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NATURAL SCIENCES

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RHEOLOGICAL AND PHYSICO-CHEMICAL PROPERTIES OF MOVING SANDS AND SOILS TREATED WITH POLYMER FIXINGS

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Summary: *Some questions of the creation and practical application of the new polymeric fixing agent's song drained bottom Aral epidemic deaths are considered in article. Synthesized lignophosphonats, got phosphoriling of lignin catalyst Fridel-Krafts. The composition and construction designed poliols were identified by using modern physic-chemical methods of the analysis.*

Keywords: *ground, poliol, recultivation, Aral Sea, lignophosphonat, construction of the polymer, sand, fastening.*

Mobile sands in the sandy deserts of the Aral Sea region are the result of aeolian processes caused by high wind speeds, an insignificant amount of atmospheric precipitation, sparse vegetation and a wide distribution of loose quaternary sediments. Moving sands under the influence of the wind leads to sand drifts, various structures, irrigated lands, railways and highways, etc. [1]. Despite the sufficient efficiency of mechanical protections, they have a significant drawback: they exclude the possibility of mechanizing the process of their installation, this affects their high cost and the pace of work. Therefore, it became necessary to search for new methods of fixing sands, allowing the mechanization of labor-intensive work. In this regard, the idea of using astringent fixing drugs appeared [2].

Each of the existing methods from a certain side characterizes the composition of sand and soil. The developed polyols of the AAA series were experimentally tested on the drained bottom of the Aral Sea in order to combat wind erosion. Before irrigation, the bottom of the irrigation furrows was treated with polyols "AAA-1", "AAA-2" and "AAA-3" in the amount of 10-50 kg / ha. This protected the surface of the fields from being washed away and contributed to an increase in plant growth by 15-20%. These polyols are highly water soluble. The developed polyols were studied in the laboratory of the Department of Ecology and Soil Science of the Karakalpak State Institute named after Berdakh. Their main sand-fixing properties have been determined: mechanical strength, wind erosion resistance, filtration rate and degree of penetration of polymers into sand, etc. According to these properties, polyols "AAA-1" and "AAA-2" do not differ significantly from "AAA-3". The area was treated by irrigation at a rate of up to 3 l / m2. Field experiments have shown that polyols completely prevent cracking of the mud cake after drying, and the crust does not interfere with the growth of young shoots, it increases the sand's resistance to deflation. The mechanical strength of the filter cake with polyol is 8-12 times higher than without it. There is always a high moisture content under the crust with a favorable temperature regime. All this creates the conditions for the normal development of the plant. To fix the sands and combat wind erosion on light soils, water dispersions of AAA series polyols were used. When applied to sand, a solution in a concentration of 2 to 16% and a consumption of 3 l / m2, the depth of impregnation of the sand layer is 7-18 mm. The bursting strength of such a crust is 1.2-3.6 kg / cm2. In the summer months, the temperature under the crust was slightly lower than in the control.

The best results were obtained when diluting solutions of AAA-1 and AAA-2 polyols with used motor oils ("AAA-4") in a ratio of 1: 5 or 1:10. When applied to soils of 100-150 kg / ha of

such a mixture in a concentration of 1.2-3.0%, the treated surface resists wind speeds of up to 20 m / s.

Laboratory tests of the developed composition "AAA-4" have shown their good sand-fixing properties. At small doses, a wind-resistant and water-resistant crust is formed. A crust with sufficient mechanical strength forms on the sands. Recommended dose: for "AAA-4" 100 150 kg / ha dry matter.

To spray the polymer composition "AAA-4", the composition was dissolved in water to 0.4-0.6% concentration, which corresponds to 15-40 tons of solution. Experiments have shown that at such dosages, a wind-resistant and very strong sand crust is formed. For its complete destruction, 80-150 mm of precipitation was required.

With this concentration and dosage, the thickness of the fixed layer is 8 mm, the punching strength after 4 months reaches 18 kg / cm2, the service life of the crust is more than three years. On the basis of mechanical (granulometric) studies carried out with the help of special sieves, as well as by the pipette method, the relationship between the size of particles and the rate of their sedimentation in water has been determined. According to the results of these studies, we were able to establish that when processing sands with polyols "AAA-1" and "AAA-2" by the content of clay and sand, the soil can be attributed to loam, and when processing with polyols "AAA-3" and "AAA-4" a system similar to sandy loam is formed.

Based on the application of the chemical method, the chemical composition of mobile sands and soil has been established. The determination of the total content of many elements (C, N, Si, Al, Fe, Ca, Mg, P, S, K, Na, Mn, Ti) was carried out using gross and elemental analysis. Another important component of the chemical method is the analysis of the water extract, which is especially important in the study of saline soils. The results of this study showed the content of water-soluble substances: sulfates, chlorides and carbonates of calcium, magnesium, sodium and other elements. Also, this method revealed the absorptive capacity of sands and soil. With its help, the provision of soil with nutrients after treatment with polyol fixers of the AAA series was determined. It was found that when processing sands and soil with polyols "AAA-1" and "AAA-2" the amount of nitrogen, potassium, phosphorus compounds assimilated by plants is greater than with polyols "AAA-3" and "AAA-4", which in all likelihood associated with the chemical structure of polyols. The results of this study contributed to the determination of the soil's need for fertilizers in the studied fields. On the basis of the chemical method, the fractional compositions of soil organic substances, forms of compounds of the main soil components, including microelements, have been studied. Using the agrochemical method, the main indicators affecting the level of sand and soil fertility have been determined. These studies have shown that when processing sands and soil with polyols "AAA-1" and "AAA-2", the moisture content, organic matter content, indicators of hydrolytic acidity, pH of the salt extract, as well as the level of nitrate and ammonium nitrogen, mobile forms of phosphorus and potassium increase. , in comparison with polyol "AAA-3". This is primarily due to the presence of lignin in the composition of the polyol, as well as the chemical characteristics of the AAA-1 and AAA-2 polyols.

Using the mineralogical method, the amount of minerals contained in the soil, both primary and secondary, has been determined. This made it possible to study the genesis of the soil and its physicochemical properties. The study of the distribution of minerals in the soil was carried out by the method of thin sections, and their quantity and change in the process of soil formation was established by the immersion method. The conducted microbiological analysis determined the content of the microflora of sands and soil. Basic requirements for sampling are established in GOST 17.4.4.02-84. "Protection of Nature. Soils. Methods of sampling and preparation of samples for chemical, bacteriological, helminthological analysis ". For soil analysis in bacteriological laboratories, the material was collected according to a specific method. These studies were carried out in the "Bacteriological laboratory" of the Tashkent Medical Academy. The studies carried out made it possible to get an idea of the biochemical properties of the soil and its biological activity. In the course of the study, the number of representatives of the main groups of soil microorganisms,

fungi, bacteria, amoebas, ciliates, soil algae, etc. was established. The consolidation of the surface cover of the saline sands of the Aral Sea region was carried out using the developed polyols at a concentration of 0.1; 0.3; 0.5 and 0.7%. The germination of salt-resistant seeds was studied on the sand fixed by the polymer composition (for example: wheatgrass - Agropyron cristatym and wormwood - Artemisic ferganensis). The influence of the developed fixers (series "AAA") on the formation of water-resistant aggregates - VPA, as well as on the value of the compressive strength are given in table. 1 and 2.

Table 1 shows the results on the effect of fixing additives on the formation of water-resistant aggregates (WPA), and in table. 2 - on the mechanical strength of the surface crust. As you can see, the value of VPA for sand without a fixing additive is a low value - 65.81%. Spraying the sand surface with an aqueous solution of "AAA-1" polyol at a concentration of 0.1 and 0.3% slightly increases the strength of the structure and the number of VPA (strength 0.723 - 0.78 MPa and VPA 29.68-29.96%) for 0 , 1% solution of polyol "AAA-2"; strength 1.39 - 2.24 MPa 42.23-49.22% for a 0.3% polyol solution, respectively). At a concentration of an aqueous solution of polyol "AAA-1" of 0.5 and 0.7%, the strength of the resulting structure was increased to 3.42-3.19 MPa for a polyol concentration of 0.5% and up to 3.34-4.24 MPa for polyol concentration 0.7%, as well as the number of VPA 67.14-72.26% and 73.13-79.26%, respectively. It should also be noted that along with an increase in the total number of water-resistant aggregates (WPA), their size redistribution also occurs. If a 0.1% solution of AAA-1 polyol is characterized by the predominant formation of aggregates 0.25-0.5 mm in size, then for a 0.5% and 0.7% solution of AAA-2 polyol, vice versa , large aggregates with a size> 2.5 mm prevail. This indicates that when the saline sands are consolidated with complex additives, the surface layers of sand pass from a free-dispersed state to a coherently dispersed state by forming a crust structure consisting of water-resistant macro-aggregates of particles.

Table 1

№ i/o	Compositions of fixing additives	Number of VPA,% by fractions, mm				VPA amount, %	Average values of VPA,%
		> 2,0	2,0-1,0	1,0-0,5	0,5-0,25		
1	No additive	-	-	1,25	5,18	6,33	6,50
2	No additive	-	-	1,26	5,22	6,57	
3	No additive	-	-	1,21	5,38	6,49	
4	AAA-1 0,1 %	1,96	0,94	3,28	25,42	29,29	43,46
5	AAA-1 0,3 %	15,62	1,46	7,34	16,42	45,42	
6	AAA-1 0,5 %	38,66	12,64	10,28	10,26	65,24	
7	AAA-2 0,1 %	1,42	0,96	3,02	23,53	28,23	44,15
8	AAA-2 0,3 %	14,66	1,64	7,96	14,65	43,24	
9	AAA-2 0,5 %	36,46	12,42	10,44	11,34	62,12	
10	AAA-3 0,1 %	1,65	1,02	3,26	23,46	24,80	46,33
11	AAA-3 0,3 %	15,06	1,28	7,58	16,42	44,11	
12	AAA-3 0,5 %	36,34	11,26	10,12	10,57	63,69	
13	AAA-4 0,1 %	1,49	1,58	3,38	25,13	22,12	42,46
14	AAA-4 0,3 %	14,90	1,99	8,12	14,12	46,98	
15	AAA-4 0,5 %	36,68	12,14	10,44	9,98	64,06	

Table 2

Influence of polyol-fixing agents on the strength of samples of saline sand of the Aral Sea region (water-solid ratio 1: 4, cubes 3x3x3 cm)

№ i/o	Polyol fixers		Compressive strength values, MPA	
	Name	Polymer concentration	Experienced	Average

1	AAA –1	0,1	0,84	
2	AAA –1	0,3	3,87	4,63
3	AAA –1	0,5	9,64	
4	AAA –2	0,1	0,81	
5	AAA –2	0,3	4,24	4,31
6	AAA –2	0,5	8,98	
7	AAA –3	0,1	0,82	
8	AAA –3	0,3	4,03	4,13
9	AAA –3	0,5	8,85	
10	AAA –4	0,1	0,91	
11	AAA –4	0,3	3,93	4,95
12	AAA –4	0,5	9,02	

In general, the studies carried out show that the developed polyols of the AAA series based on local secondary resources and waste, in doses of 0.1-0.5% of the mass of sands and soil, are an effective means of affecting the structure of soils and increase the content of agronomically valuable water-resistant aggregates. larger than 0.25mm by 20-100% or more. This has a positive effect on other physical properties of the soil - water permeability, density, porosity, moisture capacity, erosion resistance, moisture evaporation, microstructure, rheological characteristics. We have found that the most effective and economical way of introducing fixers is to spray them over the soil surface in the form of aqueous solutions. At the same time, small doses of drugs (about 10 kg / ha) contribute to the aggregation of sandy ESPs in the form of thin crusts and their reliable protection from deflation. The number of aggregates with high mechanical strength (2-4 kg / cm2) reached 13-17% of the mass of sand with a significant proportion of water-resistant aggregates (78-95%) in the case of processing "AAA-1" and low water resistance (less than 5% of aggregates) for hydrophilic structurers "AAA-2" and "AAA-3".

Treatment with polyols reduces the height of capillary rise in dry sand - "AAA-1" by 3 times (from 20 to 6 cm), "AAA-2", "AAA-3" and "AAA-4" by 20-30% with simultaneous decrease in lifting speed. The intensity of the downward movement of moisture also decreases, especially in the state of soil saturation with water: the filtration coefficient under the influence of AAA-1 and AAA-2 decreases 4-8 times, and “AAA-2” and “AAA-3” - 2.3 times. In proportion to the concentration of polyols, the water-holding capacity of sand increases, and even small doses of drugs (0.1-0.15%) increase the equilibrium moisture content at a capillary pressure of 0.6 atm from 1.5-2 times for AAA-1 to 2-4 times for "AAA-2", "AAA-3" "AAA-4". The effect on the rate of evaporation and conservation of moisture is ambiguous and depends on the dose of polyols and the stages of soil drying, however, at the stage of slow evaporation, all preparations introduced in doses of 0.1-0.15% of the mass of sand reduce the rate, increase the time by 1-3 days desiccation and 1.5-2 times the amount of moisture remaining in the soil. At the same time, it was noted that under the conditions of a washing regime (irrigation), a serious factor limiting the positive effect and aftereffect of drugs is their removal with a stream of filtered moisture, reaching 16-17% for "AAA-1" and "AAA-2", 30- 35% "AAA-3" and 62-63% "AAA-4" when washing a 25-cm layer of sand with 200 mm of water.

The reactions of soil boiling have also been investigated. The reaction that occurs when hydrochloric acid acts on carbonate (lime-containing) soil. When drops of a 10% hydrochloric acid solution are applied to the carbonate layer of the soil, the soil boils in the form of bubbles from the emitted carbon dioxide. Thus, the conducted studies of the structure and physicochemical properties of mobile sands and soils treated with polymer fixers showed that the developed new polyol fixers for sands and soils are effective means in combating water and wind erosion of soil in the Aral Sea region.

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Rezyume: *Maqolada Orol yarim orolining qurigan tubi uchun yangi polimer fiksatori tarkibini yaratish va amaliy qo'llashning ayrim masalalari ko'rib chiqiladi. Lignofosfonatlar sintez qilindi, Fridel-Krafts lignin katalizatorining fosforlanishi olindi. Ishlab chiqilgan poliollarning tarkibi va dizayni zamonaviy fizik-kimyoviy tahlil usullari yordamida aniqlandi.*

Резюме: *В статье рассмотрены некоторые вопросы создания и практического применения композиции нового полимерного фиксатора осушенного дна Аральского полуострова. Синтезированы лигнофосфонаты, получено фосфорилирование лигнинового катализатора Фридель-Крафтс. Состав и конструкция разработанных полиолов определены с использованием современных физико-химических методов анализа.*

Kalit so'zlar: *tuproq, poliol, melioratsiya, Orol dengizi, lignofosfonat, polimer konstruksiya, qum, mahkamlash.*

Ключевые слова: *грунт, полиол, рекультивация, Аральское море, лигнофосфонат, конструкция из полимера, песок, крепление.*

CHARACTERISTIC FEATURES OF THE ORDER OF BLUE BIRDS

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Summary: *The article smears the characteristic features of the representatives of the order of the pigeon-like. Dove-like birds are an ecologically plastic group of birds, as they quickly adapted to the ongoing anthropogenic changes in the natural environment.*

Keywords: *transformation, sinanthropus, urbanization, family, garbage, plastic.*

The order of pigeons (Columbiformes, Columbinae) cover different classifications, one or more families. Counts up to 360 species. Representatives of the detachment are found everywhere, feed on seeds, fruits, animal food.

Due to anthropogenic transformation of natural landscapes, deepening and expansion of urbanization processes led to changes in the distribution area of pigeons, their biology and ecology. Many dove-like species have become synanthropic species.

Dove-like birds are an ecologically plastic group of birds, so how quickly they adapted to the ongoing anthropogenic changes natural environment. Anthropogenic transformation of the environment and urbanization territories led to the growth of wastelands, dumps of household and construction garbage.

Different species of wild animals react differently to scale and the rate of anthropogenic transformations. Particularly sensitive to these the processes are birds, since they are the most mobile components ecosystems are especially sensitive to changes in habitat conditions that serve as bioindicators and objects of environmental monitoring.

Some species avoid highly modified landscapes, others interact with them, establishing a close relationship. Because of this there are changes in their ecology and biological rhythm of life.

Zone of wastelands, dumps of household and construction waste in conditions are an area of mass concentration of birds. They recycle hundreds of tons food waste, and thus bring undoubted benefits. With another hand, such flocks of birds accumulate and carry pathogens of various diseases. Clarification of the epidemiological and epizootic role birds visiting landfills as reserves and carriers of pathogens various diseases of humans and animals, is currently becoming very relevant [2].

It is the representatives of the dove-like order that are often visited landfill areas in urban settings. Currently in urban synanthropic conditions are two species of the order pigeon-like.

Rock pigeon (Columba livia) - Wild rock pigeon – mostly sedentary bird, making only irregular migrations. Inhabits the rocks mountain gorges, ravines, steep river banks. Forests and open avoids spaces. In the conditions of the city, pigeons arrange their nests in buildings of man [4].

Body weight from 240 to 360g. The physique is dense, the head is small, the neck is short, the wings are usually long and sharp, the tail is of medium length, rounded. Legs are short, four-fingered, toes are long, with short strong claws. The beak is small, straight, thin at the base, and the apex is somewhat swollen. The base of the beak is covered with soft skin- wax. The plumage of pigeons is dense and dense, often varied bright colors. Males are larger than females, they do not differ in color. Pigeons are strictly diurnal. Food is usually collected on the ground, in connection with which they walk well. They feed on the seeds of various plants, like wild and cultured, which are harvested on the ground. Spring coo and mating in semi-domestic pigeons begins very early - in February. Wild pigeons start nesting much later. A pair of pigeons remains faithful to each other throughout their lives. Clutch consists of 2 white eggs colors. After about 17 days, chicks hatch from the eggs, they are heated in another week or two, depending on the weather. Chicks fly out of

the nest at 30-35 days of age, and after a few days the parents leave them and proceed to the second laying [6].

Common Turtle Dove (Streptopelia turtur) Height 27 cm in length, the dorsal side is brown with a scaly pattern, the belly is grayish-pink, the tail is black with a white stripe along the edge. In adult birds, the neck is oblique. Black and white stripes.

Habitat. It is found more often in light forests, parks and gardens. *Nutrition.* It feeds on tree seeds and insects, grains. Nest usually suits on horizontal tree branches, most often at a height 3-6 m from the ground.

Features of masonry. Clutch of 2 small white eggs 28x22 mm. Breeding dates. Arrives quite late - in May, and soon starts laying eggs. The incubation of eggs lasts 13-14 days. Feeding chicks in the nest takes about 18 days. At the end of June they already fly out of the nest. [1.5].

Thus, in the conditions of the city, two types of detachment live dove-like: dove-gray and turtledove. They recycle hundreds of tons food waste in landfills and bring undoubted benefits, and on the other hand, carry the causative agents of various diseases. That's why elucidation of the epidemiological and epizootic role representatives of the order of pigeons is now highly relevant.

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Rezyume: *Maqolada kaptarlar tartibi vakillarining xarakterli xususiyatlari keltirilgan. Kabutar qushlar ekologik plastik qushlar guruhidir, chunki ular tabiiy yashash joylarida davom etayotgan antropogen o'zgarishlarga tezda moslashgan.*

Резюме: *В статье размазаны характерные черты представителей отряда голубевидных. Голубеводные птицы - экологически пластичная группа птиц, так как они быстро адаптировались к продолжающимся антропогенным изменениям в естественной среде.*

Kalit so'zlar: *transformatsiya, sinantrop, urbanizatsiya, oila, axlat, plastmassa.*

Ключевые слова: *трансформация, синантроп, урбанизация, семья, мусор, пластик.*

PHYTOMELIORATION OF PASTURES OF THE SOUTH ARAL SEA

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Summary: *In article it is considered designing of melioration actions it is impossible to carry out without forest melioration the classification of pastures reflecting all set of ecology technological aspects forest melioration of works in various areas arid of a zone, its separate areas and concrete economy.*

Keywords: *Subsoil waters, horizont, soil, arid the pastures, salted, a bush, wood, wood strips, forest belt, phyto mass, phyto melioration, zonal.*

The problem of drying up of the Aral Sea is a global problem of our time. This problem is aggravated by the fact that the mobile sands of the drained bottom of the Aral Sea are highly saline, contain a huge amount of various harmful chemicals that are part of various mineral fertilizers and dust. One of the serious factors of environmental degradation in the Aral Sea region is the removal of salts and dust from the territory of these areas.

In this context, the problem of fixing saline sands of the drained bottom of the Aral Sea, the creation of strong surface structures that do not interfere with plant growth and protect against weathering due to strong aerodynamic flow, is the most urgent problem of modern polymer chemistry and ecology in general.

In the predominant territory of the arid zone, where water resources are extremely limited, phytomelioration, including forest reclamation, is an important means of stabilizing and increasing the productivity of pasture lands. The multifactorial effect of forest plantations on the environment can be used to protect the soil and vegetation cover of fragile landscapes from deflation, to reclaim the microclimate of the surface layer of air, creating a favorable environment for grass growth, as well as for the normal functioning of the animal organism on pastures and in places of detention, even with an extreme combination of weather conditions [3, 12]. To date, special types of reclamation plantings have been developed and are being put into practice for the purposes of animal husbandry: pasture protective forest strips, reclamation and fodder plantings, tree green umbrellas. Extensive production experience in various regions of the country has confirmed the importance of forest reclamation for the intensification of animal husbandry: pasture protective forest strips and reclamation - forage plantations increase the yield of phytomass by 1.5 - 2 times; green umbrellas increase the survival rate of lambs, as well as the weight gain of animals and shearing of wool by 10 - 40%. According to preliminary data, it is necessary to create about 5 million hectares of such plantations in the arid regions of the country.

However, the effectiveness of forest reclamation work on arid pastures is not yet high enough.

The main factor limiting the cultivation of woody and shrubby vegetation in desert and semi–desert areas is the lack of physiologically available moisture in the rhizosphere. Without additional humidification to atmospheric precipitation, it is impossible to grow plantings with closed crowns – striped, massive backstage [5]. Practically the only natural source of such humidification can be groundwater (GW), the availability of which for trees and shrubs depends on the depth of occurrence, chemical composition, as well as the physico–chemical properties of the aeration zone [8, 10].

In layered soils, most of the trees and shrubs cultivated in the arid zone, with a favorable combination of hydrochemical and soil – soil conditions, develop a root system with a depth of 8-12 m and take the soil from this depth. However, the depth of occurrence of GW is not the only factor determining their root availability. An important indicator of the suitability of GW for woody and shrubby vegetation is their chemical composition and mineralization. With chloride-sulfate salinization, the maximum mineralization values of GW (MGW) for black poplar are 4-5, white

acacia is 10-15, squat elm is 15-20, and for tamarisk and black saxaul is 30-40 g/l [7]. In the Caspian lowland, the MGV under sandy territories varies within 0.1 - 40 g/l; for landscapes with full-profile zonal sandy loam and loamy soils, GW with a mineralization of 3 - 180 g/l is characteristic.

Groundwater is not used by woody and shrubby vegetation if there are horizons in the aeration zone that prevent the downward growth of roots: saline, impermacid, salt. With appropriate soil preparation and crop care, the saline and impermacid horizons gradually degrade, but the underlying salt horizons, typical of plains with zonal sandy loam and loamy soils, remain root-proof.

Thus, the forest suitability of arid pastures in the predominant territory of the SE ETC depends mainly on the salt characteristics of the MGV soil.

Pastures on areas with full-profile soils that have not survived anthropogenic deflation are especially unfavorable for strip afforestation.

Forest reclamation works with the use of black saxaul turned out to be more successful. Strip plantings on areas with MGV of 10-30 g/l did not lose viability in 10-12 years, although their growth at this age almost stopped. At places where the MGV reached 50 g/l, the current increase in height decreased sharply already in the third year of crop life [2], the shrinkage of the strips began at the age of 7-10.

A similar pattern was noted for natural saxauls of Kazakhstan [1]. Phytocenoses of class II-III, bonita with a wood reserve of 5-10 t/ha are formed in depressions of the Northern Ustyurt at a depth of 2-10 m with a mineralization of 10-30 g/ l, sparse (completeness 0.1-0.3) stunted (1.5-2.2 m) 17-27-year-old saxaul are characteristic of deep-water locations with saline and brackish soils in the Northern Aral Sea. On salt marshes-salt marshes with close (1-2 m) highly mineralized (more than 60 g / l) GW in Ustyurt, saxauls are not found. Pastures on sandy lands are much more promising for afforestation, especially desolate areas (foci of deflation) with dune sands [6], which are devoid of excess salts and have significant reserves of physiologically accessible moisture. Numerous arrays of tree and shrub plantations created 50-60 years ago in Dagestan, Chechen-Ingushetia, Kalmykia, Stavropol Krai, Rostov and Astrakhan regions, etc. have been preserved in good condition on such areas to date. However, forest reclamation of desolate pastures should be carried out differentially, taking into account the ecological and morphological heterogeneity of the foci of deflation [9].

In connection with the above, forest reclamation of arid pastures should be based on detailed soil and soil surveys of the entire profile of the aeration zone and the upper layer of the aquifer in order to map the lands according to the degree of forest suitability.

Currently, pasture protective forest strips are the most common in practice. This is a universal type of plantings that increases the productivity of natural herbage, allows carrying out measures to introduce fodder grasses into the interstitial spaces, as well as reliably protect the pasture territory from deflation, and grazing animals from strong winds and, in addition, create conditions for the organization of a rational mode of use of pasture arrays. However, the opportunity for growing economically profitable forest strips is not available everywhere. For the cultivation of strip tree plantations, only the lands with available agricultural land are suitable. On pastures with inaccessible GW, strip plantings are upset at an early age, turning into a chain of curtains or separate standing trees that are unable to perform all the functions intended for them.

The next type of plantings that has great prospects in all categories of pastures are reclamation and fodder plantings. Their peculiarity lies in the fact that they must remain viable in conditions of direct contact with animals in the bleed mode, ensuring the full use of water and thermal resources of this category of pastures for the production of fodder phytomass. For pasture-forage plantations, as well as for pasture protective forest strips, additional moisture is important, since their productivity is directly dependent on the available moisture reserves in the rhizosphere. Nevertheless, the peculiarity of their operation (periodic partial alienation of transpiration organs) allows us to count on the possibility of long-term functioning even with very limited additional

humidification, including through the use of vaporous moisture deposited on the roots during its daily and seasonal movement. This source of moisture can be of practical importance in areas with a deep occurrence of GW, when the rhizosphere capacity exceeds 4-5m [4].

Reclamation and forage plantations on pastures with sandy soils are very promising. Wide-row (8-10 m) juzgun crops not only stop deflation in the centers of desertification, allow natural grass to settle in the aisles or introduce fodder grasses into them, but they themselves are a source of feed. On the sands of the Caspian Sea, pastures restored with the help of juzgun reclamation and forage plantations accumulate 45-50 c/ha of raw aboveground phytomass, including about 15 c/ha of edible shrub phytomass.

