey in 2015, the most common sources of stress were money – 64%, work – 60%, the economy – 49%, family responsibilities – 47% and concern about their health – 46% [2]. The data provided here illustrates the spread of stress in the world and its relationship to various mental and physical illnesses.

In European countries, most of the data are provided by EU organizations. According to the results of the EWCS survey of working conditions, stress at work is observed in 40,000,000 workers, which results in 50%-60% of working time losses, and the level of stress also depends on the main economic indicators, to which the Human Development Index and GDP per capita are known to belong. Thus, stress in the countries that joined the EU later on, Romania – GDP = \$10757, HDI = 0.811, Croatia – \$13138, HDI = 0.831, Bulgaria – GDP = \$8064, HDI = 0.813 is felt by an average of 30% of workers, while for the old EU member states of Luxembourg, GDP = \$105803, HDI = 0.904, Switzerland = \$80590, HDI = 0.944, Norway = \$74940, HDI = 0.953 – 20%. In these countries, about 23% of accidents are due to stress. In Ukraine, GDP = \$2582. HDI = 0.813, then 70% of the Ukrainian population is under stress and one-third of the population is under severe stress [3]. In general, having reliable data on stress, determined by the same methodology of conditions, it is possible to construct a regressive dependence of working time losses, or the level of stress depending on GDP per capita and human development index. The stress indicator can be used to predict economic parameters, such as labour productivity.

At more than \$120,000,000,000 per year, U.S. scientists have estimated the costs associated with the effects of stress on human health. This figure includes the effects of stress, such as reduced productivity, reduced working hours, and the cost of treating large numbers of nervous stress-related illnesses.

Thus, a comprehensive approach to addressing the impact of stress on economic efficiency is needed today, combining the assessment of the level of stress, the prediction of economic indicators and the creation of effective means of preventing it.

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## INDICATORS FOR ASSESSING THE REGULATORY POLICY OF THE DEVELOPMENT OF THE NATIONAL ECONOMY

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An important role in the economic system of each country is played by the state. This is associated with the fact that among the main functions of the state, there is the function of regulating the economic processes of society as a whole and the economic activities of economic entities in particular. The key to positive changes in the development of Ukraine's national economy is an effective mechanism for regulating economic development that is able to respond to a wide range of problems and challenges in a timely manner. In this context, the formation of an effective regulatory policy for the development of the national economy should be based, first of all, on the assessment of the existing level of development. This assessment is an essential and essential component of strategic planning, regulation, and management of national economic development.

The establishment of a balanced regulatory mechanism for the development of the national economy should be based on a comprehensive assessment, which is proposed to be carried out on the basis of a system of regulatory policy assessment indicators and its results in the form of two subsystems: indicators for assessing the development of the national economy (regulatory policy results) [1] and indicators for assessing changes in regulatory policy [2].

Before assessing, it is important to pay attention to the formation of a system of indicators, which will be used for the assessment, and to identify performance indicators.

The subsystem of indicators of the assessment of the development of the national economy is based on the indicators used by the World Bank experts in assessing sustainable economic development – Sustainable Economic Development Assessment (SEDA) – Figure 1.