On soils resistant to deflation, it is possible to design the creation of pasture protective forest strips and reclamation and forage plantations by continuous plowing for the entire width of the strips and wings, which will ensure the best growth of plantings in the first years of their life.

On soils subject to deflation, it is necessary to create ribbons of different widths, depending on the anti-deflationary properties of the soil and the nature of natural vegetation. In the latter case, the use of the MPP-I machine, which plants crops with simultaneous soil preparation, is very promising.

On desert pastures in the dune areas of deflation foci, special soil preparation is not required, and in destructive ones, deep belt loosening of the soil along the axes of the rows is effective immediately before planting [6].

When selecting species for pasture protective forest strips on pastures with accessible in depth, but mineralized soils, it is necessary to proceed from salt-resistant plants, estimated by the maximum weighted average salinity in the capillary border. With chloride-sulfate and sulfate-chloride salinization, this indicator for black poplar, white acacia, pedunculate oak, squat elm, black saxaul and tamarisk is 0.25, 0.35, 0.50, 0.50-0.80 and 1.2-1.5%, respectively. Juzgun withstands salinity in the capillary border up to 0.2-0.3, and teresken-0.4-0.6%.

The consumption of tree and shrub vegetation by various animal species varies in different natural and climatic zones. To a large extent, it depends on the availability of herbaceous feed varies by season. On worn-out pastures, sheep can eat almost all currently used species of woody and shrubby plants, and not only leaves and thin shoots, but also lignified organs, with the exception of ailanthus, quince and in some cases tamarisk. Plants that are satisfactorily eaten in summer include teresken, juzgun, saxaul, sea buckthorn, elm, white acacia are readily eaten.

Thus, the design and practical implementation of forest reclamation measures for livestock purposes should be carried out taking into account a set of factors, including the suitability of pastures for forest reclamation and the degree of its necessity, depending on the state of vegetation cover, the susceptibility of soils to deflation, etc. In accordance with this, the types of plantings, the technologies of their creation, the range of wood and shrub vegetation used are determined. In each specific case, it is necessary to determine the order of forest reclamation of various types of pasture lands, striving to ensure that their temporary exclusion from pasture turnover does not lead to a reduction in livestock production, degradation and desertification of lands that have taken an additional load [10].

Due to these features, the design of reclamation measures cannot be carried out without a forest reclamation classification of pastures, reflecting the totality of ecological and technological aspects of forest reclamation work in various areas of the arid zone, its individual districts and specific farms. The existing geobotanical classifications do not contain exhaustive information necessary for a comprehensive assessment of pastures as objects of forest reclamation. The production experience and research results of a number of scientific institutions in the country allow us to outline the next variant of the forest reclamation classification of pasture lands (at the level of forest reclamation categories) for one of the large areas of the arid zone.

1-arrays of desolate pastures with fine-grained sands and strongly fluttering sandy soils;

2-pastures with degraded vegetation cover on medium undeveloped sandy soils;

3-pastures with degraded vegetation cover on easily sandy loam zonal soils, susceptible to deflation;

4-pastures with zonal sandy loam and loamy soils resistant to deflation.

Conclusion. The selected categories of pastures differ from each other in terms of forest growing conditions, the degree of need for forest reclamation, the specifics of its technology, the order of forest reclamation and other features. Within each category, forest-reclamation types are distinguished, equivalent in terms of the main limiting factor of the environment, the provision of the rhizosphere with physiologically accessible moisture:

- an additional source of moisture - available for woody and shrubby vegetation by depth of occurrence, mineralization and other indicators of GW;
- GW are available in depth of occurrence and mineralization, but are shielded by an impermacid horizon;
- GW are available in depth of occurrence and mineralization, but are shielded by a salt or saline horizon;
- GW are available in depth and other indicators, but have increased mineralization;
- GW are inaccessible to woody and shrubby vegetation by all indicators, an additional source of moisture is redistributed precipitation;
- there are no additional sources of moisture.

In the considered arid region, first of all, it is necessary to concentrate work on pastures of the first forest-reclamation category, and in areas and farms where such lands are absent, on the second. Having created a reserve of reclaimed pasture territories, it is possible to start improving unproductive, but still functioning lands of the third and then fourth forest reclamation categories, carrying out this work selectively (oasis) only in areas suitable for afforestation.

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When designing at the general scheme stage for forest reclamation classification and pasture mapping, photographs from orbital stations should be used, which, as our studies have shown [5], well reflect the state of the soil and vegetation cover.

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Rezyume: *Maqolada yarimcho`l yaylovlarda urmon chiziqlarini barpo etish va eko-texnologik aspektlarga asoslangan holda har hil joylarda xo`jalik ishlarini loyihalashtirmay turib ishlarni olib borish mumkin emasligi tuo`g'risida keltirilgan.*

Резюме: *В статье рассмотрен проектирование мелиоративных мероприятий невозможно осуществлять без лесомелиоративной классификации пастбищ, отражающей всю совокупность эколого-технологических аспектов лесомелиоративных работ в различных областях аридной зоны, отдельных ее районах и конкретных хозяйствах.*

***Kalit so`zlar:*** *Er osti suvlari, gorizont, tproq, yarim cho`l yolovlar, sho`rlangan, buta, yog'osh, urmon chiziqlari, fitomassa, fitomelioratsiya, zonal.*

Ключевые слова: *Грунтовые воды, горизонт, почва, аридных пастбищ, засоленным,кустарник, древесных, лесные полосы, фитомассы, фитомелиорация, зональ.*

ANALYSIS OF FOREIGN EXPERIENCES IN DEVELOPMENT OF DIGITAL ECONOMY IN AGRICULTURE

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Summary: *This paper analyzes the foreign experience in the development of agriculture, presents technical devices and innovative technologies used in this area, and shows the ways of their effective use.*

Keywords: *Digital technologies, Internet of things, intelligent agriculture, information technologies, digital economy.*

Introduction

The digital economy is being introduced in developed countries, ensuring the development of their economies. This technology will be applied in our country, especially in the context of globalization of the world economy and the development of technology, will have an impact on the economic development of Uzbekistan and will be related to the adopted regulations. In this regard, further improvement of public administration structures, The President of the Republic of Uzbekistan adopted a resolution on creating conditions for the introduction and development of the digital economy, improving the favorable investment climate, as well as the implementation of the Action Strategy for the five priority areas of development of the Republic of Uzbekistan in 2017-2021.

In recent years, Uzbekistan has taken very serious and effective measures to develop agriculture and introduce modern innovative technologies in agriculture. Further achievements in this area will increase the competitiveness of the sector and turn existing problems into new opportunities. But this requires the development and implementation of agricultural technologies and innovations that are currently used in other countries around the world. Below is a presentation of foreign experience in this area.

The indicators achieved in agriculture of the countries that have achieved a high level of overall technological development in the leading sectors of the economy are given below. (Table-1).

table-1

Countries that have achieved a high level of overall technological development in the leading sectors of the economy

in the field of technology	Rating of leading countries				
	1	2	3	4	5
Agriculture	USA	China	India	Brazil	Japan
Medicine, Biotechnology	USA	UK	Germany	Japan	China
Nanotechnology, New Materials	USA	Japan	Germany	China	UK
Energy	USA	Germany	Japan	China	UK
Defense, Security	USA	Russia	China	Israel	UK
Electronics, computer memory	USA	Japan	China	South Korea	Germany
DT, Information Management	USA	India	China	Japan	Germany
DT, Information Management	Japan	USA	Germany	China	South Korea
Aviation, rail transport	USA	Japan	China	Germany	France

Foreign experiences

The United States ranks first in the world in terms of agricultural productivity, employing only 2 percent of the country's workforce. Agriculture in the United States uses many innovative solutions that allow farmers to produce more at a lower cost. For example, the use of genetically modified seeds and direct sowing farmers use machinery, fuel and pesticides.

In the Netherlands, "digital technologies" are widely used in agriculture, including the use of precision farming and robots at various stages of agriculture, as well as "Internet of Things" (IoT) to help manage various processes. At the same time, only 2% of the country's employed population is employed in Dutch agriculture.

In Israel, less than 20 percent of the land is suitable for agriculture, but farmers provide 95 percent of the population's food needs. Given the acute shortage of irrigation water in Israel, drip irrigation technology has been developed. At the same time, the Israeli government supports the country's agriculture, providing subsidies of up to 40 percent of the cost of purchasing farmers and introducing new technologies. The main components of the smart farming approach are software, irrigation systems, innovative harvesting equipment, which are cheaper due to the subsidy system. Thanks to this approach, high rates of introduction of new technologies in the agro-industrial complex have been maintained due to close cooperation between the public, private and scientific sectors in the agro-industrial complex. The phenomenon of Israeli agriculture is that the low natural potential is offset by the high intensity and efficiency of the introduction of new technologies.In agriculture, traditional approaches are almost non-existent, and a high level of innovation helps to achieve maximum productivity of the industry with minimal resource costs.

Government regulation in the Republic of Korea is aimed at providing comprehensive assistance in the introduction of innovations and modern technologies in all sectors of the economy and life. Agriculture in the Republic of Korea is also a high-tech sector. The experience of innovative agricultural development in the Republic of Korea is unique and can be used to ensure food security and the formation of an innovative agricultural system in developing countries. In 2018, the Ministry of Agriculture of the Republic of Korea announced its intention to invest in the development of "smart" farms across the country and increase their total area from the current 4.01 hectares to 7,000 hectares.

In Taiwan, over the past 5-10 years, the government has allocated up to $ 100 million to develop and implement innovations, including the creation of research centers, software and mobile application development, and a large training program for cluster, farmers. The government has ordered the creation of Internet portals to remove as many intermediaries as possible from the market and increase the profitability of farmers, processors and retailers, where farmers can maintain their pages and thus promote themselves in the market. The portal provides access to private buyers and wholesale buyers, processors in cities interested in purchasing new organic products.

The new UK Digital Strategy 2017, released on March 1, 2017, identifies seven areas: digital infrastructure, access to digital data for everyone, conditions for business via the internet, business digitalization support, cybersecurity, public online services, use of collected data in the economy. It is planned to build five technology centers to implement the initiatives. The population will be provided with free services on the use of digital technologies. 17.3 million for research in robotics and artificial intelligence. Pounds will be invested. In 2035, the government will spend $ 654 billion. pound return.

Argentina is introducing a state-level system of crop monitoring, soil monitoring, data collection and analysis. Satellite data is constantly purchased, analytical data is obtained from weather stations, enterprises, research centers, laboratories located on the common Internet portal, and they serve as a service for farmers to obtain data in their fields.

India is focused on increasing farmers 'knowledge, in particular the introduction of Agri Value Added Services mobile applications that provide farmers with information on weather, crop

prices, best technologies for growing crops and more. Innovative and scientific centers in agriculture have been established in each region.

An important chain of Dutch industrial policy is the Smart Industry Action Agenda 2015. A distinctive feature of this program is that it focuses on building an efficient ecosystem, networks of private companies and research and educational institutions. In practice, this is the formation of field labs, industrial and technological infrastructure, in which private companies and public research organizations jointly test and implement effective solutions and smart industry products. It uses an interdisciplinary approach: field laboratories must ensure the effective collaboration of high-tech companies and research organizations in various sectors of industry, services and agriculture.

The basis of the Japanese strategy is to ensure the generation of innovations by linking things and services through ICT. The strategy identifies three priority projects:

- Revitalization of the regions through the development of smart city projects, the creation of a geospatial database on settlements;
- Solving social problems through the application of ICT in medicine, education, disaster relief, etc.;
- Establishment of free, fixed and wireless Internet access, development and implementation of an improved form of multilingual voice translation system in the framework of the Global Communication Project.

Also in 2016, Japan announced the "5th Science and Technology Basic Plan" (The 5th Science and Technology Basic Plan).

In order not to lag behind and take the lead in technological development, Japan is focusing on developing the most important strategic resource – human capital and building a Super Smart Society 5.0 ("ultra-high intelligence" or "Society 5.0"). Acceleration of economic growth is expected to be achieved through the full technological re-equipment of the industry on the basis of the interconnectedness of network platforms built in each sector, their mutual coordination and interaction. In Kazakhstan, the Ministry of Agriculture estimates that by 2025 the economic effect of agricultural digitalization will be about 40 billion tenge ($ 105.5 million).

According to experts, labor productivity in agriculture in Russia today is three times lower than in Germany, for example, and productivity is 2.5-3 times lower than in Germany and the United States.

The main aspects of the use of digital technologies in agriculture in Russia are to increase agricultural productivity and reduce losses.

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Increasing agricultural productivity and reducing losses are the main aspects of the use of digital technologies in agriculture in Russia.

Conclusions and suggestions

The problem of innovative development is of particular concern to Uzbekistan, as innovative development can only sustain the economy by conserving the environment while using new resources sparingly, extensively and effectively using new technologies.

The results of the comparison of different variants of modern technologies show that the least tillage, saving current and investment costs, the production of low-cost products and the same level of price per hectare of land per hectare.

Technology change is a complex process that requires a systematic approach, knowledge of all the changes that occur in the technological system of the enterprise in the transition from traditional technologies to new resource-saving technologies. In this regard, the process of

introduction of technological and organizational-economic innovations in agricultural enterprises algorithms need to be developed.

The use of digital technologies is growing rapidly on a global scale. Agriculture is no exception, including in the Republic of Uzbekistan, and in recent years a number of presidential decrees and resolutions have been adopted in the field of digital economy development. Experts say that due to digital transformations, the overall productivity of agriculture should increase by almost 60% by 2030, so that there will be no shortage of food.

In connection with these trends and innovations in the field of digital agro-technologies, the draft Concept of Implementation of "Smart Agriculture" in the context of agriculture in Uzbekistan has been submitted for public review and discussion by the Minister of Justice of the Republic of Uzbekistan. The main purpose of this concept is to increase the yield of agricultural crops, increase livestock productivity, protect crops and lands from pests and various insects, to control the impact of crops on the yield of different crops, and to prevent the impact of weeds on crop yields. Particular attention is paid to the introduction of high technologies and digital methods of management in agriculture of the Republic of Uzbekistan.

In general. leading countries are digital transformation analysis allows the Republic of Uzbekistan to highlight the following priority areas: - Formation of the national digital economy and digital technology legislation;

- Government funding of digital projects;
- cybersecurity;
- Cyberphysicist in order to increase productivity industrial digitization based on systems, artificial intelligence, 3D printing;
-digital agriculture;

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Rezyume: *Ushbu maqolada qishloq xo'jaligini rivojlantirishda xorij tajribasi tahlil qilinib, sohada foydalanadigan texnik qurilmalar va innovacion texnologiyalarni joriy etish va ulardan samarali foydalanish yo'llari ko'rsatilgan.*

Резюме: *В статье проанализирован зарубежный опыт развития сельского хозяйства, представлены технические устройства и инновационные технологии, применяемые в данной области, и показаны способы их эффективного использования.*

Kalit so'zlar: *Raqamli texnologiyalar, internet buyumlari, aqlli qishloq xo'jaligi, axborot texnologiyalari, raqamli iqtisodiyot.*

Ключевые слова: *Цифровые технологии, интернет вещей, интеллектуальное сельское хозяйство, информационные технологии, цифровая экономика.*

USE OF CONVOLUTIONAL NEURAL NETWORK ALGORITHM IN OBJECT DETECTION

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Summary. *This paper discusses the use of artificial intelligence based Convolutional Neural Network (CNN) deep learning algorithm in detection objects in images.*

Keywords: *computer vision, Convolutional Neural Network, deep learning, artificial neural networks*

Convolutional Neural Network (CNN) is a type of artificial neural network, one of the classic deep learning algorithms and a research hotspot in speech analysis and image recognition. A quick overview of the structure and functions of convolutional neural networks, convolutional like a signal field, it is also a sampling and sampling process as a kernel. For images, this is essentially a three-dimensional matrix. Its two-dimensional representation is shown in the figure below:

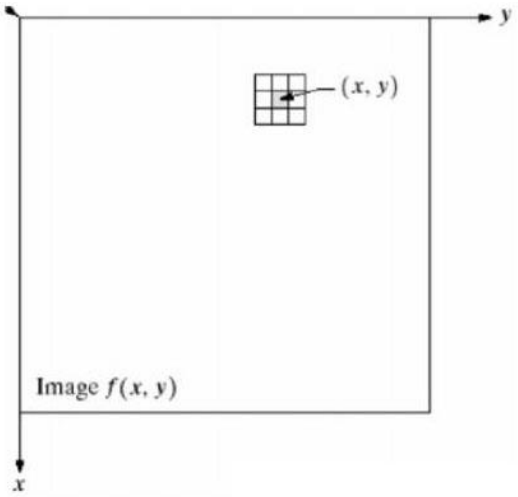

Fig. 1. 2D representation of an image

For example, an image is anti-aliased: typical 8-segment anti-aliasing, each value resulting from the product of the original corresponding position and the surrounding 8 elements and a 3x3 matrix.

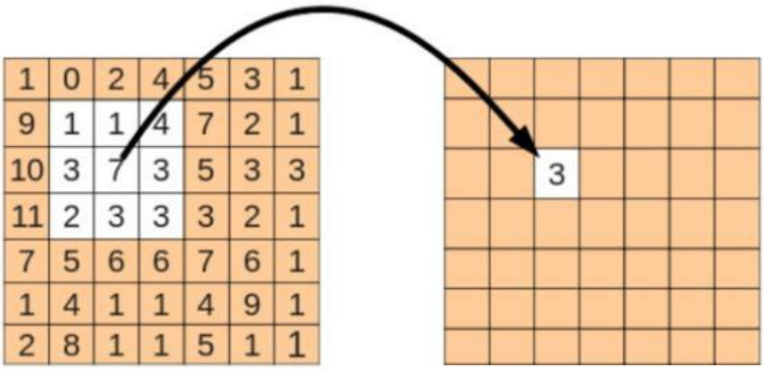

Fig. 2. 8 segment smoothing

This is equivalent to multiplying each area element by the matrix W. in the order of the original matrix. The matrix W has the following form:

$$W = \frac{1}{9} * \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$$

Fig. 3. Matrix multiplication by weight

This process is called convolution and is essentially a filter. Using this check on an image is equivalent to low-pass filtering on the image (Fig. 4.).

$$\frac{1}{273} \begin{bmatrix} 1 & 4 & 7 & 4 & 1 \\ 4 & 16 & 26 & 16 & 4 \\ 7 & 26 & 41 & 26 & 7 \\ 4 & 16 & 26 & 16 & 4 \\ 1 & 4 & 7 & 4 & 1 \end{bmatrix}$$

Fig. 4. 2D filtering

In terms of extension, the operation of filtering two-dimensional images can be written as a convolution, for example, ordinary Gaussian filtering, Laplace filtering (operator), etc.

$$G(x, y) = \frac{1}{2\pi\sigma^2} e^{-\frac{x^2+y^2}{2\sigma^2}} \qquad (1)$$

What is the relationship between filters and convolutional neural networks? This is not as good as we assumed, a recognition problem: we need to recognize a certain curve in the image, that is, this filter must have a high output for this curve and low output for other shapes, which is similar to neural meta activation.

So we convolve the entire original image, and the result is that the value is very high in that particular curve and the surrounding area, and the value is relatively low in other areas. This is an activation card. The corresponding region of high values is the position of the curve that we want to detect.

When training a specific convolutional layer of a Convolutional Audit Network (CNN), we are actually training a series of filters. For example, for a 32x32x3 image (32px wide x 32px high x three RGB channels), if we define and train 12 filters in the first CNN convolutional layer, the output of that layer will be 32X32X12. For various tasks, we can perform further processing on this output, including activation function, pooling, full connection, etc.

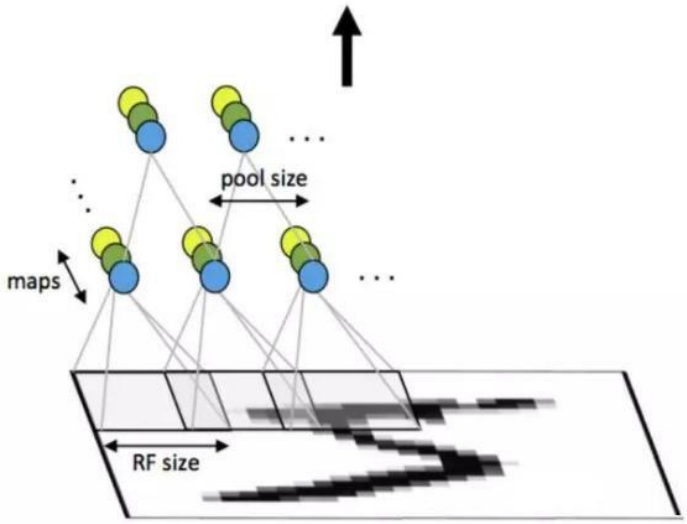

Fig. 5. Activation function

Simply put, CNN training is pretty much training the filter of each convolutional layer. Let these filter groups have high activation for certain modes in order to achieve the CNN classification / detection goal.

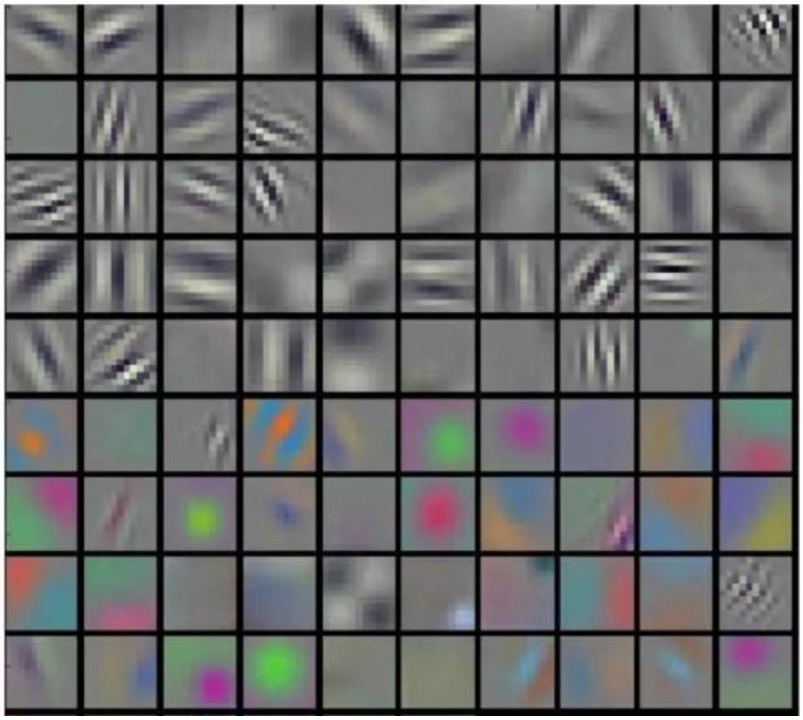

Fig. 6. Real CNN first convolutional layer filter

Real CNN first convolutional layer filter. The filter of the first convolutional layer of a convolutional neural network is used to detect low-order objects such as edges, corners, curves, etc. As the convolutional layer increases, the characteristics of the corresponding filter detection become more complicated (in a rational situation, this is also the situation we want).

For example, the input of the second convolutional layer is actually the output of the first layer (filter activation map). The filter of this layer is used to detect combinations of inexpensive features (semicircles, quads, etc.), so Accumulate to detect more and more complex features. In fact, our human brain's processing of visual information also follows this pattern, from low-level functions to high-level functions.

Refer to the previous article “Why can the achromatic series (black-white-gray) work harmoniously with any color in the color comparison? 》

According to CNN's training goal, the last layer filter can be activated when a face, handwriting, etc. is detected. [one].

Therefore, to a large extent, the task of building a convolutional neural network is to build these filters. That is, to change these filters to these (change the value of the filter matrix, that is, Weight), you can define specific features. This process is called training.

At the start of training, the convolutional layer filters are completely random and they do not activate any features (cannot detect any features). It's like a newborn child: he doesn't know what a human face is, what a dog is, and what is up, down, left and right.

The TA needs to learn to know these concepts, that is, touching human faces, dogs, up, down, left and right, and when told that they are human faces, dogs, up, down, left and right. Then the TA can memorize these concepts in the mind and can accurately produce the result after seeing it some time later.

Filter the blank and change its weight so that it can detect certain patterns. The whole process is like feedback in a project.

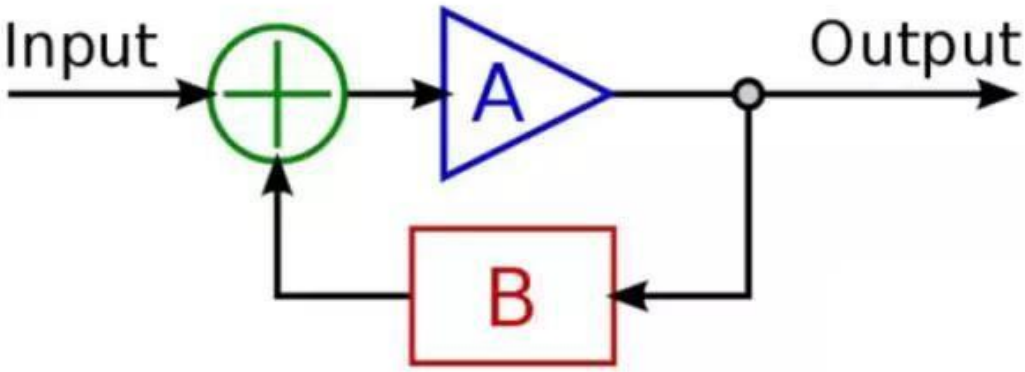

Fig. 7. Feedback process

Think about it, if there is an unconscious monkey that completely randomly changes 25 values of the 5X5 filter matrix, it is possible that after a certain round the filter will be able to detect features such as edges and corners. This is a training situation without feedback. Of course, this does not apply to neural network training we are out of luck.

For example, we want to train a classification neural network so that it can determine which of the ten categories of objects in the input image is most likely. Therefore, the training process looks like this:

For the first training, enter the image. This image is processed by each convolution layer to output a set of vectors [1, 1, 1, 1, 1, 1, 1, 1, 1, 1], that is, for the complete output of the network built by a random filter, with equal probability is considered one of ten categories.

However, for training, we have Gound Thuth - the category to which the object in this picture belongs: [0, 0, 1, 0, 0, 0, 0, 0, 0, 0], that is, the third category. At this time, we can define a loss function such as the usual MSE (root mean square error).

We assume that L is the output of this loss function. Our current goal is to pass the L value (called backpropagation in this neural network concept) to the entire convolutional neural network in order to change the weight of each filter to minimize the loss value L.

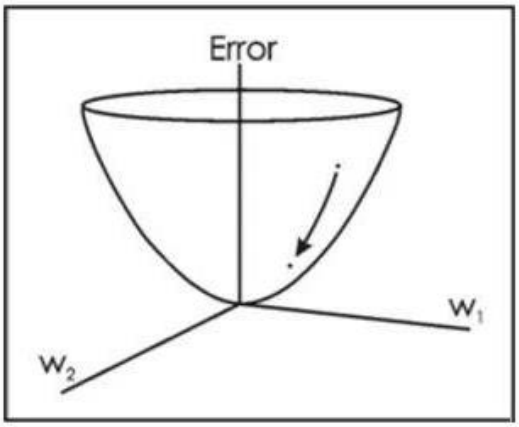

Fig. 8. Weight change error

This is a typical optimization problem. Of course, it is practically impossible in engineering to change the filter weight W to minimize L in one go, but this requires a lot of training and many modifications.

If the situation is ideal, the direction of the change in weight is to make the change in L converge. This means that our goal of training this neural network can be achieved so that the filters of each convolutional layer can be combined for optimal detection of specific patterns.

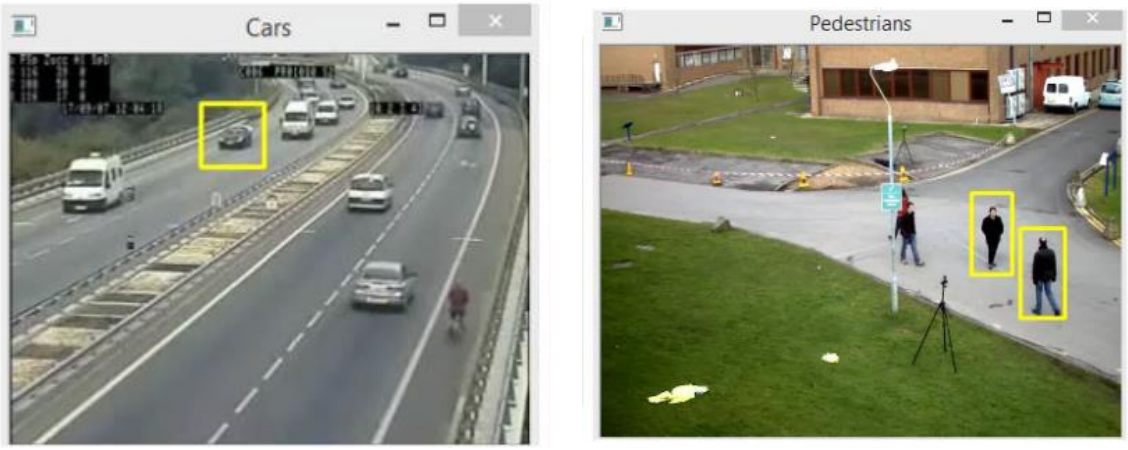

Fig. 9. Result using CNN algorithm

Using this form of neural network, **we** developed **a program** in Python **which** allows you to d**etect** objects in an image. This program allows you to determine if there is a person or a car in the photographs. The results are shown **Fig. 9**.

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Rezyume: *Mazkur maqolada tasvirlardagi obyektlarni ajratib olishda sun'iy intellekt asosidagi Convolutional Neural Network (CNN) deep learning algoritmini qo'llash masalasi qarab chiqilgan.*

Резюме: *В этой статье обсуждается использование алгоритма глубокого обучения сверточной нейронной сети (CNN) на основе искусственного интеллекта для распознавания объектов на изображениях.*

Kalit so‘zlar: *kompyuter ko‘ruvi, Convolutional Neural Network, deep learning, sun’iy neyron to‘rlari.*

Ключевые слова: *компьютерное зрение, сверточная нейронная сеть, глубокое обучение, искусственные нейронные сети*

UDC 631.6.

CLIMATE CHANGE AND WATER AVAILABILITY IN AGRICULTURAL SPHERE OF THE ARAL SEA REGION"

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Summary: *"The article evaluates the changes in natural and climatic conditions of the environment and its impact on agriculture. Recommendations are given for agricultural water use by taking into account the lack of water in that area"*

Keywords: *in the basin of the Aral Sea, the set limit of water, an increase in air temperature, reduce of atmospheric precipitation, to reduce the need for water*

Actuality of the present research paper is that the main current problem in the field of agricultural production is the creation of regional foundations of food security as a factor of social and economic stability. In the lowlands of Uzbekistan particularly in Karakalpakstan where the production of crop, farming, and other branches of agriculture are all based on irrigated agriculture. Improvement of agricultural products is getting more important.

Climate change and water resource depletion in the basin of the Aral Sea has led to using reservoirs of minimum regulation by the governments located in the upper parts of the Aral Sea.

Result of the research. According to the prediction of scientists and specialists, lack of water in the Amu Darya will have a tendency to keep its water. In recent years, water availability in the Amu Darya regions, especially in its lower parts is declining year by year. (Table 1)

Years	Water demand, mln m³	Set limit, mln m³	Real water intake		
			mln. m³	% from consumption	% from limit
1987	10880	8850	8990	82,6	101,6
1991	9990	8561	8455	84,6	98,7
1996	10434	7960	8128	77,9	102,1
1997	10387	8020	7436	71,6	92,7
1998	9897	8050	8119	82,0	100,8
1999	10655	9080	9109	85,5	100,3
2000	10850	8470	4808	44,3	56,7
2001	10135	5929	2714	26,8	45,7
2002	8801	7388	6280	71,3	85,0
2003	10018	8485	8526	85,1	100,4
2004	9855	8610	8156	82,7	94,7
2005	8918	8445	8504	95,3	100,7
2006	8485	8121,4	7804	92,3	96,5
2007	8200	8335	7448	90,8	89,3

2008	7334,2	7002,2	3999,1	54,5	57,1
2009	6927,6	7392,8	7309,7	105,5	89,9
2010	8840,5	8335	8452,3	95,6	101,4
2011	8121,0	7651,5	5057,5	62,3	66,1
2012	8619,5	8335,0	8334,4	96,7	100,0
2013	8840,5	8335,0	6928,6	78,3	83,1
2014	8477,8	8335,2	6953,0	82,0	83,4

As it can be seen from table 1 the set limit of water decreased from 8850.0 million m to 8335.0 million meters compared to 1987, and the actual volume of water was 7312.1 million meters in 2016, and compared to the year of 1987 actually took 8990.0 million meters or decreased to 1677.9 million meters.

Analysis of long-term data materials on weather stations in Nukus, Chimbay and Kungrad for the period from 1960-2019 shows small increases in air temperature (table 2).

Table 2.

Change in the average annual air temperature over a longstanding period according to the data of weather stations in the Republic of Karakalpakstan

Periods	**Weather stations**		
	Chimbay	**Nukus**	**Kungrad**
1961-1965	10,9	11,9	11,1
1961-1970	10,8	11,5	10,8
1971-1975	10,8	12	11,3
1976-1980	10,8	11,5	10,7
1981-1985	11,6	12,2	11,3
1986-1990	11,5	12,8	12,5
1991-1995	11,8	12,9	12,7
1996-2000	11,9	12,8	12,8
2001-2005	12	12,9	12,9
2006-2011	13	13,1	13,2
2012-2015	12	13,1	12,3
2016-2019	12,4	13,4	12,6

As it can be seen from table 2, there is an increase in air temperature for all weather stations in recent years. According to the hydro-meteorological service of Kungrad, changes in the average annual air temperature over a longstanding periods compared to the years from 1961-1965, the average air temperature is 12.6 C, it means, it increased by 1.6 C while in Chimbay and Nukus it experienced an increase by 1,5. What is more, according to long-term observations the air experiences a decrease in terms of its humidity from 58-65, 2% to 51-53,5% in the years of 1960-2019. (Table 3).

Table 3.

Changes in air humidity over a longstanding period according to the data collection in the weather station of the Republic of Karakalpakstan

Periods	Weather stations		
	Chimbay	Nukus	Kungrad
1961-1965	65,2	58,0	64,9
1961-1970	60,2	60,0	60,0
1971-1975	58,5	57,6	58,2
1976-1980	61,0	59,8	63,0
1981-1985	59,6	63,6	63,8
1986-1990	59,8	58,6	64,2
1991-1995	59,7	59,8	63,4
2006-2010	53,8	52,0	53,7
2011-2015	56,1	52,0	55,9
2016-2019	53,5	51,0	56,0

Having done analysis on the data received from observations at the weather stations of Nukus, Chimbay and Kungrad, the years with the most humid air was detected. And it is obvious that the irrigation of the land has a significant impact on the development of the territories.

The observation of marginal changes of atmospheric precipitations (Table 4)

NN nn	Periods	Months												Average rate per year
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
1	**1961-1985**	9	10	13	18	8	7	5	4	5	13	12	9	9.4
2	**1986-1996**	9	7	13	14	17	3	3	2	3	8	8	9	8.0
3	**2005**	26	0.7	6.6	5.8	13	1.9	5.5	5	0	0.5	3.9	42	9.3
4	**2006**	8.7	8.8	6.2	2.9	2.7	0	2.1	0	2.5	13	30	7.5	7.0
5	**2007**	6.3	2.8	23	30	3.4	2.5	1.4	0	0	0	4.1	23	8.1
6	**2008**	6.7	7.3	0.2	2.1	11	0	0	1	5.4	10	0.4	15	5.0
7	**2009**	5.2	0.4	6.1	12	6.3	0.9	0	1.2	0.6	0	31	1.2	5.4
8	**2010**	2.7	13	5.8	2.7	3.1	0.5	12	1.3	0	0	2.9	0	3.7
9	**2011**	2.9	9	17	6.8	6.7	0.8	0	1.7	0	2.9	6.2	7.6	5.1
10	**2012**	9.6	0.3	44	0	0	0	0	0	1.6	6.6	4.9	12	6.5
11	**2014**	18	6.2	23	28	0	0	0	0	0.3	6.3	33	0.7	9.6
12	**2016**	6.3	0	33	10	20	7	0.7	0	31	13	25	18	13.7
13	**2018**	5.2	36	8.1	17	0	0.3	0	7.2	0	12	16	6.2	8.9
14	**2019**	6.5	12	18	22	15	1.3	12	7.3	0	0	0.3	0.8	7.9

From the above data given in the table 4, for the past 10 years, there was considerable reduce of atmospheric precipitation. In the years given above in the table, the atmospheric precipitation decreased from 113,0 to 91,3 millimeter a year.

In the generalized analysis of literature sources and according to long-term data on the weather station of Nukus, Chimbay, Kungrad, there are factors of increased air temperature, decrease in air humidity and precipitation indicates the process of climate change.

The above mentioned factors indicate that the water supply of the Amu Darya River is detoriating year by year. Over a long period time, the water intake of the Republic of Karakalpakstan is decreasing, it experienced even the years of low water. According to the author Koshekov R. M, owing to the low water there was damage to agriculture between the years of 2000-2001, and this damage was estimated for 15 billion of sums (uzbek currency). In 2018 due to the lack of water, the cotton fields of some farms, especially in the northern parts of the country were not even irrigated once.

During the climate changes, the water availability of the territory and the cultivation of agricultural crops in the Aral Sea zone detoriates. In such conditions, the water consumption increases, the need for irrigation of agricultural crops increases as well.

Water supply is regarded to be one of the reducing factors of increasing water stress but in many cases it is not effective.

It is expected that global water supplies due to increased demand caused by population growth, increased welfare, changes in food intake, urbanization process and the growth of industry. These may all lead to the additional strain. Most of the world's water resources are currently used for food production and it is likely that this water supply will be sufficient until 2050. In the next 30 years water consumption in agriculture will decrease while in industry it will continue to grow.

During the period of lack of water, the primary thing that ought to be done is water conservation. The field of agriculture is considered to take approximately 91% of total consumers in the country. Even if there is a temporary imbalance between the availability of water resources in conditions of lack of water and water needs, the deterioration of surface and ground water quality causes competition between water consumers which may eventually lead to regional interregional conflict and causes serious economic and social consequences.

The water saving program aimed at increasing water availability and overcoming water scarcity in the face of climate change should be implemented in two directions.

1. Water saving strategies for water resources management and water supply which should include the following:

- increasing available water resources by increasing the capacity of existing sources and developing new irrigation sources
- improvement of storage systems for transportation and its water distribution for irrigation in order to ensure high flexibility of water supply and reduce system water losses
- modernization of the irrigation system
- Improvement of the ameliorative condition of irrigated lands with the aim of reducing water consumption for washing of lands
- Improved water resource management and water supply related to compliance with irrigation schedules and optimal timing. It is necessary to switch to the geographical principle of water management at the level of the Water Users Association. The experience conducted in the territory of the Chimbay district of the Republic of Karakalpakstan on the newly created hydrographic principle of the WUA "Shoh-Aryk" showed an even distribution of the established water limit between farms without infringing the rights of water users and the efficiency of operation of hydro-reclamation systems.

2. The second direction is Agronomic to reduce the need for water it is necessary

- to create a variety of crops with a low level of water consumption and change the farming system,

- Reducing the need of cotton in water when it is cultivated under a film where water consumption is reduced by reducing evaporation from the soil. Apart from this, two weeks of crop settings are lost the amount before sowing is significantly reduced.
- The reduction of water consumption in agricultural crops and the development of curtain strips
- Carrying out washings taking into account the degree of soil salinity and salt firmness, crops, the use of special techniques of agricultural machinery and reclamation on saline lands.
- Conducting leveling of fields with the use of laser systems and introduction of water saving technologies and irrigation technique. Planning of reservoir and drainage waters, use of film, mulching of the soil surface.
- Planning for the use and placement of agricultural crops taking into account the water availability of territories and experiments conducted in Karakalpakstan have shown that in order to mitigate the effects of water stress and maintain the existing level of crop production it is advisable to place the main crops in years of low water availability on land with high productivity. Land with a relatively low bonus score should be set aside for drought resistant crops and as a natural plantation for the preparation of raw materials for the pharmaceutical industry.
- Conclusion. Summarizing the above water saving measures in the context of climate change the excess of air temperature by 1.5-2.0 decrease in relative humidity and decrease in precipitation 22 millimeters, as well as current market relations require improvement of organizational and economic methods of water use management and especially water supply for agriculture of the Republic.

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Rezyume: *Maqolada atrof-muhitning tabiiy-iqlim sharoitidagi o'zgarishlar va ularning qishloq xo'jaligiga ta'siri baholanadi. Bu hududdagi suv sathining pastligini hisobga olib, qishloq xo‘jaligida suvdan foydalanish bo‘yicha tavsiyalar berilgan.*

Резюме: *В статье дана оценка изменениям природно-климатических условий окружающей среды и их влиянию на сельское хозяйство. Даны рекомендации по сельскохозяйственному водопользованию с учетом маловодья на данной территории.*

Kalit so'zlar: *Orol dengizi havzasida suv chegarasi o'rnatiladi, havo haroratining oshishi, yog'ingarchilikning kamayishi, suvga bo'lgan talabning kamayishi.*

Ключевые слова: *В бассейне Аральского моря установлен лимит воды, повышение температуры воздуха, уменьшение атмосферных осадков, снижение потребности в воде.*

ON THE QUESTION OF ENVIRONMENTAL TRANSFORMATION AS A FACTOR OF THE DYNAMICS OF THE NUMBER OF RODS IN THE ARAL REGION

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Summary: *The article discusses the study of the dynamics of the population size of rodents in the conditions of the South Aral Sea region. When determining the dynamics of the population size, only the main parameters are taken into account, and the effect on the result of most of the many interacting system components is not taken into account. A correlation analysis of the long-term dynamics of the number of rodents should be carried out taking into account the temporal dynamics of correlation due to adaptation processes that decrease the numerical value of the correlation coefficient over time.*

Keywords: *Aral Sea region, rodents, ecosystem, abundance dynamics, hydro mode.*

Introduction

Currently, the spatio-temporal dynamics of the ecosystem of the Southern Aral Sea region is mainly due to the specificity of local interactions of the populations constituting the ecosystem with inert components of the environment, which allows the ecosystem to be classified as an ecological dissipative structure [6, 8]. Due to the fact that bifurcations of various processes occur in the critical region, the development of the self-organizing ecosystem of the Aral Sea and the Aral Sea region becomes irreversible.

Changes in the ecosystem of the Southern Aral Sea region, like any synergetic system, are inextricably linked to the pursuit of a sustainable state. Slow processes of development towards a new state of stability occur in stages and are designated by the concept of "succession". Unlike succession, a crisis is characterized by faster, nonlinear processes and an increase in entropy [1, 6]. The high rate of crisis transformations and processes creates a unique opportunity for an accelerated study of the rate and nature of adaptation, the degree of tolerance of biota to environmental changes, which in conditions of stability takes much longer.

A generalized analysis of the dynamics of the biota of the Southern Aral Sea region is very difficult for many reasons, primarily due to the spatial and temporal discreteness of studies in time, and as a consequence, the absence of long series of representative empirical data necessary for a full-fledged statistical analysis.

Results and discussion.

Animals are one of the most important components of biocenoses. The species composition, distribution, abundance, lifestyle, specific ways of adaptation and many other aspects of their ecology are primarily determined by the natural conditions of the habitat. The mechanisms of adaptation to changing habitat conditions and the patterns of formation of intrapopulation relations make it possible to study and develop specific measures to stabilize the ecological situation in the region.

The scale of changes in biocomplexes is enormous, and therefore an important task of the ecological orientation is the development of a strategy for the protection of the animal population, which ensures the safety of biogeocenoses, as well as the classification and assessment of the values of environmental factors in the dynamics of the number of animals. Studies of the mechanisms of regulation and response of populations to changes in habitat conditions, their mobility are a decisive factor in the dynamics of their number and structure [9, 11, 12].

Small mammals are a classic model in environmental studies. It is best suited to consider the relevance of models and biological reality. As you know, rodents are the most important component of many ecosystems (tundra, forest, steppe, mountain), they are well studied from the experimental

point of view, have a clear position in the system of trophic relations, are of great interest from a medical and economic point of view. With all this, small mammals demonstrate the entire spectrum of population dynamics modes. The study of the territorial distribution of rodents shows their close relationship with certain types of terrain, characterized by a complex of floristic, climatic and biocenological conditions [12].

Biotopic differentiation of a population, characterized by a set of specific ecological characteristics, peculiar connections with the environment, intrapopulation interactions, spatial structure, reproduction rate, level and course of population dynamics, is the most perfect form of ecological adaptation to changing habitat conditions [13, 14].

The crisis of the ecological system in the Southern Aral Sea region has led to a disturbance in the dynamic equilibrium of the region's ecosystems, the degradation of natural complexes, and a reduction in the range and number of a number of animal species and their biodiversity. The fauna of mammals of the Southern Aral Sea region and its dynamics under the influence of anthropogenic pressure are highlighted in many works [15, 5, 7]. When determining the dynamics of population numbers, only the main parameters are taken into account, and the influence on the result of most of the set of interacting components of the system is not taken into account [1, 3]. As a consequence, the main quantitative method in this study is linear pair correlation.

The hydrological regime of the Amu Darya (Fig. 1) is one of the main factors determining the population size of meso- and hydrophilic species of animals and plants; for other species of biota it is transbiotic, mediated mainly by climatic changes in the region towards an increase in aridity and continentality. According to the provisions of synergetics, a fluctuation that develops faster than others, as it were, "subjugates" the rest of the processes, and as a result, all the elements of the system are involved in large-scale movement [6, 8]. Therefore, despite the fact that it is indirect, the hydrological regime of the Amu Darya is the main factor in the transformation of the ecosystem of the Aral Sea and the Aral Sea region as a whole. Desertification, which is a consequence of changes in the hydrological and climatic regimes of the region, is considered as a factor favorable for the sand lance, contributing to the expansion of the range.

Pic. 1 Long-term dynamics of the Amu Darya runoff and its trend (dotted line)

Even from this brief verbal analysis of the factors of the dynamics of the population of the studied populations, interdependence and nonlinearity in the system of factors is visible. Before proceeding to their quantitative assessment, we note one more circumstance that complicates

adequate modeling of the dynamics of population numbers. This is the oscillatory nature of the functioning and development of natural objects and processes.

If dynamic oscillations in the system have constant period and amplitude, are set independently of the initial conditions and are maintained due to the properties of the system itself, and not due to the effect of a periodic force, the system is called self-oscillatory [6, 8]. After the passage of an auto-wave pulse, such a medium must restore its properties due to the energy supplied from the outside and prepare for the next pulse. The time required for this recovery is called the refractory period [1, 8].

Oscillatory regimes of rodent populations have been known for a long time and have been well studied theoretically, and, according to the above definition, can be attributed to self-oscillations, therefore, as not corresponding to the subject of this article, they are ignored.

The study of the relationship between local population dynamics and such large-scale spatial processes as changes in the Amu Darya hydro-regime, climate and desertification showed significant quantitative and qualitative differences in the response of biota to these factors even within the same order (Rodentia) of mammals.

As a result of works aimed at maintaining irrigation-waste lakes and the creation of new reservoirs in the delta, fed by river and collector-drainage waters, the total area of the lakes has significantly increased [2, 3, 4]. At the same time, the ecosystem of the Southern Aral Sea region, like any self-organizing dissipative structure, has the property of coherence, i.e. coordination of actions of all its elements. In this case, the coherence of the population dynamics of the gerbil and muskrat is manifested in the occurrence of fluctuations with large amplitudes at the initial stages of the ecological crisis and their gradual attenuation under the influence of adaptation processes, which in this aspect can be considered as a negative feedback.

Conclusion and summary.

Thus, taking into account the above, it can be noted that the Complexity, nonlinearity of the internal connections of the ecosystem and its interactions with the external environment make it necessary and inevitable to use quantitative research methods. This position is especially important for the Aral Sea ecosystem, which is undergoing large-scale transformations and has complex structural dynamics. Correlation analysis of the long-term dynamics of the number of different species of rodents should be carried out taking into account the temporal dynamics of the correlation caused by adaptation processes that decrease the numerical value of the correlation coefficient over time. Environmental measures to restore populations, carried out taking into account the existing factors and trends in developing systems, have shown high efficiency and the possibility of a quick change in the sign of the dynamic gradient, and thus the importance of the anthropogenic factor in improving the ecological situation.

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Rezyume: *Maqolada Janubiy Orolbuyi sharoitida kemiruvchilar populyatsiyasining dinamikasini o'rganish haqida so'z boradi. Aholi sonining dinamikasini aniqlashda faqat asosiy parametrlar hisobga olinadi va tizimning o'zaro ta'sir qiluvchi tarkibiy qismlarining ko'pchiligining natijasiga ta'siri hisobga olinmaydi. Kemiruvchilar sonining uzoq muddatli dinamikasining korrelyatsion tahlili vaqt o'tishi bilan korrelyatsiya koeffitsientining son qiymatini kamaytiradigan moslashish jarayonlari natijasida yuzaga keladigan korrelyatsiyaning vaqtinchalik dinamikasini hisobga olgan holda amalga oshirilishi kerak.*

Резюме: *В статье рассматриваются вопросы изучения динамики численности популяции грызунов в условиях Южного Приаралья. При определении динамики численности популяций учитываются лишь основные параметры, а влияние на результат большей части множества взаимодействующих между собой компонентов системы не учитывается. Корреляционный анализ многолетней динамики численности грызунов необходимо проводить с учетом временной динамики корреляции, обусловленной адаптационными процессами, уменьшающими со временем численное значение коэффициента корреляции.*

Kalit so'zlar: *Orolbuyi, kemiruvchilar, ekotizim, populyatsiya dinamikasi, gidrorejimi.*

Ключевые слова*: Приаралье, грызуны, экосистема, динамика численности, гидрорежим.*

LOWERING THE LEVEL OF GROUNDWATER AND THEIR ZONING AT CONSTRUCTION SITES IN THE REPUBLIC OF KARAKALPAKSTAN

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Summary: *Depending on the degree of flooding of the territory, the consequences of flooding and material damage from it, natural conditions, the possibility of building protective structures and devices, protective measures are carried out on the entire territory under consideration or only part of it. The choice of a system of protective measures is carried out on the basis of water balance, filtration and hydraulic calculations, as well as a technical and economic comparison of options.*

Keywords: *drainage, drainage, rationing, use, measures, protective, structures, devices, water balance, hydraulic calculation.*

I. Introduction. Lowering the water table at construction sites. Pre-design and design hydrogeological studies will determine the potential impact of groundwater on buildings and structures. [1]. In many cases, the necessity to carry out these works is associated with an increase in the level of groundwater in the territories where the construction was completed.

In cases where groundwater complicates construction and causes damage in the future, a decision will be made to reduce its level. Water leaks from water-carrying utilities and water-containing structures play a major role in flooding of territories; therefore, special attention should be paid to their prevention. In all cases, these works are of paramount importance and neglect is unacceptable. If, despite the implementation of preventive measures, the occurrence of leaks of an emergency or permanent nature is established, then urgent measures must be taken to eliminate them.

II. Lowering the groundwater levels at construction sites is carried out in various ways. The balance equation for the mass of groundwater in an element of an aquifer can be represented in the following form. (fig. 1).

$$\sum_{i=1}^{2} \frac{\partial}{\partial_{x_i}} (\rho q_{\Phi i}) = -\frac{\partial(nm\rho)}{\partial t} + \rho(\varepsilon_1 + \varepsilon_2) \quad (1)$$

$$q_{\Phi i} = -km \frac{\partial H}{\partial x_i} \qquad (2)$$

Here $q_{\Phi i}$ – is the filtration flow rate, km – water permeability of the reservoir. (**k**-filtration coefficient, m-reservoir thickness), **H**-groundwater head, ρ – water density, ε_1 и ε_2 –water filtration rate at the boundaries of the reservoir in a vertical section, i.e., on the top and bottom (overflow water from neighboring horizons and from the atmosphere), respectively, x_i-coordinates (in the usual notation of the Cartesian system) $x_1 = x$, x_2=y). t -time.

$$\sum_{i=1}^{2} \frac{\partial}{\partial_{x_i}} (\rho km \ \frac{\partial H}{\partial x_i}) = \rho \frac{\partial m}{\partial t} + m \frac{\partial(m)}{\partial t} + \rho(\varepsilon_1 + \varepsilon_2) \quad (3)$$

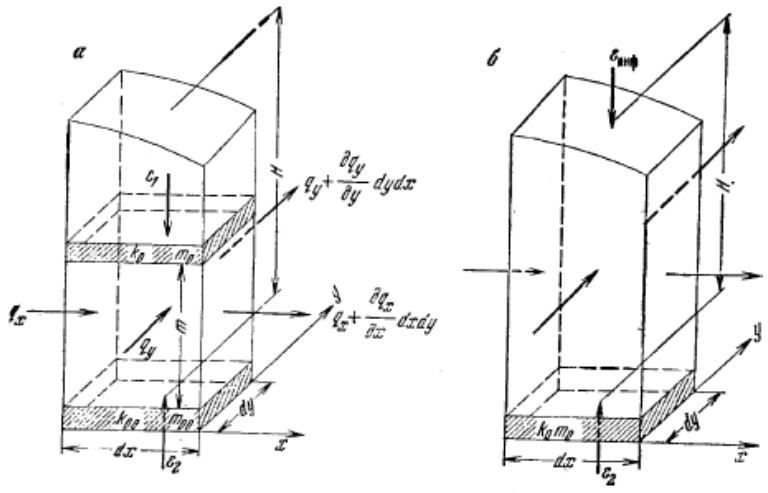


Fig. 1 ***Scheme for the derivation of the groundwater filtration equation***.
а*- for the pressure bed.* ***б****- for a reservoir with a free surface.*

This equation generally describes both pressurized and non-pressurized flows.