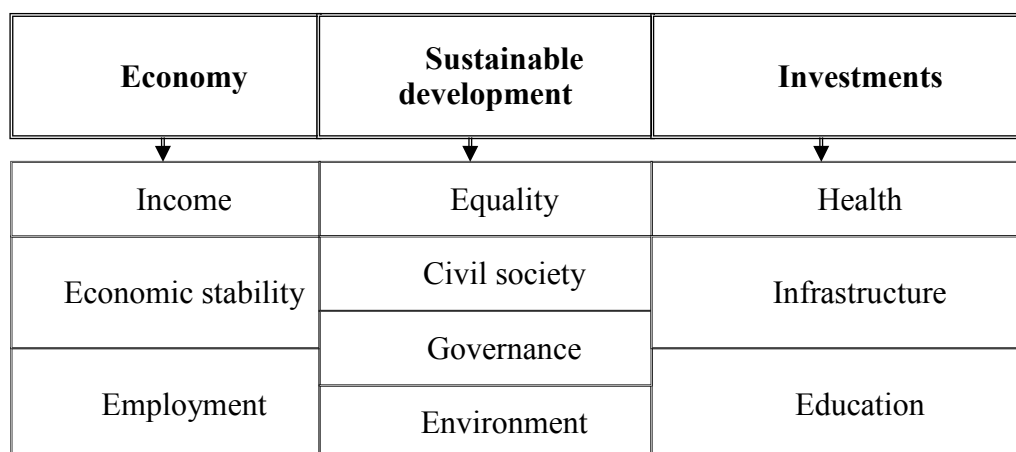
SEDA makes it possible to diagnose social and economic conditions of development based on indicators, which are grouped into three categories: economy, investments, and sustainable development [3].

The main goal of SEDA is to help governments to identify policy priorities and develop a national economy's development strategy aimed at improving the long-term social and economic well-being of citizens based on comparative analysis with reference countries [3]. In our view, the indicators used in the SEDA calculation most fully characterize development in comparison with other countries, and therefore, are suitable for individual assessment of the development of a particular country.

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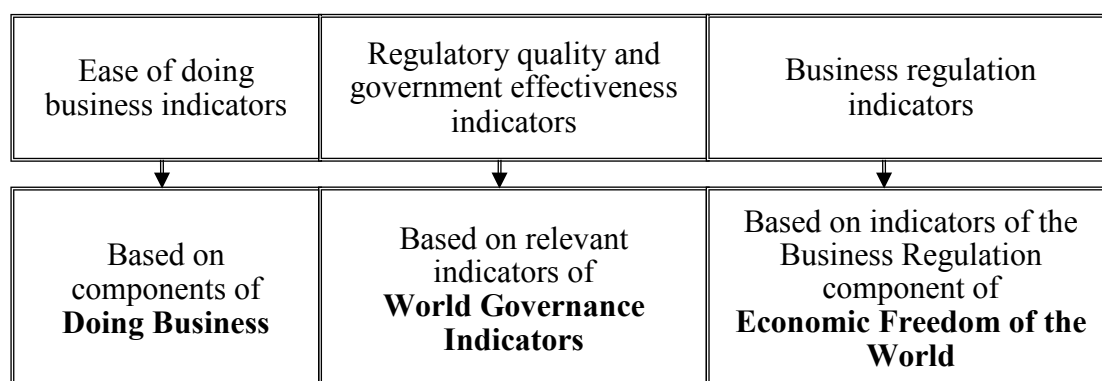


**Figure 1. The system of indicators for assessing the development of the national economy**

*Source: compiled based on [3]*

As indicated in Figure 2, it is proposed to include to the indicators characterizing the regulatory policy the following:

- components of the Doing Business ranking (each of these components in one way or another characterizes the regulation of the national economy): starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, enforcing contracts, resolving insolvency [4];
- two Worldwide Governance Indicators (these two indicators characterize regulatory policy in the country): regulatory quality and government effectiveness indicators [5];
- three indicators of the 5th component of business regulation of the Economic Freedom of the World rating: credit market regulations, labour market regulations, and business regulations [6].



**Figure 2. The system of regulatory policy assessment indicators**

*Source: compiled based on [4-6]*

The aforementioned components of the system of indicators (its subsystems) can be used as separate structural elements, on the basis of which comprehensive information about a particular process can be obtained:

- the subsystem of indicators for assessing the development of the national economy by sectors, based on which indices of change, which are further reduced into aggregate indices, are determined – serves as a basis for a comprehensive understanding of changes occurring in different areas, as well as highlighting problem areas;
- the subsystem of regulatory policy assessment indicators, based on which indices of change, which are further reduced to generalized indices, are determined – serves as a basis for obtaining information on how much regulation has improved or deteriorated for each of the areas of development.