In confined rocks, setting ***k****=const* ***m****=const* (while$\frac{\partial m}{\partial t} = 0$) and taking the known relations for n(P) и $\rho(\mathrm{P})$ ($\mathrm{P} = \Delta_в H \quad H - \text{pressure}\ \Delta_в -$ is the density of water g is the acceleration of gravity.)

$\Delta_в = \rho g$

namely

$n \approx n_0 + \frac{p - p_0}{E_{пл}}, \quad \rho \approx \rho_0 \left(1 + \frac{p - p_0}{E_в}\right)$ (4)

we get the well-known equation for the so-called elastic filtration.

$$\sum_{i=1}^{2} \frac{\partial^2 H}{\partial X_i^2} = \frac{1}{\alpha^*}\frac{\partial H}{\partial t} + \frac{\varepsilon_1 + \varepsilon_2}{km} \qquad (5)$$

$$\alpha^* = \frac{km}{\mu^*}. \qquad \mu^* = m\Delta_в\left(\frac{n_0}{E_в} + \frac{1}{E_{пл}}\right) \quad (6)$$

The ratio (6) for α^* at the suggestion of V.N. Shchelkachev is called the coefficient of piezoconductivity and serves as the main parameter of unsteady pressure filtration. [2].

The coefficient μ^* characterizes the water capacity (or elastic capacity) of the confined layer and, as can be seen from (6), is determined to a large extent by the indicators of the deformability of water and the rock that composes the layer

(E_0 и $E_0 -$ respectively, the modulus of deformation of water and layer).

For loose and weakly cemented rocks (sands, sandstones), the reservoir deformation modulus can be expressed through the compaction coefficient

$\alpha_y = \frac{\partial \varepsilon_к}{\partial p} \approx \frac{\Delta \varepsilon_к}{\Delta p}$ determined from compression test data.

$$E_{пл} \approx \frac{1 + \varepsilon_{ок}}{\alpha_y} \qquad (7)$$

where $\varepsilon_к$- porosity coefficient of rocks at pressure P,

$\varepsilon_{ок}$-initial porosity at pressure p_0,

In this case, given that $\varepsilon_{ок} = \frac{n_0}{1 - n_0}$ (n_0 - initial porosity)

$$\mu^* = m\,\Delta_в\left[\frac{n_0}{E_в} + (1 - n_0)\alpha_y\right] (8)$$

Where the coefficient μ^* - is a dimensionless quantity.

According to its physical meaning, the coefficient μ^*

Represents the ratio of the amount of water $v_в$ –which can be extracted from the reservoir (with a decrease in pressure during pumping) or taken by the reservoir (with an increase in pressure during injection) and changes in porosity, to the volume of the "funnel" of depression $v_{нп}$- formed in the piezometric surface of the formation;

$$\mu^* = \frac{V_n}{V_{н.п}} \approx \frac{V_n}{\Delta H_{ср} w} \quad (9)$$

Here $\Delta H_{ср}$ – average pressure drop in the reservoir area. Limiting the "funnel" of depression.

For pressureless waters with a free surface (see 1b), one should put in the balance equation m=H (X_i t).Then for κ = const we obtain the following nonlinear equation;

$$k\sum_{i=1}^{2}\frac{\partial}{\partial x_i}\left(\rho H\frac{\partial H}{\partial x_i}\right) = n\rho\frac{\partial H}{\partial t} + H\frac{\partial(n\rho)}{\partial t} - \rho(\varepsilon_1+\varepsilon_2) \quad (10)$$

Usually, for practical calculations, this equation is reduced to a linear one, and two methods of linearization are used.

According to the first method (Bagrova and Verigin), both sides of the equation are multiplied by the value H, which is introduced under the sign of the time derivative, and before the rest of the equation terms are averaged and taken as a constant factor H = Hcp = const.

In this case, the equation will be expressed with respect to the function

u = $\frac{H^2}{2}$

According to the second method (Boussinesq), the value of H is taken out of the sign of the derivative with respect to coordinates (the left side of the equation) and averaged. This method leads to an equation for the pressure function in the first degree; $u=H$.

If we now assume that the factor n at the derivative $\frac{\partial H}{\partial t}$ in the equation (10) characterize the effective, or so-called. active, porosity n0 is approximately equal to the water yield of rocks during their drainage or gravitational water yield μ, that is, n≈ n_0 ≈ μ , then equation (10) can be represented in the following form;

With the first method of linearization

$$\sum_{i=1}^{2}\frac{\partial^2\left(\frac{H^2}{2}\right)}{\partial X_i^2} = \frac{1}{\alpha^{**}}\frac{\partial\left(\frac{H^2}{2}\right)}{\partial t} + \frac{\varepsilon_1+\varepsilon_2}{k} \quad (11)$$

With the second method of linearization

$$\sum_{i=1}^{2}\frac{\partial^2 H}{\partial X_i^2} = \frac{1}{\alpha^{**}}\frac{\partial H}{\partial t} + \frac{\varepsilon_1+\varepsilon_2}{kH_{ср}} \quad (12)$$

In these equations

$$\alpha^{**} = \frac{kH_{ср}}{\mu+\mu^*} \quad (13)$$

It can be called a generalized coefficient of piezoconductivity for gravity reservoirs, determined by the indicators of gravitational (μ) and elastic (μ^*) fluid loss. The latter is located here, as in pressure strata, according to formulas (6) and (8) when measuring **m** in them at $\mathbf{H}_{\text{ср.}}$. [3].

Equations (11) and (12), taking into account (13), thus describe the combined gravitational-elastic filtration regime, studied in detail in the work of N.N. Verigin . [7].

It should be noted that since in most cases $\mu \gg \mu^*$, the elastic factor in unconfined formations practically affects to a small extent. Therefore, as a rule, when solving problems of gravity filtration in equation (13), the value μ^* is neglected, that is a purely gravitational filtration regime is considered.

$$\alpha^{**} \approx \alpha \approx \frac{kH_{\text{ср}}}{\mu} \quad (14)$$

To solve the above equations (5), (11) and (12), the initial and boundary conditions must be formulated, which characterize the conditions for feeding the aquifer and its interaction with the surrounding aquifers and surface water sources. In particular, some of these conditions, namely, the planes of the top and bottom of the reservoir, are already included in the equations themselves in the form of terms ε_1 and ε_2 — they estimate the intensity of the reservoir feeding within the area of its distribution. Table 6 shows the diagrams of the structure of the layers in the section and, in relation to them, the mathematical expressions for ε_1 and ε_2.

Scheme 1 illustrates a homogeneous gravity reservoir in the presence of atmospheric recharge (by infiltration of atmospheric precipitation or losses uniformly distributed over the area from a rarefied hydrographic network.) With the intensity $\varepsilon_1 = \varepsilon_{\text{инф}} = f(X_i\, t)$. The patterns of change in the value of $\varepsilon_{\text{инф}}$ in this case can be varied. The table shows the cases of an area-discrete distribution of infiltration, which in time t can vary linearly or exponentially. [7].

There may also be a dependence of the $\varepsilon_{\text{инф}}$ value on the reservoir head H, the specific formulas of these dependencies are found according to experimental data.

In the remaining schemes of Table 6, in addition to the infiltration $\varepsilon_{\text{инф}}$, the feeding of the main layers (they are indicated by the parameters κm and the pressure H without numerical indices) is carried out by filtration from neighboring, above and below located aquifers. The values of ε_1 and ε_2 in such conditions are expressed by the vertical filtration rate at the top and bottom of the formation, and to determine it, the corresponding filtration equations for adjacent layers, which reflect the value of atmospheric supply, must be solved. [6].

Schemes and the formulation of typical conditions on the contours of the reservoir in the plan under which the initial differential equation should be solved are presented in Table 2.

The most common is the limitation of an aquifer of a surface layer by a surface watercourse (river, reservoir, etc.) with which the aquifer is hydraulically connected.

Such a connection can be perfect when it is permissible to set the conditions **H = const** or **H = f (t)** along the watercourse line (diagram .1), or difficult, not perfect - with incomplete insertion of the watercourse into the aquifer and the presence of siltation in the watercourse bed and poorly permeable interlayers and lenses that impede water filtration (schemes 2 and 3). [3].

If the aquifer borders on another aquifer with different filtration properties, at the contact of the layers, the conditions of equality of normal (to the contact line) flows and the pressure functions themselves are accepted (Scheme 4), which expresses the principle of the continuity of filtration flows during the transition from one layer to another.

Specific feeding conditions are created in areas where pressure strata emerge to the surface (for example, in the marginal parts of artesian basins). Here drainage of the formation can take

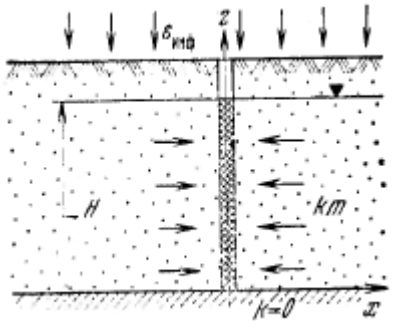
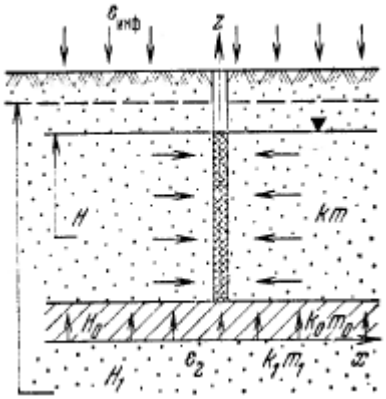
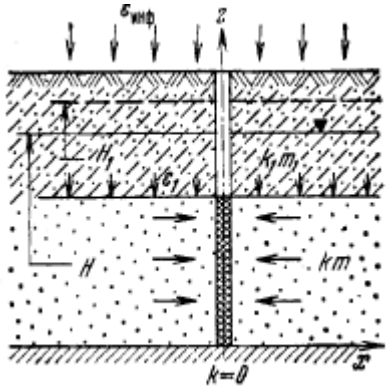
place while simultaneously feeding it with atmospheric precipitation, therefore, the flow balance at the boundary will be expressed in the form of the ratio given in Table 2 (Scheme 5).

Finally, in many cases, the aquifer in question is in contact with very weakly permeable, practically impervious rocks. Accordingly, the flow of water across the border is assumed to be zero.

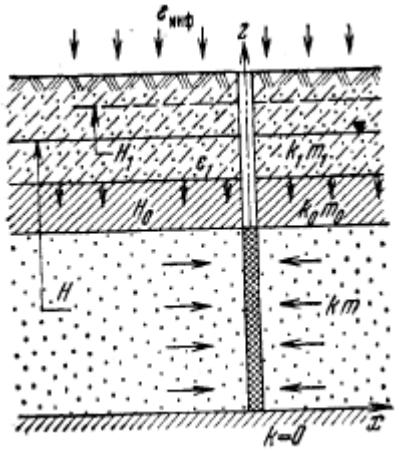
To solve the initial equations, the operating conditions of the water intake facilities must also be known. As a rule, the operation of wells, horizontal and other types of water intakes is carried out at a known (predetermined in accordance with the planned water consumption) flow rate: $\boldsymbol{Q_n = f(t)}$, in a particular case $\boldsymbol{Q_n}$ = **const.** [4].

In some cases, water intake structures are operated at given pressure levels in them $H_в = \boldsymbol{f(t)}$, in particular H_n = **const**.

Table 1. Diagram of aquifers and conditions at the top and bottom.

№ П/п	Reservoir diagram	Expressions for ε_1 *and* ε_2 in the filtration equations
1		$\varepsilon_1 = \varepsilon_{инф}$; $\{\varepsilon_{инф}$=$[\varepsilon_{инф}(t, H)$ for $x_{i1} < x_i < x_{i2}$ 0 $for\ x_i > [x_{i\,1.2}]$ $\varepsilon_1 = 0$
2		$\varepsilon_1 = \varepsilon_{инф}$ $\varepsilon_2 = K_0 \frac{\partial H_0}{\partial z}\|_{z=m_0}$ *When* $\mu_0 = 0$ *(hard mode in a separate layer).* $\varepsilon_2 \approx \frac{K_0}{m_0}(H_1 - H)$
3		$\varepsilon_1 = K_1 \frac{\partial H_1}{\partial z}\|_{z=m}$ When $\mu_1 = 0$ (hard mode in the upper layers). $\varepsilon_1 \approx \frac{K_1}{m_1}(H_1 - H)$ $\varepsilon_2 = 0$

4



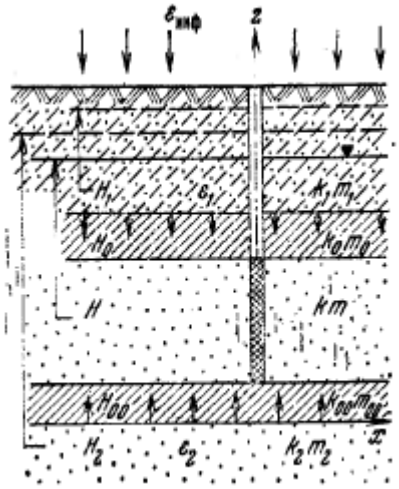
$$\varepsilon_1 = K_0 \frac{\partial H_0}{\partial z}|_{z=m}$$

When $\mu_0 = 0$ (*hard mode in a separate layer*).

$$\varepsilon_1 = \frac{K_0}{m_0}(H_1 - H)$$

$$\varepsilon_2 = 0$$

5



$$\varepsilon_1 = K_0 \frac{\partial H_0}{\partial z}|_{z=m+m_{00}}$$

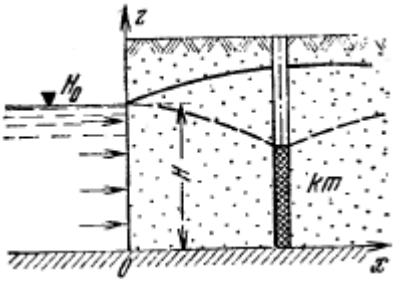
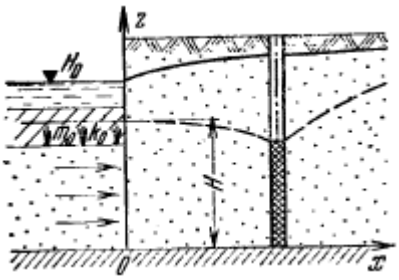
$$\varepsilon_2 = K_{00} \frac{\partial H_{00}}{\partial z}|_{z=m_{00}}$$

When $\mu_0 = \mu_{00} = 0$ (*hard mode in a separate layer*).

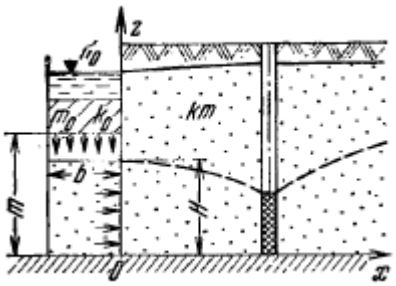
$$\varepsilon_1 = \frac{K_0}{m_0}(H_1 - H)$$

$$\varepsilon_2 = \frac{K_{00}}{m_{00}}(H_2 - H)$$

Table 2. Aquifer diagrams and contour conditions in plan

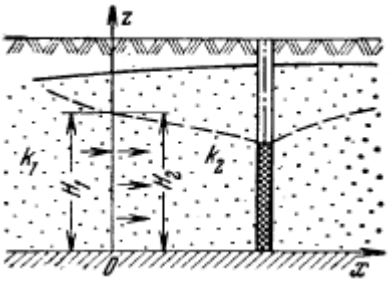
№ П/п	Reservoir diagram	Border conditions x=0
1		$H = f(t)$ In a particular case $H = H_0 = const$
2		$\frac{\partial H}{\partial x} = \lambda(H_0 - H)$

3



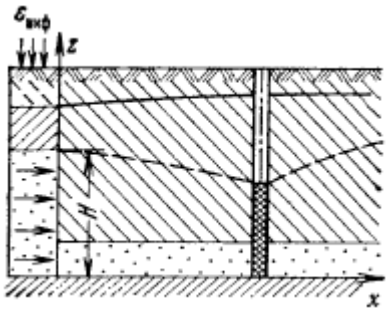
$$\frac{\partial H}{\partial x} = \frac{K_0}{KHm_0}(H_2 - m)\text{b}$$

4



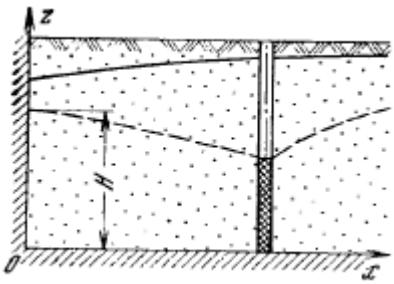
$$K_1\frac{\partial H_1}{\partial x} = K_2\frac{\partial H_2}{\partial x}$$
$$H_1 = H_2$$

5



$$\varepsilon_{инф} - \mu\frac{\partial H}{\partial t} = K\frac{\partial H}{\partial x}$$

6



$$\frac{\partial H}{\partial x} = 0$$

III. Conclusions. As can be seen from the above schemes and formulas, it is possible to zone the territories of the construction areas of the Republic of Karakalpakstan. Filtration calculations should be based on sufficiently reliable data from engineering-geological and engineering-hydrogeological surveys in the area of the protected area in order to correctly display the actual natural conditions in the calculation schemes on their basis**.** The information necessary for these purposes should contain an assessment of the geological structure (the nature of the occurrence of soils) of the protected area, the water permeability of soils (the value of filtration coefficients), the position of the depression surface in its natural state, the nature of nutrition and drainage of groundwater in natural conditions.

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Rezyume: *Hududni suv bosishi darajasiga, suv toshqini oqibatlari va undan kelib chiqadigan moddiy zararga, tabiiy sharoitlarga, himoya inshootlari va drenaj larini qurish imkoniyatiga qarab, himoya choralari ko'rib chiqilayotgan hududda yoki uning faqat bir qismida amalga oshiriladi. drenaj tizimini tanlash suv balansi, fil'tratsiya va gidravlik hisob-kitoblar, shuningdek variantlarni texnik va iqtisodiy taqqoslash asosida amalga oshiriladi.*

Резюме*: В зависимости от степени подтопления территории, последствий подтопления и материального ущерба от него, природных условий, возможностей строительства защитных сооружений и устройств защитные мероприятия осуществляются на всей рассматриваемой территории или только ее части. Выбор системы защитных мероприятий осуществляется на основе водобалансовых, фильтрационных и гидравлических расчетов, а также технико-экономического сравнения вариантов.*

Kalit so'zlar: *drenaj, ratsion, foydalanish, chora-tadbirlar, himoya, inshootlar, qurilmalar, suv balansi, gidravlik hisoblash.*

Ключевые слова: *дренаж, нормирование, использование, меры, защитные, сооружения, устройства, водный баланс, гидравлический расчет.*

UDC 599.32

THE REPRODUCTION OF MIDDAY GERBILS (MERIONES MERIDIANUS PALLAS 1773) IN THE NORTH-WESTERN KYZYL-KUM

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Summary: *The article presents the results of the North-Western Kyzyl-Kum inhabiting midday gerbils of reproduction of perennial average indicators, on the number of average indicators of embryos. It is substantiated that it is related to the drying up of the Aral Sea and changes in ecological indicators, adaptations and conservation of the number of populations.*

Keywords: *dynamics of changes, population, embryo, reproduction*

According to the reproduction of the number of midday gerbils in 1986-2019, our material collected in 2016-2019 (1100 heads) and perennial materials of the Karakalpak Plague Control Branch, this species began to breed from March to October. It is known that the best winter and spring are those that give birth to the number of breeding years from the beginning of February to the end of the year, for example, in February 1962-1963. The number of embryos of midday gerbils was 4.5% of the number of females examined, and the average number of embryos per female was 3.5. This early breeding was observed in other areas of this species. It was studied by Yu.M.Rall (1936, 1938, 1939); A.A.Lisitsin, M.P.Demyashev (1961); M.P.Demyashev (1962); V.S.Petrov, M.V.Sheykina (1950) in Volga-Ural and Western Kazakhstan; A.N.Pavlov (1959, 1965) studied in the territories of the North-Western Caspian Sea, G.A.Asenov (1968) studied in the territories of the Kyzyl-Kum of Karakalpakstan.

Our long-term materials, the conclusions of the studied and analyzed in various areas of the North-Western Kyzyl-Kum of midday gerbils are presented in Table 1 and Table 2.

As can be seen from the materials, the number of pregnant gerbils in 1965-1966 and 1989-1990 in January was 1-5%, and the average number of embryos in each of them was 4-5 (Table 3), from the second decade of March (decade) up to 33% in 1966-1967; 8.7% in 1998, while in the first decade of the year these indicators were 16.6% (1966-1967); up to 50.0% (1998) the average number of embryos per head was 4.5-6.1.

The pregnancy indicators for this species - in the first decade of April 21.4% (1990-2010), 33.0% (1966-1967), in 1998 reached 63.6%, the average number of embryos is not less than 4.0-5.6 , this indicator in the month of the second decade is 20.1-45.0% and 50.0%, and in the third decade the number of pregnant females is 33.0% (1966-1967), 16.5% (1980-1990), 49.1% (2000-2010) and 50.0% turned out to be about (2000).

The increase in the number of midday gerbils in the first 1-2 decades of May 1966-1967 was 20-66% of the number of pregnant females, the average number of embryos was 5.5-6.0 each.

In the period from 1980 to 1990, these indicators were 43.2% in the first decade, 20.7% in the second decade and 32.1% in the third decade, with an average of 5.7-6.3 embryos. In August, the number of embryos was 5.7-18.5%, and the average number of embryos in each of them was 5.3-6.5.

Most breeding of midday gerbils continued in the fall. For example, in the second decade of September 1966-1967 the number of pregnant gerbils was 33.0% and the average number of embryos was 4.5. In 1978-79 in the second decade of September, this figure was 23.7%, and the average number of embryos was 4.7. In 1989-90 the reproduction of the number of midday gerbils continued in the 3rd decade of September, and in the 1st and 2nd decades of October, the number of pregnant gerbils did not exceed 0.3-2.3%, the average number of embryos was 3.5-4.7-5.0.

Table 1

The reproduction of midday gerbils in the North-Western Kyzyl-Kum

Months	Decade	1966-1967			1980-1990			2000-2010			2016-2019		
		Age and sex females	Including pregnant gerbils in %	The average number of embryos per female	Age and sex females	Including pregnant gerbils in %	The average number of embryos per female	Age and sex females	Including pregnant gerbils in %	The average number of embryos per female	Age and sex females	Including pregnant gerbils in %	The average number of embryos per female
III	**1**	3	1,0	5,0	-	-	-	105	5,5	4,0	-	-	-
	2				123	0	0	36			33		
IV	**1**				83			13					
	2	3	33,0	5,0				26			8	8,7	6,1
	3	12	16,6	4,5				88			16	50,0	5,6
V	**1**	3	33,0	4,0	395	5,0	6,4	340	21,4	5,6	11	63,6	4,7
	2	6	45,0	4,0				469	20,1	5,2	2	50,0	5,0
	3	6	33,0	6,0	2315	16,5	5,7	307	49,1	5,6	8	50,0	5,8
VI	**1**	5	20,0	6,0				155	43,2	5,8	31	32,2	5,3
	2	3	66,0	5,5				166	20,7	5,7	56	30,3	5,4
	3				1128	36,0	5,8	106	32,7	6,3	78	16,4	4,2
VII	**1**							77	22,1	5,0			
	2							31	12,9	5,7	4	25,0	4,0
	3				38	45,0	7,4	10					
VIII	**1**							9	11,1	3,0			
	2							21	24,0	4,4			
	3	6			473	5,7	5,3	13			9		
IX	**1**							13					
	2							23					
	3				108	18,5	5,5	26	7,7	6,5			
X	**1**							44	6,8	3,7	11		
	2	20	33,0	4,5	325	23,7	4,7	127	11	3,6	2		
	3	30						342	13,7	4,0	52	2,4	2,5
XI	**1**	74						568	2,3	4,3	142		
	2				932	0,7	4,7	716	0,3	5,0	117	0,9	5,0
	3				246			258			49		

Table 2

The reproduction of the potential of midday gerbils in the Nukus sands of the Western Kyzyl-Kum

Years	Age and sex females	Including pregnant gerbils in %	The number of embryos per 100 females	Giving birth for a year	The reproduction per year in %	The number of embryos per female	The reproduction, the number of decades
1970	1408	288(20,4)	951,4	1,9	415,1	4,9	11
1980	6930	641(10,0)	424,0	0,8	176,1	5,5	7
1990	3747	263(7,0)	1005,6	1,3	301,2	5,4	14
2000	1595	208(13,0)	1091,0	1,3	312,5	5,7	8
2016-2019	542	189(35,1)	2265,3	0,9	664,4	5,2	12

We analyzed the material over 24 years and have seen breeding over the past 9 years, 10, 17 decades, and 6-9 decades over 15 years. Over the last 10-17 decades 1970, 1972, 1985, 1986, 1988, 1989, 1991, 1998, the breeding potential of the number of midday gerbils (by the number of embryos per adult female) increased from 931.9 to 2265.3, and there was also a high annual increase. Also, in the 7th year of the 24th year, the number of adult females of each sex was shown 2-3 times, in the 14th year - once or twice, only in the 3rd year of life the average fertility of each female was low. The average potential for long-term growth of reproduction of midday gerbils in the sands of the Nukus region (as a percentage of the number of pregnant gerbils) is 10.5%. While in some years it is up to 20, 30, 48%, and in different years it does not increase and equal to 5.3-7.2%. The average number of embryos ranged from 4.2 to 5.9. It is noteworthy that the number of pregnant gerbils in 1966-1967 was 31.7%, the average number of embryos was 4.9, in 1978-1979 - 16.7% and 5.0 embryos, in 1989-1990 - 17.9%, the number of embryos was 4-9, in 1998 - 29.9% and the number of embryos was 4-9.

The reason for the decrease in these indicators every 10 years is associated with the rapid drying of the Aral Sea and the deterioration of the ecological situation in the region, on the other hand, we think that adaptation to the changing ecological situation is a manifestation of the mobilization of all biological resources of the body to maintain the population.

Midday gerbils have a high potential for mass reproduction in April and May in the conditions of dramatic changes of the environment. In particular, the first peak of pregnancy occurs in the 2nd decade of April and 1-2 decades of May.

In some years it may be a decade earlier or later or so. The continuous growth of this species is due to the fact that the population has different kinds and their puberty does not occur simultaneously. The number of the wintered multiplies at least twofold. The first cousins start puberty. Reason: according to our estimates for 1963, 1979, 1989, in April, 1-2 decades of May, it was found that about 21% of pregnant gerbils, and in May, about 6-10% of cases were repeated.

The most interesting thing is that the North-Western section of Kyzyl-Kum is the place where the Central Asian peninsula is divided into two, and the border of the North and South

peninsula runs along the sands of the Nukus section of sands, which are the middle of the territory. The giving birth midday gerbils can be seen by the number of embryos listed below (Table 3). As can be seen from Table 3, midday gerbils have the highest fertility in the post-western part of the Kyzyl-Kum Desert.

Of the 604 surveyed females (10.1%) had low fertility which comprises 10.1%, 82.6% had average fertility, 5-8 embryos and 6.6% had high fertility, compared with 9-11 embryos of giving birth.

Table 3

The fertility rate of the midday gerbil in the North-Western Kyzyl-Kum

Number of embryos	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**Total**	**The average number of embryos**
Occurrence	2	30	29	172	156	122	50	33	7	3	604	5,8
Number of embryos	4	90	346	860	936	859	400	297	70	33	3835	-
Pregnancy in %	0,3	5,6	4,4	28,4	25,8	20,2	8,2	3,0	1,1	0,5	-	-
Pregnancy in %	10,2			82,6				6,6			-	

According to our materials, in the population of the Nukus sandy region, the annual number of this species in the spring is 51-55%, 72-84% of mice aged 6-8 months in autumn, 3.5-4% of mice in the fall is found in the amount of 0.4-0.6%.

Conclusion

1. The studying of the reproduction of the number of midday gerbils, the beginning of the reproduction process in the North-Western Kyzyl-Kum population of the species, the maximum number of giving birth once a year, each average number is the maximum, the minimum number of embryos per year.

2. The determination of the fertility of this species under the conditions of the Kyzyl-Kum is of great practical importance in determining the size of the population, its growth, seasonality, long-term dynamics, anti-epidemiological measures in some epizootic conditions.

3. The study of the rate of reproduction of biopotential is considered a scientific study of the quantitative dynamics of a species as a factor that determines the role of the system in the epizootic process of a species.

4. It was found that midday gerbils in the North-Western Kyzyl-Kum range took 8-10 years to reproduce and varied depending on living conditions.

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Rezyume: *Maqolada Shimoliy-Ǵarbiy kızılkumida yashovchi tushki qum sichqonining kòp yillik ortacha kòpayish potentsiali, ortacha embrion soniga asoslangan. Bu tuǵuvchanlik kòrsatkichlari Orol deńgizining qurib borishi va ekologik sharoitga moslashishi, populyatsiya sonini saqlab qolishi bilan boǵlik ekanligi kursatilgan.*

Резюме: *В основе статьи - средний многолетний репродуктивный потенциал полуденных песчанок, обитающей в северо-западных кызылкумах, и среднее количество эмбрионов. Было показано, что эти коэффициенты рождаемости связаны с высыханием Аральского моря и его адаптацией к условиям окружающей среды, поддерживая популяцию.*

Kalit so'zlar: *dinamik òzgarishlar, populyatsiya, embrion, kòpayishi.*

Ключевые слова: *динамика изменений, популяция, эмбрион, размножения.*

UDC 517.95

SOLVABILITY OF A BOUNDARY VALUE PROBLEM FOR THE SECOND ORDER EQUATION OF PARABOLIC-HYPERBOLIC TYPE

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Summary: *In this paper, we investigate the solvability of a boundary value problem for equations of parabolic-hyperbolic type. The uniqueness, existence and stability of regular solutions are proven. Regular solution of the problem is constructed by the method of separation of variables.*

Keywords: *parabolic-hyperbolic equation, method of separation of variables, Fourier series, convergence, boundary value problem.*

Intensive research on problems in the theory of boundary value problems for equations of mixed type have been conducted since the twenties of the last century, the foundations of which were laid in the fundamental works of F. Trikomi, S. Gellerstedt, A.V. Bitsadze, F.I. Frankl and K.I.Babenko.

The interest in the study of boundary value problems for equations increased especially after the discovery of their connection with the problems of gas dynamics, the theory of infinitesimal bendings of surfaces, and the momentless theory of shells. This interest is due not only in practical terms, but also in the large mathematical content of the problems arising here.

In this regard, in recent years, the theory of boundary value problems for equations of mixed type has been developing rapidly and has become one of the central problems of the theory of partial differential equations. In [1] - [6] and many others, the theory of mixed-type equations developed in various directions.

In this paper, we consider the questions of the unique solvability of a boundary value problem for an equation of mixed type.

Formulation of the problem. In the domain of $\Omega=\{(x,t):0<x<q,\ -T<t<T, T>0\}$ consider the equation

$$\begin{cases} u_t-u_{xx}=f(x,t), & t>0 \\ u_{tt}-u_{xx}=f(x,t), & t<0 \end{cases} \tag{1}$$

where $f(x,t)-$ given function.

We denote $\Omega^+=\Omega\cap(t>0),\Omega^-=\Omega\cap(t<0).$

Problem A. Find in domain Ω solution $u(x,t)$ equation (1) satisfying the gluing conditions

$$\frac{\partial^k u}{\partial t^k}(x,+0)=\frac{\partial^k u}{\partial t^k}(x,-0),\quad k=0,1\quad 0\le x\le q, \tag{2}$$

boundary conditions

$$u(0,t)=u(q,t)=0,\qquad -T\le t\le T, \tag{3}$$

$$u(x,-T)=0,\qquad 0\le x\le q, \tag{4}$$

Uniqueness of the solution.

Theorem 1. Let the numbers q and T such that for $n=1,2...$

$$\left|\cos\left(\frac{n\pi}{q}\right)T-\left(\frac{n\pi}{q}\right)\sin\left(\frac{n\pi}{q}\right)T\right|\geq\delta_0>0, \tag{5}$$

then if there is a regular solution to problem A, then it is unique.

Proof. Let there be two solutions $u_1(x,t)$ and $u_2(x,t)$ tasks. Their difference satisfies the homogeneous equation (1) and conditions (2) - (4). We denote this difference by $u(x,t)$, i.e. $u(x,t)=u_1(x,t)-u_2(x,t)$...

It is known that the functions

$$X_n(x)=\sqrt{\frac{2}{q}}\sin\lambda_n x,\quad \lambda_n=\frac{n\pi}{q},\quad n=1,2,..., \tag{6}$$

form in $L_2(0,q)$ complete orthonormal system.

We denote

$$u(x,t)=\begin{cases}u^+(x,t),\ (x,t)\in\Omega^+\\ u^-(x,t),\ (x,t)\in\Omega^-\end{cases}$$

Consider the integrals

$$\int_0^q u^+(x,t)X_n(x)dx=\alpha_n(t),\quad n=1,2,\ldots.\ \ t>0, \tag{7}$$

and for negative values

$$\int_0^q u^-(x,t)X_n(x)dx=\beta_n(t),\ n=1,2,\ldots.\qquad t<0, \tag{8}$$

where the functions $X_n(x)$ are defined in (6).

Suppose that the condition

$$\lim_{x\to 0+0}u_x(x,t)\cdot x=\lim_{x\to p-0}u_x(x,t)\cdot(q-x)=0,\quad -T\leq t\leq T. \tag{9}$$

Based on (7), (8), we introduce the functions

$$\alpha_{n,\varepsilon}(t)=\int_{\varepsilon}^{q-\varepsilon}u(x,t)X_n(x)dx,\ n=1,2,...,\ t>0,\ 0<\varepsilon<q, \tag{10}$$

$$\beta_{n,\varepsilon}(t)=\int_{\varepsilon}^{q-\varepsilon}u(x,t)X_n(x)dx,\ n=1,2,...,\ t<0,\ 0<\varepsilon<q, \tag{11}$$

moreover $(\varepsilon,q-\varepsilon)\neq\varnothing$. Differentiating (10) once by t and (11) twice t, and integrating two times by parts, passing to the limit as $\varepsilon\to 0$ taking into account conditions (9) and (3), we obtain the equations

$$\alpha_n'(t)+\lambda_n^2\alpha_n(t)=0,\qquad n=1,2,...,\quad t>0, \tag{12}$$

$$\beta_n''(t)+\lambda_n^2\beta_n(t)=0,\qquad n=1,2,...,\quad t<0 \tag{13}$$

Solving equations (12) and (13) under the conditions $\beta_n(-T)=0$, $\alpha_n(0)=\beta_n(0),\alpha_n'(0)=\beta_n'(0)$ we get $\alpha_n(t)=0,\beta_n(t)=0$ at $t\in[-T,T]$... Then, the right-hand sides of equality (7) and (8) will be equal to zero. Hence it follows the orthogonality $u(x,t)$ to the complete system (6). Hence $u(x,t)\equiv 0$.

Existence of a solution.

Theorem 2... If $f(x,t)\in C_{x,t}^{1,0}\left(\overline{\Omega}\right)$, $f_x(x,t)\in L_2(0,q)$, $\forall\, t\in[-T,T]$ and $f(0,t)=f(q,t)=0$, and condition (5) is satisfied, then a regular solution to problem A exists and belongs to the class $C_{x,t}^{2,1}\left(\overline{\Omega^+}\right)$ at $t>0$ and $u(x,t)\in C_{x,t}^{2,2}\left(\overline{\Omega^-}\right)$ at $t<0$.

Proof. Particular solutions of equation (1), which are not equal to zero in the domain Ω, we will search in the form $u(x,t)=X(x)\cdot T(t)$, satisfying zero boundary conditions (3). Substituting this product into the homogeneous equation (1), we obtain with respect to $X(x)$

$$X''(X)-\lambda^2 X(X)=0,\qquad 0<x<q, \tag{14}$$

We solve equation (14) with conditions (3), which turn into the following

$$X(0)=X(q)=0. \tag{15}$$

The solution to problem (14), (15) has the form (6). We seek the solution of equation (1) in the form of series

$$u^+(x,t)=\sum_{n=1}^{\infty}u_n^+(t)X_n(x),\qquad t>0, \tag{16}$$

and at $t<0$ as

$$u^-(x,t)=\sum_{n=1}^{\infty}u_n^-(t)X_n(x) \tag{17}$$

Solutions (16) and (17) satisfy conditions (3). Decomposing $f(x,t)$ in a Fourier series in terms of eigen functions $X_n(x)$ problems (14), (15), as well as substituting (16) and (17), respectively, into equation (1), we arrive at the following two equations

$$u_n^{+'}(t)+\lambda_n^2 u_n^+(t)=f_n(t),\quad t>0,$$

$$u_n^{-''}(t)+\lambda_n^2 u_n^-(t)=f_n(t),\quad t<0.$$

Solving these equations with conditions (2), (4), we obtain

$$u_n^+(t)=\frac{\sin\frac{\pi n}{q}T\cdot e^{-\frac{\pi n}{q}t}}{\cos\frac{\pi n}{q}T-\frac{\pi n}{q}\sin\frac{\pi n}{q}T}\left[\int_{-T}^{0}f_n(\tau)\left(\sin\frac{\pi n}{q}\tau+\cos\frac{\pi n}{q}\tau\right)d\tau+f_n(0)\right]-$$

$$-\frac{qe^{-\left(\frac{\pi n}{q}\right)^2 t}}{\pi n}\int_{-T}^{0}f_n(\tau)\sin\frac{\pi n}{q}\tau d\tau+\int_{0}^{t}f_n(\tau)e^{-\left(\frac{\pi n}{q}\right)^2(t-\tau)}d\tau;$$

$$u_n^-(t)=\frac{\sin\frac{\pi n}{q}(T+\tau)}{\cos\frac{\pi n}{q}T-\frac{\pi n}{q}\sin\frac{\pi n}{q}T}\left[\frac{q}{\pi n}\int_{-T}^{0}f_n(\tau)\left(\frac{\pi n}{q}\sin\frac{\pi n}{q}\tau+\cos\frac{\pi n}{q}\tau\right)d\tau+\frac{q}{\pi n}\cdot f_n(0)\right];$$

It can be verified directly that the function

$$u(x,t)=\begin{cases} u^{+}(x,t)=\sum\limits_{n=1}^{\infty}u_n^{+}(t)\cdot X_n(x), & (x,t)\in\Omega^{+} \\ u^{-}(x,t)=\sum\limits_{n=1}^{\infty}u_n^{-}(t)\cdot X_n(x), & (x,t)\in\Omega^{-} \end{cases} \tag{18}$$

will be a regular solution to Problem A.

Under condition (5) and using the Cauchy-Bunyakovsky inequality, we have

$$\left|u^{+}(x,t)\right|\le C, \qquad \left|u^{-}(x,t)\right|\le C_1. \tag{19}$$

where $C,C_1=const>0,$ and by virtue of this, the series in (18) converge absolutely and uniformly in the domain under consideration.

Moreover, under the conditions of Theorem 2, the functions imposed on the function $f(x,t)$, the series in (18) can be differentiated term by term with respect to t and twice by x v Ω^{+} and term wise two times t and twice by x in Ω^{-}, and the obtained series converge absolutely and uniformly in the domain $\overline{\Omega}.$. Hence it follows that $u(x,t)\in C_{x,t}^{2,1}\left(\overline{\Omega^{+}}\right)$ at $t>0$ and $u(x,t)\in C_{x,t}^{2,2}\left(\overline{\Omega^{-}}\right)$ at $t<0.$

The stability of the obtained solution to the problem $u(x,t)$ can be shown by evaluating

$$\|u\|_{C(\overline{\Omega})}\le C_2\|f\|_{L_2(\Omega)}+C_3\|f(x,0)\|_{L_2(0,q)},$$

where $C_2,C_3=const>0.$ The estimate is obtained using the properties of the scalar product.

Since there is a trace of the function in the solution of the problem, $f_n(0),$ then for this problem it is impossible to obtain an estimate of the solution in the norm $L_2(\Omega),$ therefore, it is not possible to prove strong solvability for this problem.

Note also that since the constructed solution $u(x,t)$ the considered problem belongs to the class $u(x,t)\in C_{x,t}^{2,1}\left(\overline{\Omega^{+}}\right)$ at $t>0$ and $u(x,t)\in C_{x,t}^{2,2}\left(\overline{\Omega^{-}}\right)$ at $t<0,$ then condition (9) is always satisfied.

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Rezyume: *Bu maqolada parabola-giperbolik tipdagi tenglama uchun bitta chegaraviy masala o'rganilgan. Masalaning yagona regulyar echimining mavjudligi va turg'unligi isbotlangan. Masala yechimi Fure qatori yordamida qurilgan.*

Резюме: *В данной работе исследована разрешимость одной краевой задачи для уравнения парабола-гиперболического типа. Доказаны единственность, существование и устойчивость регулярного решения. Регулярное решение рассматриваемой задачи строится методом разделения переменных.*

Kalit so'zlar: *parabolik-giperbolik tenglama, o'zgaruvchilarni ajratish usuli, Furye qatori, yaqinlashish, chegaraviy masala.*

Ключевые слова: *уравнение параболо-гиперболического типа, метод разделения переменных, ряд Фурье, сходимость, краевая задача.*

REVIEW OF WIRELESS TECHNOLOGIES IMPLEMENTATION IN AGRICULTURE TO OPTIMIZE IRRIGATION SYSTEM

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Summary: *Controlling water consumption and efficient use of agricultural land are the key issues nowadays in Central Asian countries, especially around the Aral Sea in Uzbekistan. In this paper we review the recent digital technologies offered by the academy and industry to propose their possible implementation in agriculture to optimize water distribution methods.*

Keywords: *wireless technologies, IoT, WSN, sensor, actuator, smart farming, agriculture, soil humidity, water allocation.*

Introduction

Satisfying the changing food habits and increased demand for food intensifies pressure on the world's water, land and soil resources. According to the forecasts of the Food and Agriculture Organization of the United Nations (FAO), in order to provide food for the growing world population, farmers by 2050 will need a stable, fifteen percent more crops than nowadays. And without the widespread introduction of smart agriculture, which allows us to automate agricultural activities as much as possible [1].

Sustainable agricultural practices lead to water saving, soil conservation, sustainable land management, conservation of natural resources, ecosystem and climate change benefits. Accomplishing this requires accurate information and a major change in how we manage these resources. It also requires complementing efforts from outside the natural resources management domain to maximize synergies and manage trade-offs.

Smart agriculture significantly increases crop yields and livestock productivity and reduces production costs [2].

In recent years, very serious and effective measures have been taken in Uzbekistan to develop the agricultural sector, introduce modern innovative technologies into agriculture. One of the priority directions of the "Strategy of actions for the further development of the Republic of Uzbekistan", adopted at the beginning of 2017, is the modernization and intensive development of agriculture. On October 23, 2019, by the Decree of the President, the "Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020-2030" [3] was approved, which covered nine strategic priorities, the first of which was to ensure food security of the population. Further progress in this direction will increase the competitiveness of the sector and turn the existing challenge into new opportunities. But this requires the development and implementation in Uzbekistan of an already existing range of agricultural technologies and innovations used today in other countries of the world.

In this paper we overview existing and proposed information and communication technologies usage in agriculture to optimize the distribution of water resources and land usage.

Smart farming technologies

"Internet of Things" (Internet of Things - IoT) is a system of interaction and information exchange between various devices and machines, which allows you to automate management and control processes through various "smart devices" and significantly reduce human participation in them. The fields of application of IoT technology in agriculture are precision farming, Smart farms, Smart greenhouses, raw material management, storage of agricultural products, agricultural transport management, "Big data" and others.

Precision farming is the use of smart devices to manage crop productivity in response to changes in plant habitats, as well as more efficient land use. Smart greenhouses allow more efficient use of fertilizers, chemicals, water, as well as optimize the number of personnel required to care for crops and reduce losses due to human factors. Smart farms can improve pets' productivity and

product quality, as well as reduce costs. Monitoring the use of agricultural machinery using satellite navigation systems (for example, GPS) and sensors allows us to reduce energy consumption, as well as optimize routes and the workload of personnel serving equipment. The safety of raw materials in the process of collecting and moving them can be ensured by appropriate sensors, which make it possible to fully track both the location and the weight of the moved raw materials. "Smart" storages for vegetables and fruits allow monitoring the state of products during storage using specially set algorithms in real time (storage temperature, humidity level, carbon dioxide content), which helps to make the right decisions. Automation of irrigation allows us to minimize the costs of irrigation water and at the same time to obtain high yields.

The above-mentioned concept of "Smart Agriculture" is based on the "Internet of Things" platform, and presupposes an integrated high-tech system of agricultural management, which includes technologies and tools such as wireless sensor networks, distributed and cloud computing, global positioning geographic information systems (GPS), systems for collecting and controlling spatial information operations (GPS-satellite navigation devices, sensors, RFID systems, etc.), IoT networks for data transmission over long distances LPWAN, NB-IoT (based on LoRa, Sigfox developing competing protocols etc.), satellite monitoring and remote sensing, data analysis (Data Science) and Big Data, estimates of productivity (Yield Monitor Technologies) and variable rate setting (Variable Rate Technology). Wireless sensor networks (WSS) are an important component of IoT.

Possibilities of using WSN in agriculture.

A wireless sensor network is a distributed, self-organizing network of many sensors and actuators, interconnected by means of a radio channel. The coverage area of such a network can range from several meters to several kilometers due to the ability to relay messages from one node to another and depends on the distribution environment (forest, urban development, water bodies) and the terrain.

What is a wireless sensor network?

A sensor is a device that is used to collect information about a physical process or physical phenomenon and convert it into electrical signals that can be processed, measured and analyzed. The term "physical process" used in the above definition of a sensor can be any real information such as temperature, pressure, light, sound, movement, position, flow, humidity, radiation, etc.

A sensor network is a structure consisting of sensors, computing units and communication elements for the purpose of recording, observing, and responding to an event or phenomenon. Events can be related to anything, for example, the physical world, industrial environment, biological system, or IT (information technology) infrastructure, while the controlling or monitoring body can be a consumer application, government, civilian, military or industrial enterprise. Such sensor networks can be used for remote sensing, medical telemetry, surveillance, monitoring, data collection, etc.

Nowadays WSNs are a very promising tool of monitoring events and are used in many other fields, such as agriculture, environmental monitoring of air-water pollution, greenhouse, health monitoring, structural monitoring and more. Given the benefits offered by WSNs compared to wired networks, such as, simple deployment, low installation cost, lack of cabling, and high mobility, WSNs present an appealing technology as a smart infrastructure for building and factory automation, and process control applications [4]. A typical sensor network consists of sensors, a controller, and a communications system. If the communication system in the sensor network is implemented using a wireless protocol, then these networks are called wireless sensor networks or simply WSN (Wireless Sensor Networks).

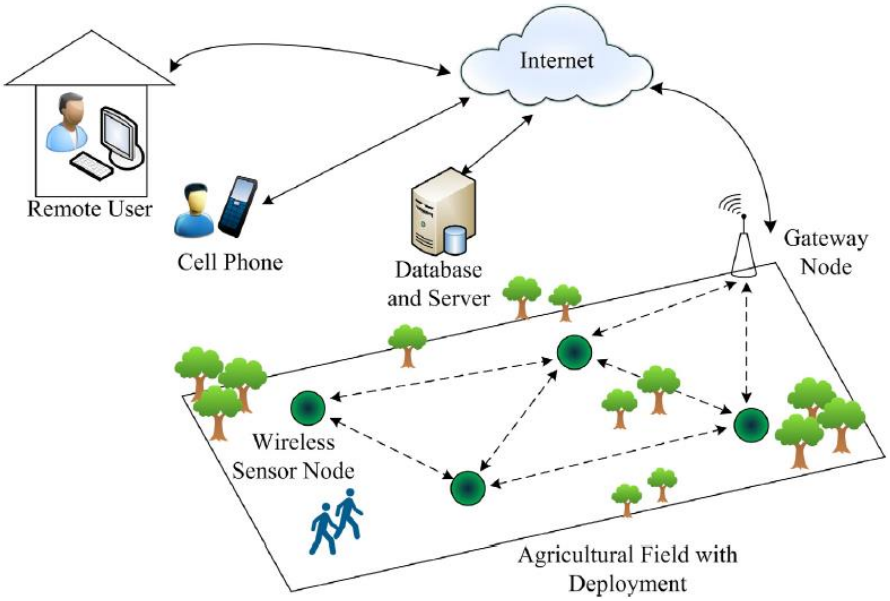

Figure 1 : A typical Wireless Sensor Network deployed for agricultural application [5]

A wireless sensor network consists of sensor nodes that are deployed at high density and often in large numbers and support recognition, data processing, embedded computing, and communications.

Wireless sensor network structure

A typical wireless sensor network can be divided into two elements: a sensor node and a network architecture.

Wireless Sensor Network Sensor Node

A sensor node in a WSN consists of following main components: a power supply, a sensor unit, a processing unit (controller and a memory), and a communication system.

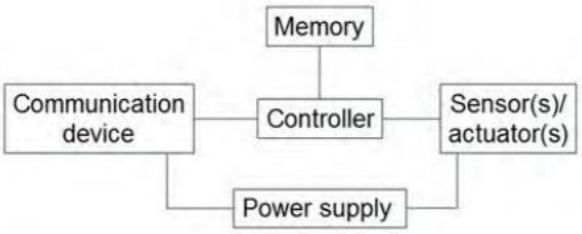

Figure 2 : Components of WSN nodes [4]

Each sensor unit is responsible for gathering information of a certain type, such as temperature, humidity, or light, and is usually composed of two subunits: a sensor and an analog-to-digital converter (ADC). The analog signals produced by the sensor based on the observed phenomenon are converted to digital signals by the ADC, and then fed into the processing unit. The main processor, which is usually a microprocessor or microcontroller, performs intelligent processing and manipulation of data. A communications system consists of a radio communications system, usually a short-range radio, for transmitting and receiving data.

Wireless sensor network architecture

When a large number of sensor nodes are deployed over a large area to collaboratively monitor the physical environment, equally connecting these sensor nodes is important. The sensor node in the WSN not only communicates with other sensor nodes, but also with the base station using wireless communication. The base station sends commands to the sensor nodes, and the sensor nodes perform the task by interacting with each other. After collecting the necessary data, the sensor nodes send the data back to the base station.

The base station also acts as a gateway to other networks over the Internet. After receiving data from the sensor nodes, the base station performs simple data processing and sends updated information to the user via the Internet.

The ubiquitous nature of sensor networks, together with small self-organizing nodes, makes wireless sensor networks a potential automation tool in agriculture. As such, precision farming, automated irrigation scheduling, plant growth optimization, farmland monitoring, greenhouse gas monitoring, agricultural production management, and crop safety are just a few of the possible applications. However, wireless sensor networks have some limitations, such as low battery power, limited computing power, and small sensor node memory. These limitations cause problems in the development of wireless sensor network applications in agriculture.

Most applications based on wireless sensor networks developed for agricultural needs can be used in other areas of life, and vice versa. For example, wireless sensor networks for environmental monitoring with information on soil nutrients are used to predict crop health and product quality over time. Irrigation schedule is predicted using wireless sensor networks by monitoring soil moisture and weather conditions. The performance of an existing WSN-based application can be improved by adding additional sensor nodes to the existing architecture, allowing more parameters to be monitored. The problems that can arise in such applications are determining the optimal placement strategy, measurement interval, energy-efficient MAC protocols and routing protocols [6]. Agricultural solutions based on wireless sensor networks must be very cheap to be available to a wide range of end users.

Conclusion

In conclusion we list here the reasons for using WSN in agriculture. Below are the main features of the WSN, which allowed them to become a potential instrument of automation in the field of agriculture. Very first reason of using WSN in agriculture is the intellectual ability to make decisions. WSN usually contains multiple transit sections (multi-hop) [7], [8]. When the network is deployed over a large area, this property increases the energy efficiency of the entire network, and therefore increases the service life of the network. Using this property, several sensor nodes can interact with each other and jointly make a final decision [9], [10].

The second reason of using WSN in agriculture is their dynamic topology configuration. To conserve battery power, the sensor unit keeps itself in standby mode (i.e., sleep mode) most of the time. Using topology control techniques [11], sensor nodes can jointly make these decisions. To maximize the lifetime of the network, the network topology is configured so that the minimum number of nodes remains active.

The next one is fault tolerance. One of the common problems that must be considered when deploying WSN is that sensor nodes are prone to malfunctions [12]. In such circumstances, broken node placement can lead to loss of connectivity, and this, in turn, affects the overall performance of the network. However, sensor nodes can “self-organize” by dynamically adjusting the network topology [13].

Contextual awareness is the next one. Based on the information received about the physical and environmental parameters, the sensor nodes receive knowledge about the environment. The decisions made by the sensor nodes thereafter are context sensitive [14]. Scalability of WSN. As a rule, WSN protocols are designed to be implemented in any network, regardless of its size and the number of nodes. This property undoubtedly expands the possibilities of using the WSN for numerous applications.