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## **PROBLEMS OF MODERN ACCOUNTING OF FIXED ASSETS**

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For today one of the main problems of economy of Ukraine is overcoming output gap on domestic enterprises and maintenance of normal reproduction process on all its links. The main objective of the enterprises is increase in efficiency of use of material and technical resources of the enterprise in the conditions of an acute shortage of investment resources. The most important component of material and technical resources fixed assets.

On which accurate and rational accounting further process of reproduction, updating, replenishment and finally – security of the enterprise with competitive, modern labor instruments depends. Development of this direction of economy depends first of all on timely obtaining reliable, solid and full registration and economic information. In this regard, the role and value of accounting of fixed assets as important function of business management increases.

Fixed assets occupy the main specific weight in the total amount of fixed capital of the enterprise. From quality, costs, technological level of fixed assets, efficiency of their use depend resulting effects of activity of the enterprise: production, its prime cost, profit, profitability, stability of a financial position.

Increase in efficiency of use of fixed assets is one of the main questions during transition to the market relations [3]. The solution of this problem influences a financial condition of the enterprise, competitiveness of its products in the market.

In accounting the task to improve management and control of safety of fixed assets and strengthening of a financial condition of the enterprise, increase in efficiency of activity and reduction of risk of loss of means for unreasoned actions is assigned.

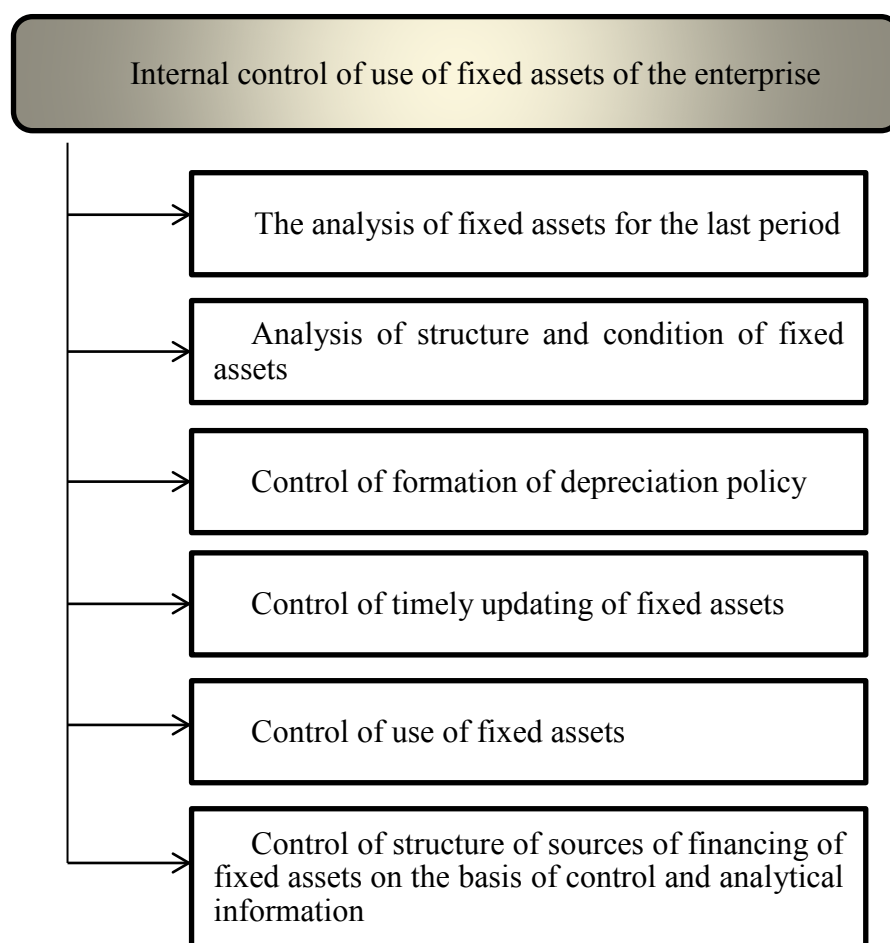
Some of elements of a control system of fixed assets of the enterprise is the economic analysis and audit [2, p. 71]. The analysis of existence and use of fixed assets is the main direction of the analysis in the long term as methodical receptions of the economic analysis allow to define in the presence of the small volume of information on results of activity of economic entity its potential opportunities, internal reserves which use will allow to reach positive changes in financial results of activity (Figure 1).