It is often assumed that the WSN consists of homogeneous sensor devices. However, in many realistic scenarios, devices are heterogeneous in terms of processing power, memory, sensitivity, transmit / receive, and movement capability.

Tolerance to communication failures in harsh environmental conditions. Due to its wide range of applications in open agricultural environments, WSNs suffer from the effects of harsh environmental conditions. The WSN protocol stack includes techniques to counter the effects of network outages due to environmental influences [15]. An important feature of WSN is their

autonomous mode of operation and adaptability. In agricultural applications, this function certainly plays an important role and provides a simple and advanced mode of operation [13].

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***Rezyume**: Suv iste'moli va qishloq xo'jaligi erlaridan samarali foydalanishni nazorat qilish Markaziy Osiyo mamlakatlarida, ayniqsa, Orol dengizi atrofidagi joylarda muhim masalalar hisoblanadi. Ushbu maqolada biz tadqiqotchilar va ishlab chiqaruvchilar tomonidan taklif qilingan suv taqsimlash usullarini optimallashtirish uchun qishloq xo'jaligida amalga oshirilishi mumkin bo'lgan rekonstruktiv texnologiyalarni o'rganib chiqamiz.*

***Резюме:** Контроль водопотребления и эффективное использование сельскохозяйственных земель в настоящее время являются ключевыми проблемами в странах Центральной Азии, особенно вокруг Аральского моря в Узбекистане. В этой статье мы рассматриваем последние цифровые технологии, предлагаемые академией и промышленностью, чтобы предложить их возможное внедрение в сельское хозяйство для оптимизации методов распределения воды.*

***Kalit so'zlar**: Simsiz texnologiyalar, Internet uskunalar, WSN, sensor, aktuator, aqlli dehqonchilik qurilmalari, qishloq xo'jaligi, tuproq namligi, suv taqsimoti.*

***Ключевые слова:** Беспроводные технологии, IOT, WSN, датчик, привод, умное сельское хозяйство, сельское хозяйство, влажность почвы, выделение воды.*

UDC 517.95:519.6

ON CONVERGENCE OF DIFFERENCE SCHEMES FOR THE EQUATION OF SPIN WAVES IN MAGNETIC OF THE EASY-PLANE TYPE

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Karakalpak State University named after Berdakh

Summary: *The paper considers the difference schemes of the finite element method of a higher order of accuracy for the equation of spin waves in the magnetic of the easy-plane type (the Sobolev type equations). Using the method of energy inequalities, an a priori estimate is obtained in a certain negative norm. On the basis of the a priori estimates obtained, theorems on the convergence and accuracy of the algorithms under consideration are proved.*

Keywords: *Sobolev type equation, spin wave equation, difference schemes, finite element method, a priori estimates, stability, convergence, accuracy.*

1. Introduction. This study is a direct continuation of the research conducted by the authors in [1], where the problems for the equation of a two-temperature plasma were studied based on the finite element method. Difference schemes of the finite element method of a high order of accuracy were constructed and investigated. The stability and convergence of the constructed difference schemes were proved. Estimates for the accuracy of the scheme were obtained under weak assumptions on the smoothness of solutions to differential problems. Similar studies were conducted in [2 - 5] for high-order Sobolev-type equations. In particular, in [2], schemes of the finite element method for the equation of motion of internal waves of weakly stratified fluids were investigated, and in [3-5], various difference schemes of a higher accuracy were studied for solving equations of gravitational-gyroscopic waves with various boundary conditions. A higher order of accuracy of difference schemes was achieved by special discretization of time and space variables and by the choice of scheme parameters. In [6, 7], similar problems were reduced using some transformation to two equations (one equation contained differentials in time, the other equation contained differentials in space) and then these equations were solved by the finite difference method with the study of quasi-uniform grids. In this case, the constructed schemes have the second-order accuracy in time and in space variables with sufficient smoothness of the solution to the original differential problem.

Recently, the Sobolev-type equations with nonlocal boundary conditions have attracted the attention of many specialists in numerical methods since the practical applications of these equations are numerous (in physics, mechanics, ecology, biology, etc.) [8-12]. Boundary value problems for loaded equations are of particular interest [13-15] since their numerical study is of great practical and theoretical importance [16, 17]. At the same time, numerical methods for solving the problem with local and nonlocal boundary conditions for loaded equations of elliptic, parabolic and hyperbolic types are being intensively studied [18-20]. The constructed difference schemes in these studies are, mainly, of the first or second orders of accuracy in time and space. Therefore, at present, it is important to construct and study difference schemes of a higher order of accuracy.

In this paper, we consider the initial-boundary value problem for the equation of spin waves in the magnetic of the easy-plane type [6]. Three-parameter difference schemes of a higher accuracy constructed and investigated in [5] on the basis of the finite element method with piecewise cubic interpolation, are used for this problem. At that, the parameters of the scheme made it possible to obtain schemes with the fourth-order accuracy in time and the third-order accuracy in space. In addition, the parameters of the scheme made it possible to compose an economy-type algorithm for realizing the difference scheme. On the basis of a special technique, a priori estimates were obtained and, on their basis, theorems on the stability and convergence of the considered

numerical algorithms were proved. A theorem on the convergence of the scheme is obtained under the weak assumption on the smoothness of solutions to the original differential problem.

2. Statement of the problem. Let G be a bounded domain of space R^3 with Γ boundary, Q_T - is the cylinder $G\times(0,T)$, $0<T<+\infty$. Consider the following equation in the cylinder:

$$\left(\frac{\partial^2}{\partial t^2}+\omega_3^2\right)\Delta_3 u(x,t)+\omega_4^2 u_{x_2x_2}(x,t)+\omega_5^2 u_{x_3x_3}(x,t)=f(x,t),\ (x,t)\in Q_T, \quad (1)$$

where $\omega_3=\gamma\sqrt{H_0(H_0+|\beta|M_0)}$, $\omega_4=\gamma\sqrt{4\pi(H_0+|\beta|M_0)M_0}$, $\omega_5=\gamma\sqrt{4\pi H_0 M_0}$, $\gamma=g|e|/(2mc)$, g - is the hydromagnetic ratio of ferromagnet, $\beta=K/M_0^2$, $M_0=m_0e_0$ is the ferromagnet of the easy-axis type $(e_3), K-const.$, $H_0=H_0e_3$ is the external field, c is the speed of light, m is the mass, e is the absolute value of the electron charge, $\Delta_3=\frac{\partial^2}{\partial x_1^2}+\frac{\partial^2}{\partial x_2^2}+\frac{\partial^2}{\partial x_3^2}$ are the three-dimensional Laplace operators, $u_{x_\alpha x_\alpha}=\frac{\partial^2 u}{\partial x_\alpha^2}$, $\alpha=2,3$, $Q_T=\{(x,t): x\in G, t\in(0,T]\}, G=\{0<x_k<l_k,\ k=1,2,3\}$, $\overline{G}=G+\Gamma$, $f(x,t)$ - is the known function.

The problem is to find function $u(x,t)$ from (1) satisfying the following initial conditions

$$u(x,t)=u_0(x,t),\ \frac{\partial u}{\partial t}(x,t)=u_1(x,t),\ t=0,\ x\in G \quad (2)$$

and boundary conditions

$$u(x,t)=\mu(x,t),\ x\in\Gamma=\partial G,\ t\in(0,T], \quad (3)$$

where $u_0(x,t)$, $u_1(x,t)$, $\mu(x,t)$ are the given functions with the appropriate choice of x and t.

Let us formulate a generalized statement of problem (1)-(3). Function $u(x,t)$ is called a generalized solution of the problem, which for each $t\in(0,T]$ belongs to $H=\overset{\circ}{W}{}_2^1(\Omega)$, has derivative $\frac{\partial^2 u}{\partial t^2}\in W_2^1(\Omega)$, and satisfies the following relations [8] almost everywhere on $(0,T)$:

$$a_4(\ddot{u}(t),\vartheta)+\sum_{k=1}^{3}a_k(u,\vartheta)=(f,\vartheta), \quad (4)$$

$$(u(0)-u_0,\vartheta)=0,\ (\dot{u}(0)-u_1,\vartheta)=0,\ \forall\vartheta=\vartheta(t)\in H, \quad (5)$$

where $a_4(u,\vartheta)=\int_G\sum_{k=1}^{3}u_{x_k}\vartheta_{x_k}dx$, $a_1(u,\vartheta)=\omega_3^2\int_G\sum_{k=1}^{3}u_{x_k}\vartheta_{x_k}dx$, $a_2(u,\vartheta)=\omega_4^2\int_G u_{x_2}\vartheta_{x_2}dx$, $a_3(u,\vartheta)=\omega_5^2\int_G u_{x_3}\vartheta_{x_3}dx$, $\ddot{u}=d^2u(t)/dt^2$, $\dot{u}=du(t)/dt$.

Here $u=u(t)$ is the function of the abstract argument $t\in[0,T]$ with values in H, $\overset{\circ}{W}{}_2^1(G)$ is the Sobolev space with the scalar product $(u(x),\vartheta(x))=\int_G\sum_{k=1}^{3}\frac{\partial u}{\partial x_k}\cdot\frac{\partial u}{\partial x_k}dx$, with norm $\|u\|_1=\sqrt{\int_G\sum_{k=1}^{3}(u_{x_k})^2dx}$, and vanishing at the boundary Γ of domain $\overline{G}$, $dx=dx_1dx_2dx_3$. The

following estimates hold $c_m\|u\|_1^2 \le a_m(u,u) \le C_m\|u\|_1^2$, $m=1,4$, $0 \le a_m(u,u) \le C_m\|u\|_1^2$, $m=2,3$, where C_m, c_m are positive constants depending on ω_5, ω_4, ω_3. Constants c_4, C_4 do not depend on these parameters.

The existence of a unique solution was considered in [6].

3. Discretization in space. Let us approximate problem (4), (5) in space variables using the finite element method. Let $H_h \subset H$ be the set of elements of the form $\vartheta_h = \sum_{m=1}^{M} a_m \varphi_m(x)$. Here $\{\varphi_m = \varphi_m(x)\}_{m=1}^{M}$ is the basis of piecewise polynomial functions that are a polynomial of degree p on each finite element [21, 22].

Let us give an example of a basis based on third-degree polynomials. Introduce the partition of domain Ω into $M = N_1 \times N_2 \times N_3$ parallelepipeds:

$$\Omega_{ijk} = \{(i-1)h_1 \le x_i \le ih_1,\ (j-1)h_2 \le x_2 \le jh_2,\ (k-1)h_3 \le x_3 \le kh_3\},$$

$$i = \overline{1, N_1},\ j = \overline{1, N_2},\ k = \overline{1, N_3},\ h_3 = l_s / N_s,\ s = 1,2,3.$$

Let us choose a system of basic functions:

$$\Phi_{ijk}(x_1, x_2, x_3) = \varphi_i(x_1)\varphi_j(x_2)\varphi_k(x_3),\ i = \overline{1, N_1},\ j = \overline{1, N_2},\ k = \overline{1, N_3},$$

where $\varphi_l(x)$ is the basis function built on the basis of the B_3-spline [21]. In this case, $p = 3$. Then, the approximate solution is represented in the form of bicubic spline $u_h(x_1, x_2, t) = \sum_{k=1}^{N} a_k(t)\Phi_k(x_1, x_2, x_3)$. Therefore, in accordance with (4), (5), we obtain a semi-discrete problem for $t \in [0, T]$:

$$a_4(\ddot{u}_h(t), \vartheta_h) + \sum_{k=1}^{3} a_k(u_h, \vartheta_h) = (f(t), \vartheta_h), \tag{6}$$

$$(u_h(0) - u_0, \vartheta_h) = 0,\ (\dot{u}_h(0) - u_1, \vartheta_h) = 0,\ \forall \vartheta_h \in H_h. \tag{7}$$

Problem (6), (7) corresponds to the following Cauchy problem:

$$D\ddot{u}_h(t) + Au_h(t) = f_h(t),\ u_h(0) = u_{0,h},\ \dot{u}_h(0) = u_{1,h}. \tag{8}$$

Operators D, A act from H_h to H_h and they correspond to stiffness matrices $D = \left(a_3(\varphi_l, \varphi_m)\right)_{l,m=1}^{M}$ and $A = \sum_{k=1}^{3} a_k(\varphi_l, \varphi_m)_{l,m=1}^{M}$. Besides, $u_{k,h} = P_h u_k(x)$, $k = 0,1$, where P_h is the projection operator $P_h H = H_h$. Here $D = D^* > 0$, $A = A^* > 0$.

4. Discretization in time. We approximate problem (8) in time by the difference scheme [5]:

$$D_\gamma \dot{y}_t + Ay^{(0.5)} = \varphi_1,\ D_\alpha y_t - D_\beta \dot{y}^{(0.5)} = \varphi_2,\ y^0 = u_0,\ \dot{y}^0 = u_1. \tag{9}$$

Here $y = y^n = y(t_n)$, $\hat{y} = y^{n+1}$, $\dot{y} = \dot{y}^n = dy(t_n)/dt$, $n = 0,1,\ldots$, $y^n,\ \dot{y}^n \in H_h$,

$$\varphi_k = \int_0^1 f(t_n + \tau\xi)\vartheta_k(\xi)d\xi,\ k = 1,2,\ \xi = (t - t_n)/\tau,\ y_t = (\hat{y} - y)/\tau,\ \dot{y}_t = (\hat{\dot{y}} - \dot{y})/\tau,$$

$y^{(0.5)} = (\hat{y} + y)/2$, $\dot{y}^{(0.5)} = (\hat{\dot{y}} + \dot{y})/2$, $\vartheta_1(\xi) = 1$, $\vartheta_2(\xi) = s_1\vartheta_2^{(1)}(\xi) + s_2\vartheta_2^{(2)}(\xi)$, $\vartheta_2^{(1)}(\xi) = \tau(\xi - 1/2)$, $\vartheta_2^{(2)}(\xi) = \tau(\xi^3 - 3\xi^2/2 + \xi/2)$, $s_1 = 180\beta - 40\alpha$, $s_2 = 1680\beta - 280\alpha$.

Parameters α, β, γ obey the condition of the fourth-order approximation

$$\alpha + \gamma = \beta + 1/6. \tag{10}$$

In [5], based on the analysis of variance, it was proved that under additional condition $\beta - 6\alpha\gamma + 1/40 = 0$, scheme (9) has $O(\tau^6)$ order of approximation.

In addition, according to the calculated values

$$y^n = y(t_n),\ \dot{y}^n = dy(t_n)/dt,\ y^{n+1} = y(t_{n+1}),\ \dot{y}^{n+1} = dy(t_{n+1})/dt,$$

it is possible to restore the approximation for $u(t)$ at any point in time $t \in [t_n, t_{n+1}]$, $n = 0,1,...$ by the following formula

$$y(t) = y^n\varphi_{00}^n(t) + \dot{y}^n\varphi_{10}^n(t) + y^{n+1}\varphi_{01}^n(t) + \dot{y}^{n+1}\varphi_{11}^n(t),$$

where

$$\varphi_{00}^n(t) = 2\xi^3 - 3\xi^2 + 1, \quad \varphi_{01}^n(t) = 3\xi^2 - 2\xi^3,$$
$$\varphi_{10}^n(t) = \tau(\xi^3 - 2\xi^2 + \xi), \quad \varphi_{11}^n(t) = \tau(\xi^3 - \xi^2), \quad \xi = (t - t_n)/\tau.$$

In this case, the errors of the scheme $\|y(t) - u(t)\|$ and $\|\dot{y}(t) - \dot{u}(t)\|$ for any point in time $t \in [t_n, t_{n+1}]$, $n = 0,1,...$ remain the same.

5. Study of stability and convergence. Let us analyze the stability and accuracy of scheme (9). The following theorem holds.

Theorem 1 [5]. Let $A^* = A > 0$, $D^* = D > 0$ and the approximation conditions be satisfied (10). Then if the following condition is met

$$D - \delta\tau^2 A \geq \varepsilon D,\ 0 < \varepsilon < 1,\ \delta = \max\{\alpha, \beta, \gamma\}, \tag{11}$$

then, the solution $y(t)$ of scheme (9) converges to the solution of problem (8) $u_h(t) \in C^6[0,T]$ and the following estimate is valid:

$$\|u_h(t) - y(t)\|_A + \|\dot{u}_h(t) - \dot{y}(t)\|_D \leq M\tau^4.$$

The proof is based on reducing the two-layer vector scheme (9) to a three-layer scheme, separately for the solution y and its derivative $\dot{y}$. The proof assumes that the operators A and D, are permutable, i.e. $AD = DA$. To eleminate this condition, we introduce $w = D^{1/2}y$, $\dot{w} = D^{1/2}\dot{y}$, instead of y, $\dot{y}$, where $D^{1/2}$ is the square root of positive operator D. Note that $(D^{1/2})^* = D^{1/2} > 0$, and there is an inverse operator $D^{-1/2} = (D^{-1/2})^* > 0$. After obvious transformations, from scheme (9), we obtain the following scheme

$$\widetilde{D}_\gamma\dot{w}_t + \widetilde{A}w^{(0.5)} = \widetilde{\varphi}_1,\ \widetilde{D}_\alpha w_t - \widetilde{D}_\beta\dot{w}^{(0.5)} = \widetilde{\varphi}_2, \tag{12}$$

where $\widetilde{\varphi}_1 = D^{-1/2}\varphi_1$, $\widetilde{\varphi}_2 = D^{-1/2}\varphi_2$, $\widetilde{D}_\omega = \widetilde{D} - \omega\tau^2\widetilde{A}$, $\widetilde{D} = E$, $\widetilde{A} = D^{-1/2}AD^{-1/2}$, $\omega = \alpha, \beta, \gamma$. It is clear that $\widetilde{D} = \widetilde{D}^* > 0$, $\widetilde{A} = \widetilde{A}^* > 0$ and $\widetilde{D}\ \widetilde{A} = \widetilde{A}\widetilde{D}$.

To estimate the accuracy of scheme (12), it is necessary to estimate the error $z = w - u_h$. Using the technique of such an estimate in the theory of difference schemes [23] and the theory of the finite element method [24], we formulate the final result.

Theorem 2. Under condition (10), (11), the solution of scheme (12) $w(t)$ converges to the solution of problem (1) - (3) and the following estimate is valid:

$$\|u(t)-y(t)\|_1 \le M(|h|^{\sigma}+\tau^4),\ |h|^{\sigma}=h_1^{\sigma}+h_2^{\sigma}+h_3^{\sigma}.$$

When choosing a third-degree polynomial on each finite element in space, we have the third-order accuracy in space steps h, i.e. $\sigma=3$.

Let us check the fulfillment of the stability condition (11). The operators of scheme (9) are represented in the following form

$$D=A_1+A_2+A_3,\ A=\omega_3^2(A_1+A_2+A_3)+\omega_4^2A_2+\omega_5^2A_3,$$

where operators $A_k \ge 0$ correspond to stiffness matrices $\mathsf{A_k}=\left(b_k(\varphi_l,\varphi_m)\right)_{l,m=1}^{M}$ of bilinear form $b_k(u,\vartheta)=\int_{\Omega}\left(u_{x_k}\vartheta_{x_k}\right)dx$. Condition (11) takes the form

$$(1-\varepsilon)(A_1+A_2+A_3)-\delta\tau^2(\omega_3^2(A_1+A_2+A_3)+\omega_4^2A_2+\omega_5^2A_3)\ge 0.$$

To satisfy it, it is enough that

$$\tau^2 \le \frac{1-\varepsilon}{\delta}\max\left(\frac{1}{\omega_3^2},\frac{1}{\omega_4^2},\frac{1}{\omega_5^2}\right),\ \text{where}\ 0<\varepsilon<1. \qquad (13)$$

The last condition is interesting because the time step is not related to the space step and is determined by the parameters of the problem: $\omega_3^2,\ \omega_4^2$ and ω_5^2 – are the Väisälä-Brent frequencies. For the parameters of the scheme (13) $\alpha=1/8,\ \beta=1/24,\ \gamma=1/12$ we have $\delta=1/8$. So finally $\tau \le \dfrac{2\sqrt{2(1-\varepsilon)}}{\min(\omega_3,\omega_4,\omega_5)}$.

5. Algorithm for implementation. To implement scheme (9), it is necessary to solve a system of two equations for unknowns $\hat{y},\ \hat{\dot{y}}$:

$$m_{11}\hat{\dot{y}}+m_{12}\hat{y}=\Phi_1,\quad m_{21}\hat{\dot{y}}+m_{22}\hat{y}=\Phi_2,$$

where $m_{11}=D-\tau^2\gamma A,\ m_{12}=\tau A/2,$

$m_{21}=-\tau(D-\beta\tau^2A)/2,\ m_{22}=D-\alpha\tau^2A, \Phi_1=\tau\varphi_1-(\tau/2)Ay+(D-\tau^2\gamma A)\dot{y},$

$\Phi_2=\tau\varphi_2+(D-\alpha\tau^2A)y+(\tau/2)(D-\beta\tau^2A)\dot{y}.$

Excluding one of the unknowns $\hat{y},\ \hat{\dot{y}}$, we obtain two equations:

$$Cy^{n+1}=F_1,\ C\dot{y}^{n+1}=F_2$$

where

$$C=m_{22}m_{11}-m_{12}m_{21}=D^2-(\alpha+\gamma-\frac{1}{4})\tau^2AD+(\alpha\gamma-\frac{\beta}{4})\tau^4A^2,$$

$$F_1=m_{22}\Phi_1-m_{12}\Phi_2,\ F_2=m_{11}\Phi_2-m_{21}\Phi_1.$$

Matrix C is factorized $C=C_1C_2=(D-\sigma_1A)(D-\sigma_2A)$, where σ_1,σ_2 are the roots of equation

$$\sigma^2+(\alpha+\gamma-1/4)\sigma+(\alpha\gamma-\beta/4)=0.$$

For $\alpha = 1/8,\ \beta = 1/24$, for example, we have $\sigma_1 = -1/24,\ \sigma_2 = 0$. Then $y^{n+1} = C^{-1}F_1 = C_2^{-1}C_1^{-1}F_1,\ \dot{y}^{n+1} = C_2^{-1}C_1^{-1}F_2$.

Due to the degeneracy of operators $A,\ D$, we have the problem of implementing the algorithm of scheme (9) since operators C_1, C_2 are also degenerate.

To eliminate the problem of operators $A = A^*,\ D = D^*$ degeneration, we apply the regularization principle, which for self-adjoint operators allows us to apply a shift along the spectrum: $\tilde{A} = A + \varepsilon E,\ \tilde{D} = D + \varepsilon E$. Here $\varepsilon > 0$ is a small parameter specifying the magnitude of the shift of the operators along the spectrum.

As a result, we replace scheme (9) with the following regularized one:

$$\tilde{D}_\gamma \dot{\tilde{y}}_t + \tilde{A}\tilde{y}^{(0.5)} = \varphi_1,\ \ \tilde{D}_\alpha \tilde{y}_t - \tilde{D}_\beta \dot{\tilde{y}}^{(0.5)} = \varphi_2,\ \ \tilde{y}^0 = u_{0,h},\ \dot{\tilde{y}}^0 = u_{1,h}$$

where $\tilde{D}_m = \tilde{D} - m\tau^2\tilde{A},\ m = \alpha,\ \beta,\ \gamma$.

In the scheme implementation algorithm, we also change operators $A,\ D$ to $\tilde{A},\ \tilde{D}$.

For matrix $\tilde{C}_1, \tilde{C}_2$ inversion, the direct square root method is applied once at the initial time. On the remaining layers, the solution is found by multiplying matrix $\tilde{C}^{-1} = \tilde{C}_2^{-1}\tilde{C}_1^{-1}$ by vectors F_1, F_2.

Thus, the number of arithmetic operations for the implementation of scheme (9) is approximately 4 times greater than for the classical three-layer schemes of the second-order accuracy. However, this scheme allows us to choose large time steps to achieve a certain accuracy since there is no limitation on the time step.

An increase in the computations for scheme (9) occurs due to the need to construct the stiffness matrices D and A, realized by numerical integration (one-time integration at the initial point in time $t = 0$).

Remark. It is not difficult to generalize the proposed methods for solving problem (1) - (3) for the case of variable parameters $\omega_3(x),\ \omega_4(x_2),\ \omega_5(x_3)$.

7. Conclusions. A three-parameter difference scheme of the fourth-order accuracy is used to solve the equation of spin waves in magnetic of the easy-plane type. It is based on the finite element approximation in space and time using the third-degree polynomials. An algorithm for the implementation of the method was developed. Theorems on stability and convergence of these difference schemes were proved. A separate article will be devoted to numerical modeling; on the basis of the algorithm developed, it will be tested for exact solutions in the form of a Fourier series and compared with other methods. In addition, on the basis of a computational experiment, the convergence rates of the method along the space and time directions will be checked, and visualizations will be conducted, which will confirm these theoretical results.

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Rezyume: *Uchbu maqolada engil tekislik tipidagi magnitlardagi spin to'lqinlar tenglamasi uchun (Sobolev tipidagi tenglamalar) aniqlik darajasi yuqori bo'lgan chekli elementlar usulining ayirmali sxemalari ko'rib chiqilgan. Energetik tengsizliklar usulidan foydalanib, ma'lum bir salbiy normalarda aprior baholar olingan. Olingan aprior baholar asosida ko'rib chiqilayotgan algoritmlarning yaqinligi va aniqligi haqidagi teoremalar isbotlangan.*

Резюме: *В работе рассматриваются разностные схемы метода конечных элементов повышенного порядка точности для уравнения спиновых волн в магнетиках типа лёгкая плоскость (уравнения соболевского типа). Методом энергетических неравенств получены априорные оценки в некоторых негативных нормах. На основе полученных априорных оценок доказаны теоремы о сходимости и точности рассматриваемых алгоритмов.*

Kalit so'zlar: *Sobolev tipidagi tenglama, spin to'lqinlar tenglamasi, ayirmali sxemalar, chekli elementlar usuli, aprior baholar, turg'unlik, yaqinlik, aniqlik.*

Ключевые слова: *уравнение соболевского типа, уравнение спиновых волн, разностные схемы, метод конечных элементов, априорные оценки, устойчивость, сходимость, точность.*

TECHNICAL SCIENCES

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RESERVES FOR PRODUCTION OF ADDITIONAL VOLUMES OF RARE METALS IN THE CONDITIONS OF JSC «ALMALYK MMC»

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Summary: *the article presents the results of studies of the sorption of molybdenum from waste solutions on various ion-exchange resins.*

Keywords: *uterine liquor, ion exchange resins, sorption, anions and cations.*

In the world, the development of the economies of advanced countries is entirely dependent on the production of rare and rare earth metals, which determine the creation of other high-tech industries, such as electronics, electrical engineering, mechanical engineering, instrument making for solar energy.

The increase in the rate of production of rare metals leads to the depletion of the natural resource base and, due to the use of extensive technologies in all countries, the mining and metallurgical industries are a source of large man-made waste [1-3]. For the period 2023-2027 adopted an international research project in the field of sustainability and circular economy for the processing of metallurgical waste.

The Decree of the President of the Republic of Uzbekistan PP-5159 of June 24, 2021 "On additional measures for the development of the mining and metallurgical industry and related other areas" emphasized the special demand for developments aimed at creating products with high added value, as well as in other regulatory - legal documents adopted in this area.

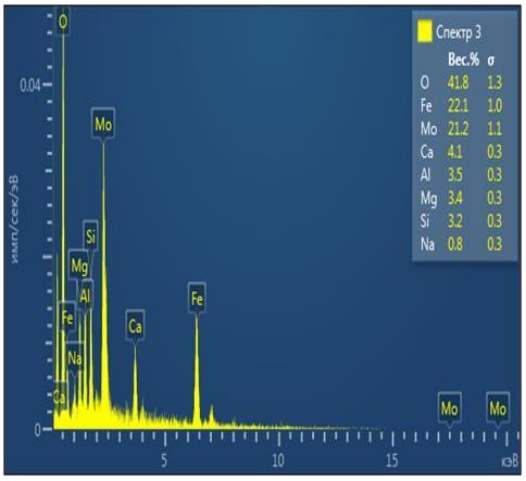
At JSC «Almalyk MMC», along with the processing of primary raw materials, work is underway to organize production facilities for the processing of technogenic raw materials, which ensure the extraction of additional volumes of precious, rare and non-ferrous metals.

According to the analyzes carried out on the distribution of rare metals in the products of beneficiation and metallurgical processing, the flows of molybdenum, rhenium, selenium, tellurium, platinum and palladium were determined, as well as reserves for their production were identified. The most promising and economically attractive resource for increasing the production of rare metals are:

1. Waste solid waste and solutions of molybdenum production in Research and production association «Production of rare metals and hard alloys»;

2. Wash acid (product of wet gas cleaning after extraction of rhenium) of sulfuric acid production at the Copper Smelting Plant of JSC «Almalyk MMC».

Figure 1 shows a microphotogram and energy dispersive spectra of molybdenum cake for determining the chemical composition. Spectra were taken from 10 local sample points and averaged.



Element	Product weight%	Link name
O	41.77	SiO_2
Na	0.75	Albite
Mg	3.41	MgO
Al	3.46	Al_2O_3
Si	3.24	SiO_2
Ca	4.09	Wollastonite
Fe	22.05	Fe
Mo	21.23	Mo
Итого :	100.00	

Fig. 1 Energy dispersive spectra of molybdenum solid waste.

The waste compositions of Research and production association «Production of rare metals and hard alloys» are given in Table 1.

Table 1. Composition of technological solutions of Research and production association «Production of rare metals and hard alloys»

№	Name	pH	Chemical analysis		
			Mo	Re	Cu
1	Nitric sulfate solution	1,0 – 3,0	10,0 – 20,0 g/l	15,0 –50,0 g/l	2,0 –10,0 g/l
2	Tetromolybdate uterine liquor	2,0 – 3,0	5,0 – 10,0 g/l	-	-
3	Sorbent grade (possible for use)		A–100 Mo	S–930	A–170

The study of the processing of cakes by acid leaching was carried out with the content of Mo-4,66%, Au-30-35 g/t, Ag-154 g/t, Re- 2-3 g/t, Cu-0,25%, Pb-2,46 %, Bi-0,138%, As-0,4%, total sulfur – 1,59%, silicon oxide – 28,2%.

Since at Research and production association «Production of rare metals and hard alloys», nitric acid is used for the decomposition of molybdenum-containing concentrates, which is less aggressive than sulfuric acid, the process does not require acid-resistant equipment. We recommend opening the dump cakes with nitric acid at a concentration of 75-100 g/l. In this case, the extraction of molybdenum in the ammonia solution is 86-86,5%. Nitric acid solutions containing 8-3,5 g/l of molybdenum should be directed to sorption on the A-100 Mo resin.

In addition, the possibility of multiple use of acidic solutions for processing the initial cakes to obtain a solution suitable for the subsequent sorption of molybdenum from these solutions was tested. So, when using a solution containing 100 g/l HNO_3, S:L-1:5, a temperature of 90-95 ° C and a duration of 2 hours, the solid waste were leached three times with an increase in the concentration of the solution with nitric acid to 100 g/l at each subsequent leaching stage. The molybdenum content in the third-stage solution was 13,5 g/l. The molybdenum content in the residues after the ammonia treatment was 0,6%, the through-extraction of molybdenum into the solution was close to 91,2%.

Technical characteristics of technological solutions of JSC "Almalyk MMC" are given in Table 2.

In sulphate mother liquors of the workshop for the production of rare metals of JSC "Almalyk MMC", the composition of which: H_2SO_4, g/l - 300-400; Re, m /l - <10; Mo, g/l; Cu, m /l-550-800; Zn, mg/l-35-40; Fe, g/l; As, mg/l-15-20; pH-1.

These solutions are formed in the system of wet dust-gas trapping of kilns and a feature of these solutions is the high content of sulfuric acid. In this regard, an important point is to establish the form of finding molybdenum [4].

Table 2.

Composition of Copper smelting plant technological solutions

№	Name	Chemical analysis, g / l									
		Cu	Ni	Zn	Re	Mo	In	Se	Ge	Cd	H_2SO_4
1	Washing acid of SK-3	0,073	-	0,9	0,017	0,007	0,0009	0,014	0,0002	0,0033	70,0
2	Washing acid of SK-4	0,052	-	0,1	0,01	0,002	0,001	0,013	0,00013	0,004	21,0
3	Waste electrolyte	45,0	4	-	-	-	-	-	-	-	100,0
4	Recycled water from the stormwater storage tank	0,6	-	0,48	-	-	-	-	-	0,05	15,0

In order to select the sorbent of molybdenum from the sulphate mother liquor, several grades of sorbents were tested. Table 3 shows the results of tests under static conditions.

As can be seen from Table 3, the most effective sorbent is A-100 Mo. With a V_{liq}/V_{sor} ratio of 19,4 and pH-2, Mo recovery is 99,6%. To determine the sorption indices, highly basic and

bifunctional anionites of experimental and industrial grades, known in the technology of molybdenum, uranium, gold, tungsten, were selected. Of the cation exchangers, the chelated cation exchanger S-957 Purolite was tested.

Along with the sorption of molybdenum from the initial solution, the indicators of the sorption of molybdenum on the A-100 Mo sorbent from a solution adjusted to pH-2 by adding ammonia were checked. The conditions correspond to the sorption of molybdenum in the optimal pH range for the formation of polymolybdates on one of the most effective sorbents in this range, A-100 Mo.

Table3

Sorption of molybdenum from uterine liquor under static conditions on sorbents converted to H^+ / SO_4^{-2} form

(Mo – 6,3 g/l;; H_2S0_4- 400 g/l; V_{liq}/V_{sor}=10)

№ п/п	Sorbent grade in H^+ / SO_4^{-2} form	Ratio V_{liq}/V_{sor}	Residual content Mo, g/l	Resin exchange capacity, g/l$_s$	Mo recovery,%
1.	C-100x10MBH	10	5,6	7,0	11,1
2.	AB-17	10	3,9	24,0	38,1
3.	Ам-2Б	10	3,2	31,0	49,2
4.	АМП	10	2,9	34,0	54,0
5.	A-600(U)	10	3,2	31,0	49,2
6.	A-500/$_2$788	10	3,2	31,0	49,2
7.	A-107	10	3,2	31,0	49,2
8.	S-957	10	1,6	47,0	74,6
9.	PFA-460	10	1,6	47,0	74,6
10*	A-100 Mo	19,4 pH-2	0,0137	62,73	99,57
11*	A-100 Mo	40 pH-2	0,7	112,1	78,4
12*	A-100 Mo	80 pH-2	1,22	162,4	62,46

*at pH-2, the initial content of molybdenum in solutions is 3,25 g / l.

According to the results of the extraction of molybdenum from sulfuric uterine liquors, preference is given to macroporous weakly basic anion exchangers.

For further testing and development of modes of sorption and desorption of molybdenum from sulfuric acid solutions, A-100 Mo and S-957 Purolite resins were selected.

The option of extracting molybdenum from the sulphate mother liquor using its neutralization to pH ~ 2 and the sorption of molybdenum from the neutralized solution onto the A-100 Mo sorbent can be recommended for industrial implementation after conducting enlarged tests and working out the process of desorption of molybdenum.

At the same time, the problem of extracting molybdenum from the mother liquor without additional consumption of ammonia is of practical interest. In this regard, and taking into account the fraction of the molybdenyl ion MoO_2^{2+} when diluting the sulfuric uterine liquor with water, experiments were carried out on the sorption of molybdenum under static conditions on the S-957 cation exchanger from diluted sulfuric uterine liquors. The results shown in table 4 show that the extraction of molybdenum from the uterine liquor increases when the uterine liquor is diluted with water 2 and 4 times increases the capacity of the sorbent S-957 and the extraction of molybdenum

from the sulfuric uterine liquor. The results obtained confirm that a decrease in the concentration of sulfuric acid due to dilution of the solution promotes the conversion of molybdenum into a form more favorable for sorption on S-957.

Table 4

Sorption of molybdenum under static conditions on the cation exchanger S-957

№ п/п	Dilution of the solution (H_20:liq)	Acid concentration H_2SO_4, г/л	Vp/V_c	Mo content, g/l		V_c sorbent S-957, g Mo/ls	Mo recovery,%
				initial content	residual content.		
1.	3:1	100	40	1,8	0,29	60,4	83,9
2.	7:1	50	80	0,9	0,17	58,4	81,1

Thus, the possibility of increasing the efficiency of the sorption extraction of molybdenum from the sulfuric mother liquor onto the S-957 cation exchanger was revealed due to the dilution of the solution with water to a sulfuric acid concentrationof 100 g / L.

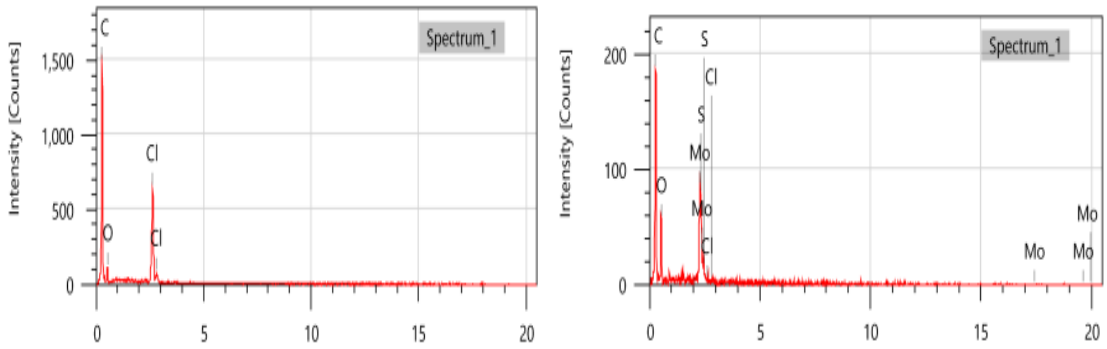


Fig. 2 SEM-EDX sorbent A-100 Mo before and after sorption of molybdenum.

In fig. Figures 2, 3 show the energy dispersive spectra of A-100 Mo and S-957 Purolite resins before and after sorption, from which both sorbents effectively sorb molybdenum.

According to the results of the analysis of the output data, the exchange capacities of the saturated sorbents were: for the S-957 cation exchanger 68.95 gMo/ls for sorbent A-100 Mo-235 gMo/l$_S$; including, before the breakthrough of molybdenum 0,4 g/l, the sorption capacity of A-100 Mo was 125 g Mo/ls. For sorbent S-957, a high "slip" of molybdenum is observed at a given specific load practically from the beginning of sorption.

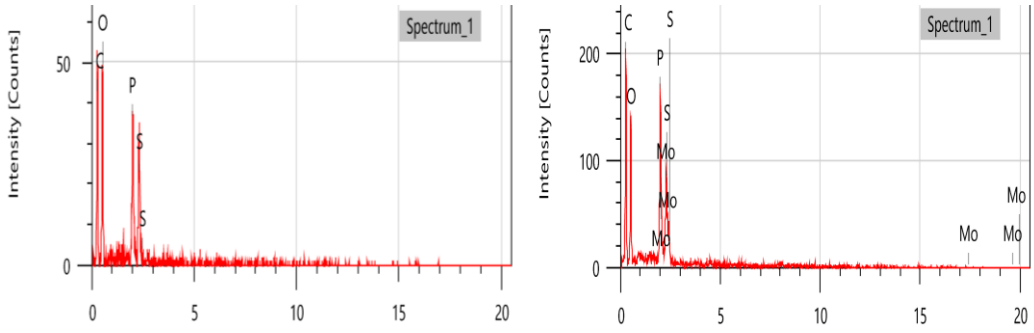


Fig. 3 SEM-EDX sorbent S-957 Purolite - before and after sorption of molybdenum.

According to calculations, after the launch of the Copper Concentrating Plant-3, the issue of the involvement of washing acid will become very urgent.

In order to increase the production of ammonium perrhenate up to 2,524 tons, as well as additional extraction of ammonium tetramolybdate in the amount of 98 tons per year, the specialists

of the plant propose to implement the project "Organization of production of rare metals from the waste of sulfuric acid production of the refinery of Copper smelting plant".

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Rezyume: *Maqolada chiqindi eritmalardan molibdenni ion almashuvchi smolalar bilan sorbsiya qilish tadqiqot ishlarining natijalari keltirilgan.*

Резюме: *В статье представлены результаты исследований сорбции молибдена из сбросных растворов на различных ионообменных смолах.*

Kalit so´zlar: *chiqindi eritma, ion almashuvchi smola, sorbsiya, anionlar va cationlar.*

Ключевые слова: *сбросной раствор, ионообменная смола, сорбция, анионы и катионы.*

INTEGRATION OF CONTENT AS A FACTOR IN THE DEVELOPMENT OF A COMPETENCY-BASED LEARNING MODEL

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Summary: *This article reveals the scientific foundations of content integration as a factor in the development of a competency-based learning model.*

Keywords: *competence, model, training, development, factor, integration, content.*

On February 16-17, 2012, an international conference was held in Tashkent on the topic "Preparation of an educated and intellectually developed generation - as the most important condition for sustainable development and modernization of the country". The conference was attended by leaders, scientists and specialists of the education system from 48 countries of the world, such as Great Britain, Germany, Italy, China, the USA, South Korea, Japan, Russia, as well as representatives of many major international organizations and financial institutions, including the UN, the Asian Development Bank, the Islamic Development Bank, who studied Uzbekistan's experience in developing a system of continuing education and creating a national model of educating a harmoniously developed young generation. And indeed, all conditions and opportunities have been created in our country for the education of active, talented young people with high spiritual and moral qualities, who have firmly mastered modern knowledge and professions - which are the decisive force of today and tomorrow.

Taking into account the reports heard and discussed, studying the experience of the development of the education system in Uzbekistan, the participants of the International Conference recommended the following modernized directions on a global scale:

- to modernize national education systems, creating the necessary conditions for high quality training, competitiveness and demand for personnel;
- in connection with the introduction of the system of continuing education, to study the experience of Uzbekistan in the implementation of the National Training Program based on the concept: "Education for all through life";
- to ensure continuity and interconnection of curricula at all levels of study;
- constantly improve curricula, textbooks and teaching aids, teaching methods taking into account international standards, modern achievements of science and technology;
- creation of new technological educational forms and methods;
- to expand teaching at all levels of foreign language teaching, to ensure the adaptation of young people to the conditions of the international labor market [3; pp. 8-9].

Also, the justification and action program of strategic measures in the field of general secondary education of the Plan for the development of the education sector of Uzbekistan for 2013-2017 – "Education is the basis of the future" reflected the development and implementation of modernized didactic provision of educational institutions [5].

In particular, the Plan for the development of education in Uzbekistan for 2013-2017 – "Education is the basis of the future" defines the following priority features of the modernization of general secondary education:

1) creating an atmosphere of healthy education based on the right to choose the language of education and educational institution;

2) equipping schools for the effective use of modern methods of education with modern equipment, library, laboratory and computers;

3) improving the requirements for the knowledge, skills and abilities of students, as well as the introduction of a competent approach in general secondary education;

4) improvement of teaching methods aimed at the student's personality and their application in practice;

5) increasing the potential and professional excellence of teachers and management personnel, establishing the skills of free thinking among students;

6) expansion of monitoring capabilities and evaluation strategies by establishing self-monitoring and evaluation system;

7) establishing an effective system of vocational guidance for secondary school students [5; p. 70].

It is known that in the State Educational Standards of general secondary education, developed from 1998 to 2014, the requirements for the level of training of students were limited to determining the minimum amount of knowledge, skills and abilities necessary for assimilation [6; p. 208].

The stages of personality development set the appropriate stages of continuing education, define the requirements and conditions that ensure the implementation of specific educational goals. Every person at any stage of their life path should have the right and real opportunities to be included in educational structures in accordance with their cognitive needs, psychophysical and personal characteristics, in accordance with the needs of society.

It is necessary to provide and stimulate the advancement to higher levels of education of the most capable, better prepared, actively working on their improvement members of society.

The typological needs of personality development at different stages of the general life path determine the appropriate stages and levels of continuing education, set requirements for its subsystems and conditions that ensure the implementation of its specific goals. In accordance with these goals, vertical (basic education and all stages of the educational pyramid) and horizontal (additional, informal types of education) integration of educational structures should be carried out, problematic issues at the "joints" of different substructures should be resolved.

Integrative processes in the system of continuing education take into account several functions, trends, directions, types, levels and specific forms, a certain hierarchical model of integration of continuing education.

Integrative learning is the implementation of an approach that is the development of methods of activity, the construction of complex developing objects and the process of their research based on the combination of various properties, models, concepts.

The object of design and research is learning, considered as a system and a process of establishing integrative connections. Thus, the integrative approach includes integration as a principle of designing a learning system and as a process of establishing links between the elements of the system. At the same time, a specific methodological function of integration in learning is revealed (in comparison with interdisciplinary connections), namely, the creation of a qualitatively new product (idea, meaning, element, etc.) based on the resolution of contradictions. This means that the process of integrative learning is carried out in the mode of constant creative self-development, the development of innovative pedagogical means of constructing a holistic pedagogical process.

The relevance of integrative learning is determined by the fact that the global problems of our time (environmental, energy, socio-economic, national epic, etc.) today have an integrating influence on humanity, realizing the interconnection, interdependence, community of destinies, natural and social processes.

Understanding the need for cooperation in solving common problems of our time leads to the internationalization of human life. In this regard, the picture of the world, the general orientation of a person is radically changing, there is a need to form such a way of understanding the world in which the world appears as a unity consisting of interconnected parts, as an integrated integrity.

Integration of educational structures as a means of ensuring its continuity can be carried out through pedagogical and information technologies. Pedagogical and information technologies of education, upbringing and development, having different types, directions, levels, provide continuity of various stages of the educational pyramid.

Technologies of continuous education and its information support can be created at the level of the entire system of continuing education. Next, pedagogical technology is created according to the stages of education. The next stage is the creation of local, modular, motivational pedagogical technologies, pedagogical technologies of management, monitoring, etc.

Developing pedagogical technologies of a private subject, it is necessary to ensure the change of education from informational-reproductive to active-creative, productive - from didactic games for younger ages to business games, search and productive activities for seniors, from justified classical forms and methods of teaching to those that embody meaningful pedagogical integration of education, science and production, computer technology of training.

At each level and in each link of the system of continuing education, it is necessary to choose adequate goals and content of the system of forms, methods and means of teaching. The pedagogy of cooperation presupposes a learning technology in which the principles of the student's personality activity, the joint activity of participants in the educational process, their dialogical communication and interaction are implemented. It is important to ensure continuity of forms, methods and means of teaching at different levels and in different parts of the system of continuing education.

The basis of a new type of training should be based on the development of needs and skills of independent acquisition of knowledge, methods of their replenishment and application using advanced information and communication technologies.

The tasks of developed information, didactic and organizational support, the creation of a didactic industry, the purpose of which is to develop all the information to be studied and turn it into a form convenient for mastering without loss of content and quality, become urgent.

The problem of a new type of textbook as a scenario for the future practical activity of a person in society and in production, productive and creative activity, arises in full growth. Textbooks should correspond to a multi-level, hierarchical system of knowledge, assume the possibility of using a video sequence in computer training, control knowledge and pedagogical tests to control and self-control the level of assimilation of the learning content.

In the process of compiling new textbooks, the level of interdisciplinary connections is of particular importance. The level of interdisciplinary connections is currently the most widespread in the practice of both secondary schools and professional colleges. This level is characterized by the assimilation of the professional and general theoretical involved in the integration of the educational subject with the basic subject, each of which at the same time retains its sovereignty in the educational process.

At the level of interdisciplinary connections, the status of the basic subject is variable. When establishing links between two disciplines, one or the other discipline may periodically act as a base, during their integration. At the same time, it should also be noted that the level of interdisciplinary connections mainly solves such didactic tasks as updating students' knowledge, their generalization and systematization. The integrating factor at the level of interdisciplinary connections is the common structural elements of the content of general and vocational education, i.e. knowledge, skills and abilities, the transfer of which can be carried out both in the direction of general education and professional disciplines. It should be emphasized that the level of interdisciplinary connections is based not so much on the formation of new knowledge, as on the actualization of previously formed due to their transfer of their respective academic disciplines.

Thus, ensuring the continuity of different forms of education is a complex process of integrating content by functions, trends, directions and types, as well as levels of integration.

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Rezyume: *Ushbu maqola kompetentsiyaga asoslangan ta'lim modelini ishlab chiqish omili sifatida kontent integratsiyasining ilmiy asoslarini ochib beradi.*

Резюме: *В данной статье раскрыты научные основы интеграции содержания как фактор развития компетентностной модели обучения*

Kalit so'zlar: *kompetentsiya, model, o'qitish, rivojlanish, omil, integratsiya, mazmun.*

Ключевые слова: *компетенция, модель, обучение, развитие, фактор, интеграция, содержание.*

UDC: 697.1

ALGORITHM FOR THERMOPHYSICAL CALCULATION OF ENERGY EFFICIENCY OF BUILDINGS IN THE COUNTRY

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Summary: *This article describes how the city of Nukus meets the requirements of energy saving in accordance with the second level of wall calculation and thermal protection in climatic conditions.*

Keywords: *wall, thermal energy, construction, climate, buildings, layer, thermal insulation.*

The development of the economy is a general trend in the development of modern civilization, leading to an increase in the use of energy resources and an increase in demand and price of energy resources. 49% of the energy produced in the country is spent on buildings. The new standards, designed and implemented to improve the energy efficiency of buildings, will reduce energy consumption by 25-50%.

New sources include solar energy, wind energy, (rivers) hydropower, currents, waves, energy from the deeper layers of the earth. New non-renewable energy sources account for 90% of the country's heat balance, including 30% oil, 40% gas and 20% coal. All fossil fuels (oil, gas, coal, etc.) are the appearance of solar energy that has passed through various stages, re-formed and reached us millions of years later, and is in danger of running out and becoming more expensive. The energy efficiency of a building depends mainly on its exterior cladding, i.e., walls, roof, lighting proem. Today, proper use of protective structures can save up to 50% on heating costs. Saving energy and resources is one of the main directions of technical policy in the field of construction. In energy saving, much attention is paid to increasing the heat storage capacity of building barriers. According to statistics, 90% of the total energy consumed in the construction sector is spent on heating and air conditioning, 8% on the production of construction materials and products, and 2% directly on construction. However, it should be noted that most of them are used to compensate for heat loss due to the following reasons: [1]:

- heated air infiltration (up to 40%);
- inconsistency in the use of heating and hot water supply systems (up to 30%);
- Insufficient value of thermal insulation of barrier structures (up to 30%).

In order to prevent unreasonable energy consumption during the operation of construction sites, new standards for thermal insulation of buildings should be introduced, which should significantly increase the requirements for thermal insulation in the cold and hot seasons of the year.

One of the measures to increase the energy efficiency of buildings is to increase the resistance of external barrier structures to heat transfer. Improving the thermal insulation properties of barriers requires a significant increase in the consumption of material and labor resources. Therefore, the work on equipping the heat storage facilities should be carried out after the development of the relevant project. The design solution is required to be based on initial calculations, taking into account the experience of increasing the level of heat storage available in construction practice, as well as the technological characteristics of the work at each particular site.

Currently, the current system of thermal insulation of buildings and rooms in the country is divided into three levels in terms of thermal protection. Depending on the level of thermal protection of buildings and the degree of daily construction site, the required value of resistance to heat transfer for external barrier structures, such as external walls, roofs without roofs and attic coverings (Table 2a, 2b, 2c) [1]. The second level of heat protection should be adopted in accordance with Table 2b [1] in the construction, reconstruction and overhaul of housing, health care facilities, children's institutions, schools, lyceums, colleges, boarding schools, carried out at the

expense of state capital funds or local budgets. Heating season degree-day D_d, °C* day, should be determined according to the following formula

$$D_{от.пер.}=(t_в–t_{от.пер.})z_{от.пер.},\ ^oC*кун \quad (1)$$

where: $t_в$ - the calculated temperature of the indoor air in the room, ^{0}C; $t_{от.пер.}$, $z_{от.пер}$--average temperature, °C and the duration of the average daily temperature period not exceeding 10 °C (according to QMQ 2.01.01-94), days.

Depending on the value of D_d and the degree of thermal protection of the building, the required value of resistance to heat transfer is determined for the external barrier structure (Tables 2a, 2b, 2c) [1]. For the new construction under construction

$$R_0 = \frac{1}{\alpha_в} + \sum\frac{\delta_i}{\lambda_i} + \frac{1}{\alpha_н},\ м^2°C/Вт; \quad (2)$$

$\alpha_в$- The heat transfer coefficient of the inner surface of the barrier structures is taken from Table 5 * [1]. $\alpha_н$– The heat transfer coefficient of the outer surface of the barrier structures (for winter conditions), Вт/(м^2·°C), is taken from Table 6 [1].

δ- layer thickness, m;

λ- The calculated coefficient of thermal conductivity of the layer material, Вт/(м·°C), is taken from Annex 1 [1]. The value of the heat transfer resistance determined using the second formula, R_0, is compared with the value determined above. If the condition $R_0 \geq R_0^{тр}$ is met, the building is considered energy efficient in accordance with the accepted level of thermal protection.

Due to the increased requirements for energy-efficient external structures of buildings, the current problem of increasing their resistance to heat transfer is becoming more urgent. To solve this problem, ie to determine how much to increase the resistance of external barrier structures to heat transfer, it is necessary to know the true value of its total resistance to heat transfer $R_0^ф$. The following method is used to identify such information.