Control of effective use of fixed assets can be considered as a measure for reduction of the need for the volume of their financing and increase in rates of economic development of the enterprise due to rational use of own financial resources [1, p. 143]. Approach of carrying out internal control is considered allows to construct the rational system of control and auditing procedures of fixed assets that gives the chance, first, to create effective depreciation policy; secondly, in due time to reveal reserves of efficiency of use of fixed assets.

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**Figure 1. The sequence of internal control in management of fixed assets of the enterprise**

*Source: author's development*

Thus, in modern conditions of managing, a lack of financial resources, bankruptcies and elimination of subjects of managing and also considering the high level of moral and physical wear of the equipment of the enterprises, more than ever there is a problem of the most rational and effective use of fixed assets.

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## KEY INHIBITING FACTORS OF INNOVATION ACTIVITY IN UKRAINE

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In modern economy the innovative component of development largely determines the structure of the national economy, the quality of created products and services, as well as the efficiency of functioning on the global markets, export opportunities and share in world's monetary income.

Despite some successes Ukraine is still in the transformation process that influence development of the innovation component. The research demonstrates the presence of a complex problems in this sphere. First of all there is a lack of a unified national innovation system in Ukraine.

State regulation of innovation activity and creation of a favorable innovation environment can act as a influential factor in the market transformation of the economic sphere of society. This requires the creation of an effective mechanism for reconciling the interests of all participants of the innovation process through carefully considered economic measures.

All inhibiting factors of development of innovations in Ukraine can be conditionally divided into two groups: problems of the state level and problems connected with innovative activity of the enterprises. Summarizing the available researches, we can distinguish the following factors of inhibiting innovation process at the enterprise level: lack of own funds; high costs of innovations; insufficient financial support from the state; high economic risk; long payback period for innovations; low solvent demand for new innovative products; lack of information on markets; lack of qualified staff; lack of funds from customers.

As can be seen most of the problems at the enterprise level are related to the financial and infrastructural components of innovation activity. Unfortunately, the enterprise itself is not able to overcome all these barriers to innovation activity, so this insist the urgency of introducing new mechanisms for the cooperation of government, science and business.

The key factors of inhibiting innovation process at the state level can be divided into: problems of legislative support (availability of number of uncoordinated programs, laws and regulations; problems with protection of intellectual property; harmonization of legislation in accordance with international requirements, etc.) and institutional problems related to development and functioning of the innovation activity infrastructure, which currently does not cover all the links of the innovation process and does not have a systematic approach to provide relevant services in the field of innovation activity for participants of the process.

In order to solve problems related to the financing of innovations at enterprise level it is important to introduce special programs and create innovative institutions within

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the framework of innovation activity in order to find alternative sources of financing the innovation process, for example: special benefits for innovative enterprises; various forms of financial leasing; granting of state orders and control of the efficiency of the program-targeted forms for financing the priority directions of development. In our opinion, the development of innovative infrastructure and the establishment of its effective structure can give the necessary impetus to the rapid innovative growth of Ukraine.

Given the scarcity of investment and financial resources, it is advisable to focus on innovative development of specific territories of high technologies and productive areas. However it should be remembered that effective innovation process is possible only if there is a mutually beneficial partnership between government, science and business. Separately, neither the state nor business is able to move the economy to an innovative path.

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