In the presence of accurate information about the materials of the existing external barrier structures, the actual value of the total resistance to heat transfer for the structure is determined as $R_0^ф$f, the calculated value of resistance to heat transfer R_0 is determined using the second formula.

The first method. At certain points on the surface of the structure where additional thermal insulation is to be installed, the temperature of the indoor and outdoor air and the inner surface of the structure are measured for several days using thermocouples installed on them. Based on the obtained results, the resistance of the external barrier structure to heat transfer $R_0^ф$ is determined using the following formula:

$$R_0^ф = \frac{t_в - t_н}{(t_в - \tau_в)\times\alpha_в},\ м^2°C/Вт, \quad (3)$$

Here:

$t_в$- average temperature of indoor air during the measurement period, ^{0}C;

$t_н$- average outdoor temperature during the winter, ^{0}C;

$\tau_в$- average temperature of the inner surface of the wall during the measurement, ^{0}C;

$\alpha_в$- heat transfer coefficient of the inner surface of the wall, Вт/(м^2 ^{0}C).

Then, the value of the additional heat transfer resistance $\Delta R_{доб}$ for the structure is determined, provided that the value of the heat transfer resistance R_0 of the external barrier structure to be repaired is equal to or greater than the required energy-saving value $R_0^{тр}$:

$$\Delta R_{доб} = R_0^{тр} - R_0^ф,\ м^2°C/Вт, \quad (4)$$

The thickness of the additional thermal insulation layer is determined using the following formula to ensure energy savings: $\delta = \Delta R_{доб} \times \lambda$, м, (5)

Here: λ- The coefficient of thermal conductivity of the material used as additional thermal insulation, Вт/(м ^{0}C), the value of which is determined in accordance with the operating conditions A or B, determined depending on the humidity regime of the room [1].

The humidity regime of the room is taken from Table 1 of [1]. Hence, the operating conditions of the barrier structures should be taken depending on the humidity regime of the room: for parameters A for dry and normal modes, and for parameters B for wet or wet modes.

To reduce energy consumption to adapt the building to the climate, as well as to provide natural ventilation, the building's exterior light-transmitting barriers are designed in two layers. One layer has an outer shell of glass, through which air enters the space between the layers from the outside. Windows on all floors can be open. In this way, the outside air enters from the top of each room and exits through the blinds next to the swing windows, which provides direct natural air exchange up to 50 floors. Based on the requirements of energy saving, we will test a sample of thermophysical calculations for the city of Nukus on the second level of thermal protection. The thickness of the residential building in Nukus is 2 bricks, the resistance to heat transfer R_0 on both sides is required to be adjusted to the second level of thermal protection due to the installation of additional thermal insulation on the outside.

We calculate the problem according to the algorithm described above.

1. Construction site - Nukus.

2.The function of the building is a residential building.

3. From Annex first of QMQ 2.01.04-97 * we determine the calculated temperature of indoor air $t_в = 20$ °C.

Table 4 of QMQ 2.01.01-94 [2] shows the value of the average temperature $t_{от.пер}$ for the periods when the outside air temperature in Nukus is t≤8 °C and t≤12 °C, respectively, and the duration of these periods (per day) $Z_{от.пер}$ information about:

- Average temperature for the period t ≤ 8 °C $t_{от.пер} = -0{,}6$°C, duration 143 days;
- Average temperature for the period t ≤12 °C $t_{от.пер} = +1{,}0$°C, duration 182 days;

Based on these values, we determine the value of the average temperature $t_{от.пер}$ for the period t ≤ 10 °C and the duration of this period $Z_{от.пер}$: $t_{от.пер} = \frac{-0{,}6+1{,}0}{2} = +0{,}2 \approx 0$°C and $Z_{от.пер} = \frac{143+182}{2} = 162{,}5 \approx 163$ per day.

5. Using formula (1), we determine the degree-day (IMGS) of the heating season for the city of Nukus:

$D_{от.пер.}=(t_в–t_{от.пер.})z_{от.пер.}=(20-0)\times163=3260$ degrees-day.

6. Given the condition that the required resistance of the outer wall of a residential building to heat transfer $R_0^{тр}$ corresponds to the second level of thermal protection, we determine from Table [1] 2b: $R_0^{тр} - 2{,}2$ м^2 °C/Вт teng.

7. According to the formula (3) we can determine the actual resistance of the external barrier structure to heat transfer $R_0^{ф}$. To do this, we measure the temperature of the indoor and outdoor air, as well as the inner surface of the wall, using thermometers for several days. Assume that the following results are obtained from the measurements:

$t_в$- average temperature of outdoor air during measurements, -13 ^{0}C;

$t_н$- average temperature of outdoor air during measurements, -13 ^{0}C;

$\tau_в$- average temperature of the inner surface of the wall during the measurement, +16 ^{0}C.

$\alpha_в$- we assume the heat transfer coefficient of the inner surface of the wall according to Table 5 * in [1].

Based on the obtained results, we determine the resistance to heat transfer of the external barrier structure R_0 ^ f using the formula (3):

$$R_0^{\phi} = \frac{t_в - t_н}{(t_в - \tau_в) \times \alpha_в} = \frac{19{,}8-(-13{,}0)}{(19{,}8-16)\times 8{,}7} = 0{,}992 \quad м^2 °C/Вт.$$

Note: In case the design thermophysical parameters of the materials used in the design, which require energy saving, are clear, the actual value of heat transfer resistance R_0^{ϕ} can be used as the calculated value R_0 determined by formula (2).

8. Determine the value of the resistance ishga $\Delta R_{доб}$ for additional heat transfer for the structure using the formula (5):

$$\Delta R_{доб} = R_0^{тр} - R_0^{\phi} = 2{,}2 - 0{,}992 = 1{,}208, \quad м^2 °C/Вт.$$

9. For the additional layer of thermal insulation from the application of No. 1 of [1] we determine the acceptance of polystyrene foam with a density of 40 kg / m^3 and its thermal conductivity λ in accordance with the operating conditions of the structure A: λ=0,041 Вт/(м ^{0}C).

10. Determine the thickness of the additional layer of thermal insulation using the formula (6):

$$\delta = \Delta R_{доб} \times \lambda = 1{,}208 \times\times 0{,}041 = 0{,}049 \text{ м}$$

Assuming that the determined thickness of the thermal insulation layer δ is rounded to the greater side, depending on the properties of the material, δ = 0.049≈0.05 m.

11. Calculate the value of heat resistance $R_0^{\phi'}$ of the wall with an additional layer of polystyrene foam 5 cm thick on the outside:

$$R_0^{\phi'} = R_0^{\phi} + \frac{\delta}{\lambda} = 0{,}992 + \frac{0{,}05}{0{,}041} = 2{,}21 \text{ м}^2 °C/Вт > R_0^{тр} = 2{,}2 \text{ м}^2 °C/Вт.$$

Conclusion: 2 brick walls plastered with lime-sand mixture with a thickness of 20 mm on both sides, 5 cm foam polystyrene slab as additional thermal insulation on the outside, Nukus city the requirements of energy saving in accordance with the second level of thermal protection in climatic conditions.

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Rezyume: *Ushbu maqolada Nukus shahri iqlim sharoitida devor hisobi va issiqlik himoyasining ikkinchi darajasiga mos energiya tejamkorlik talablariga javob berishi haqida yozilgan.*

Резюме: *В статье рассказывается, как город Нукус отвечает требованиям энергосбережения в соответствии со вторым уровнем расчета стен и тепловой защиты в климатических условиях.*

Kalit so'zlar: *devor, issiqlik energiyasi, konstruktsiyasi, iqlim, binolar, qatlam, issiqlik izolyatsiyasi.*

Ключевые слова: *стена, тепловая энергия, строительство, климат, здания, слой, теплоизоляция.*

UDC 665.5

MODERN METHODS OF REDUCING THE CONTENT OF AROMATIC HYDROCARBONS IN GASOLINE

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Summary: *Various refining methods are presented to improve the ecological environment and reduce the amount of aromatic hydrocarbons in motor gasolines in the oil refining industry.*

Keywords: *gasoline, aromatic hydrocarbons, azeotropic distillation, extraction, rectification, adsorption.*

Road transport is the main source of air pollution. Pollution occurs as a result of fuel combustion. About 2 billion tons of petroleum fuel are burned annually in automobile internal combustion engines in the world. Moreover, the average efficiency is 23%, the remaining 77% goes to the environment [1].

The following types of transport are distinguished: light, medium and heavy freight, bus, passenger. At the same time, 90% of cars use gasoline as fuel, and 10% - gas, trucks use diesel fuel and gas, 50% of buses use gasoline, and 50% - gas [2].

About 25% of the world's oil is used to produce gasoline, which is the main type of fuel for vehicles [3].

It was found that 30% of urban diseases are directly related to air pollution by exhaust gases. The most dangerous for humans are hydrocarbon compounds of the carcinogenic group: 1,2-benzanthracene ($C_{18}H_{12}$), 3,4-benzpyrene ($C_{20}H_{12}$), 1,2-benzpyrene ($C_{20}H_{12}$), 3,4-benzofluorantene ($C_{20}H_{14}$). Particularly dangerous is 3,4-benzpyrene, which is a kind of indicator of the presence of other carcinogens in the mixture [4-6].

The range and quality of gasolines are determined recently by environmental requirements for them. Currently, in order to reduce the toxicity of car exhausts, according to the requirements of European standards, restrictions are set on the content of benzene (up to 1%) and total aromatic hydrocarbons (30 - 35%) in gasolines (table 1). MPC of gasoline = 300 mg / m3. Reducing the harmful effects of exhaust gases on the environment and humans can be achieved by reducing the content of aromatic hydrocarbons in gasolines, primarily benzene [7].

Table 1

Modern requirements for the quality of gasoline

Indicators	Requirements	
	Euro 4 (since 2005)	Euro 5 (since 2009)
Benzene content, not more than,%	1,0	1,0
Sulfur content,%	0,005	0,001
The content of aromatic hydrocarbons,%	35	35
The content of olefinic hydrocarbons,%	14	14
Oxygen content,%	2,7	2,7

Benzene, the most easily boiling among aromatic compounds, is harmful to people directly working with gasoline, as it contributes to the disease with leukemia [8].

There are various methods for the separation of aromatic hydrocarbons:

– Azeotropic distillation;

– Extractive distillation;
– Extraction;
– Adsorption release.

Azeotropic distillation. As you know, aromatic hydrocarbons form azeotropic mixtures with boiling paraffin-naphthenic hydrocarbons in cases of significant deviations of the mixtures from the behavior of an ideal system. In fig. Figure 1 shows the dependence of vapor pressure on the composition of the mixture of two components A + B for a system with a minimum boiling point.

The dashed line A + B represents the theoretical or ideal vapor pressure of the solution, calculated according to Raoult's law.

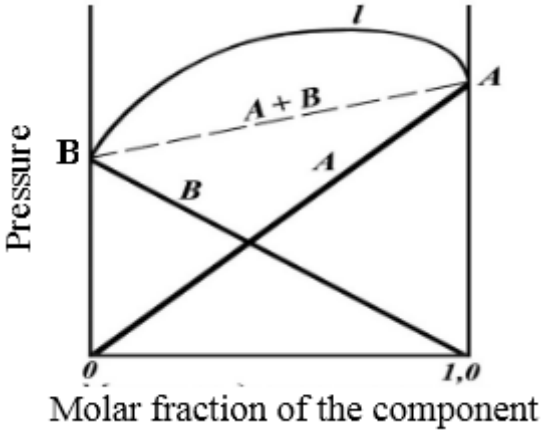

Figure. 1. The dependence of vapor pressure on the composition of the mixture with a minimum boiling point

The upper solid curve shows the actual vapor pressure of the mixture. Point z, where the curve passes through the maximum, corresponds to the composition of the azeotrope. Since this is the point of maximum vapor pressure, it corresponds to the minimum boiling point of mixture A-B, which is lower than the boiling point of pure components A and B. The mixture corresponding to the composition at point z will be distilled at a constant temperature and without changing the composition.

Aromatic hydrocarbons C_6, C_7 and C_8 form azeotropes with paraffin-naphthenic hydrocarbons with only a minimum boiling point. In fig. 2. The composition of the vapor and liquid phases of the cyclohexane-benzene system is given. These hydrocarbons boiling at 80.0 and 80.1 ° C, respectively, form an azeotrope with a benzene content of 51.8% by weight. The boiling point of the azeotrope is 77.5 ° C. The vapor pressure curve of this system is similar to the curve in Fig. 1.

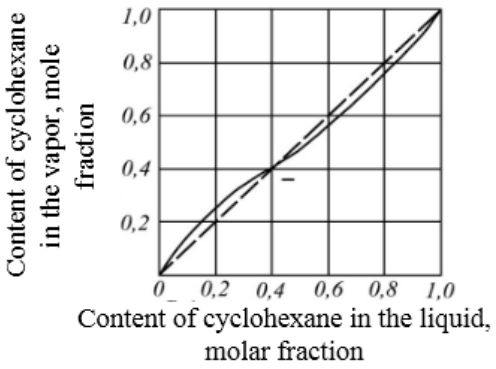

Figure. 2. The cyclohexane-benzene system

Since the azeotrope has a minimum boiling point, then for any ratio of components, the azeotropic mixture will be distilled first. But the nature of the residue will already depend on the ratio of the components. So, if the initial mixture contains 20% cyclohexane and 80% benzene, then after distillation of the azeotrope, pure benzene will remain in the residue; if a mixture consisting of

80% cyclohexane and 20% benzene is distilled, pure cyclohexane will remain in the residue. In practice, this method is sometimes used to obtain pure benzene or cyclohexane from mixtures thereof.

When choosing a reagent that forms an azeotropic mixture with one or both of the separated components, the following series of circumstances must be taken into account:

1. When adding the third component, the boiling point of the resulting azeotrope should be quite different from the boiling points of the other components or mixture.

2. It is desirable that the resulting azeotropic mixture contains the maximum amount of product per unit weight of the distilled reagent and has a low boiling point.

3. The third component must have a low latent heat of evaporation, so that the heat consumption for distilling the resulting product is minimal.

4. The third component should be easily regenerated for further use in the process. For this, several methods are used to separate the reagent and non-aromatic hydrocarbon, such as separation of liquid phases upon cooling, followed by extraction with a solvent, or water washing, distillation at various pressures, and other methods.

5. The third component should be chemically inert, not react with shared hydrocarbons, not corrode the equipment, be thermally stable, non-toxic and available on an industrial scale.

Extractive distillation - characterized by the use of a solvent, the boiling point of which is much higher than the boiling points of the separated components. The solvent is fed to the top of the column. Flowing down, it dissolves one of the constituent parts of the mixture - aromatic hydrocarbons. Non-aromatic hydrocarbons free of solvent are removed from the top of the column. The solvent used to separate the hydrocarbon mixture changes the normal relative volatility of the components. In this case, a deviation of the system from the ideal one is observed.

A large number of solvents have been tested to isolate aromatic hydrocarbons by extractive distillation. In the table. 3 shows data on the relative volatility of a mixture consisting of 50 mol%. methylcyclohexane and 50 mol%. toluene, in the presence of various solvents (relative volatility of the toluene - methylcyclohexane 1.37 system).

Table 4 shows the relative volatilities of the toluene-non-aromatic hydrocarbon system (1: 1 ratio) in the presence of various compounds. As a non-aromatic hydrocarbon, a specially dearomatized fraction of direct distillation gasoline boiling in the range of 99-113°C served.

Table 3

Relative volatility of methylcyclohexane mixed with toluene in the presence of various solvents

Solvent	Solvent boiling point, ^{0}C	Solvent content, mol %.	Relative volatility methylcyclohexane to toluene, α
Aniline	184,4	65,8	2,71
Ethylene glycol monoethyl ether	135,2	65,8	2,29
Diethylene glycol	197,2	66,5	1,88
Formamide	193	66,7	1,42
Ethylene glycol monomethyl ether	124	66,7	2,72
Phenol	182,2	65,8	2,52
Pyridine	115,3	66,7	2,59

Furfural turned out to be the best selective solvent for the isolation of toluene. However, furfural boiling at a temperature of 163°C can form azeotropic mixtures with non-aromatic hydrocarbons distilled from toluene, which makes it difficult to regenerate it.

Phenol, being the same selective solvent as aniline, is chemically inactive and quite stable. It also meets the requirements for boiling point, availability and cost. For the above reasons, phenol is the main solvent used for the extraction of benzene and toluene mainly consists of aromatic hydrocarbons.

Table 4

Relative volatility of non-aromatic hydrocarbons mixed with toluene in the presence of various solvents

Solvent	Solvent boiling point, 0C	The solvent content in the feed,% wt.	Relative volatility methylcyclohexane to toluene, α
Furfural	163	50	2,30
Acetonyl acetone	188	50	2,20
Nitrobenzene	212	50	2,16
Nitrotoluene	223	50	2,16
Phenol	182	50	2,10
Aniline	184	50	2,08
Phenol + Cresol (60% + 40%)	193	50	1,98
Phenol + Cresol (40% + 60%)	195	50	1,95
Acetophenone	203	50	1,95
Meta + or paracresol	205	50	1,85
Diacetonglycol	191	50	1,64

Extraction. Extractive separation processes are based on the unequal solubility of aromatic and non-aromatic hydrocarbons in various solvents.

The conditions of the extraction process are determined by the nature of the feedstock and solvent, the amount of solvent, temperature and the required number of stages of extraction and the given selection and properties of the aromatic hydrocarbon concentrate.

The solvent should be characterized by the following qualities:

- high selectivity and high dissolving ability in relation to aromatic hydrocarbons;
- stability during long-term operation;
- the difference in density between the solvent and hydrocarbons to facilitate phase separation during extraction;
- ability to easy regeneration;
- to be economically accessible, not to corrode the equipment and not have a pronounced toxic effect.

The choice of the temperature range of extraction depends on the critical temperature of dissolution of the feedstock. Extraction is carried out in the temperature range at which there are two phases - extract and raffinate.

The amount of solvent is determined by the temperature of the process and a given percentage of extraction of aromatic hydrocarbons from the feedstock. The process must be carried out in such a way as to obtain, possibly, a greater extraction of aromatic hydrocarbons with a minimum consumption of solvent and a practically acceptable number of extraction steps. Diethylene glycol (DEG) and liquid sulfur dioxide are used as solvents in the evolution of aromatic hydrocarbons in industrial practice.

The influence of the extraction temperature and the fractional composition of the raw material on the content of aromatic hydrocarbons in the extract is shown in Fig. 3.

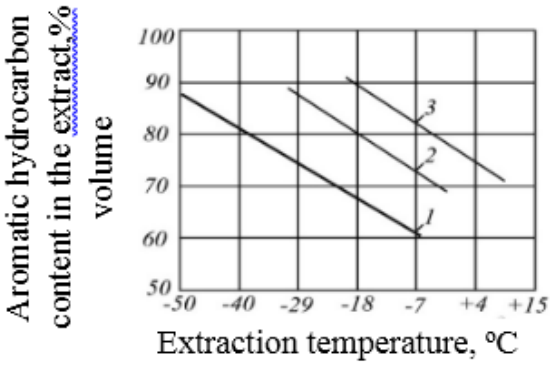

Figure. 3. The effect of the temperature of extraction and the fractional composition of raw materials on the content of aromatic hydrocarbons in the extract

1 - average boiling point of the fraction 144°C; 2 - average boiling point of the fraction 216 ° C; 3 - average boiling point of the fraction 276°C.

The curves were obtained on the basis of laboratory studies and the operation of an industrial extraction plant using sulfur dioxide.

Adsorption release. Aromatic hydrocarbons are able to adsorb more strongly on specially selected adsorbents than paraffinic and naphthenic hydrocarbons; this is the basis for their isolation from petroleum products.

Separation of complex mixtures using the adsorption method has been used in laboratory practice for a long time - since 1903. Adsorption separation in the liquid phase is used not only to separate aromatic hydrocarbons, but also to isolate a number of other chemical products [9, 10].

Adsorbents used to extract aromatic hydrocarbons from oil fractions should have high selectivity, mechanical strength, and long service life; they should be easily regenerated, be chemically inert with respect to shared components and economically available.

The industrial design of the process of adsorption of aromatic hydrocarbons is determined by the absorption capacity of the adsorbent, the rate of percolation of the raw material, propellant and desorbent. The necessary amount of propellant and desorbent and the size of the adsorbent granules are also taken into account.

Thus, for the extraction of aromatic hydrocarbons from the composition of automobile fuels in the oil refining industry, the cleaning methods presented in this article can be used.

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Rezyume: *Maqolada neftni qayta ishlash sanoatida ekologik muhitni yaxshilash va avtobenzinlar tarkibidagi aromatik uglevodorodlar miqdorini kamaytirish uchun turli qayta ishlash usullari taqdim etilgan.*

Резюме: *В статье представлены различные методы переработки нефти в нефтеперерабатывающей промышленности для улучшения окружающей среды и снижения количества ароматических углеводородов в бензине.*

Kalit so'zlar: *benzin, aromatik uglevodorodlar, azeotrop distillash, ekstraktsiya, rektifikatsiya, adsorbsiya.*

Ключевые слова: *бензин, ароматические углеводороды, азеотропная перегонка, экстракция, ректификация, адсорбция.*

LOCAL DERIVATIONS ON SOLVABLE LIE ALGEBRAS WITH A FILIFORM NILRADICAL

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Summary. *The present paper is devoted to the description of local derivations on rank one or zero solvable Lie algebras with the filiform nilradical. Firstly, we shall consider local derivations of rank one solvable Lie algebra* W_n^+ *and* R_n^+ *with the filiform nilradical* W_n *and* R_n. *Namely, we find a general form of local derivations in the case of solvable Lie algebras whose nilradical is the Witt algebra* W_n *and special filiform algebra* R_n. *In particular, in these cases the spaces* $\mathrm{LocDer}(\mathrm{R})$ *are Lie algebras. Finally, we shall find a general form of rank zero solvable Lie algebra with a metabelian filifrom nilradical.*

Keywords. *Lie algebra, derivation, local derivation.*

Let A be an algebra (not necessary associative). Recall that a linear mapping $D:\mathrm{A}\to\mathrm{A}$ is said to be a derivation, if $D(xy)=D(x)y+xD(y)$ for all $x,y\in\mathrm{A}$. A linear mapping Δ is said to be a local derivation, if for every $x\in\mathrm{A}$ there exists a derivation D_x on A (depending on x) such that $\Delta(x)=D_x(x)$. The definition of local automorphism is similar [9]. These notions were introduced and investigated independently by R.V. Kadison [8] and D.R. Larson and A.R. Sourour [9]. The above papers gave rise to a series of works devoted to the description of mappings which are close to automorphisms and derivations of C^*-algebras and operator algebras. In [9] D.R. Larson and A.R. Sourour proved that if $\mathrm{A}=B(X)$, the algebra of all bounded linear operators on a Banach space X, then every invertible local automorphism of A is an automorphism. Thus automorphisms on $B(X)$ are completely determined by their local actions. In [4, Lemma 4] it was shown that the set of all local automorphisms $\mathrm{LocAut}(\mathrm{A})$ of an algebra A form a multiplicative group. In [2] Sh.A. Ayupov and the first author have proved that every local derivation on semi-simple Lie algebra over an algebraically closed field of characteristic zero is a derivation and gave examples of finite-dimensional nilpotent Lie algebras with local derivations which are not derivations. In [15] the authors studied local derivatoions of standard Borel subalgebras of a finite-dimensional simple Lie algebra over an algebraically closed field of characteristic 0 and proved that every local derivation of such algebras is a derivation. In [3] have shown that in the class of solvable Lie algebras there exist algebras which admit local derivations which are not ordinary derivation and also algebras for which every local derivation is a derivation. The authors found necessary and sufficient conditions under which any local derivation of solvable Lie algebras with abelian nilradical and one-dimensional complementary space is a derivation. For the structure of solvable algebras with a given nilradical see [1, 7, 12].

Let L be a Lie algebra. Consider the following central lower and derived sequences:

$$\mathrm{L}^1=\mathrm{L},\quad \mathrm{L}^{k+1}=[\mathrm{L}^k,\mathrm{L}],\qquad k\geq 1,$$
$$\mathrm{L}^{[1]}=\mathrm{L},\quad L^{[s+1]}=[L^{[s]},\mathrm{L}^{[s]}],\quad s\geq 1.$$

A Lie algebra L is called nilpotent (respectively, solvable), if there exists $p\in\mathrm{N}$ such that

$L^p = 0$ (respectively, $L^{[p]} = 0$). The smallest integer k such that $L^k = 0$ is called the nilindex (or the nilpotency class) of L.

A Lie algebra L is called filiform, if $\dim L^k = n-k-1$ for $1 \le k \le n-1$. Note that the filiform Lie algebras have the maximal possible nilindex, $n-1$. These algebras are the "least" nilpotent. Any Lie algebra L contains a unique maximal solvable (resp. nilpotent) ideal, called the radical (resp. nilradical) of the algebra (see [5, 6, 10, 14]).

Let L be a nilpotent Lie algebra and let $\mathrm{Der}(L)$ be the Lie algebra of all derivations of L. There is maximal abelian subalgebras of $\mathrm{Der}(L)$, consisting of semisimple elements. By a theorem of Mostow, these algebras are conjugate under the action of the group of inner automorphism of L. These abelian algebras are called maximal torus of derivations and the dimension of the maximal torus of $\mathrm{Der}(L)$ is an invariant of L. It is called rank of L [7].

It is known [7, 11] that the rank of solvable algebra with a filiform nilradical is at most 2. There are only two types of filiform Lie algebras of rank 2 and three types of filiform Lie algebras of rank 1 [7].

Theorem 1. *Any local derivation Δ on W_n^+ is uniquely represented in the form*

$$\Delta = ad(a) + \overline{\Delta},$$

where $a \in span\left\{e_0, e_1, \ldots, e_{\left[\frac{n}{2}\right]-1}\right\}$ and $\overline{\Delta} \in PLoc(W_n^+)$, $[t]$ is the integer part of the real number t. Moreover, the space $LocDer(W_n^+)$ equipped with a Lie bracket is a Lie algebra and $PLoc(W_n^+)$ its ideal.

Theorem 2. *Any local derivation Δ on R_n^+ is uniquely represented in the form*

$$\Delta = ad(a) + \overline{\Delta},$$

where $a \in span\{e_0, e_1, e_2\}$ and $\overline{\Delta} \in PLoc(R_n^+)$. Moreover, the space $LocDer(R_n^+)$ equipped with a Lie bracket is a Lie algebra and $PLoc(R_n^+)$ its ideal.

Further we obtain description of the space of all local derivations of rank zero solvable Lie algebras with filiform nilradical, namely with a so-called matabelian filifrom Lie radical.

A non-abelian Lie algebra L is called a metabelian, if $L^{[2]} = 0$.

We shall consider a metabelian filiform Lie algebra L of dimension $n \ge 7$ with a basis $\{e_1, \ldots, e_n\}$ such that

$$[e_1, e_i] = e_{i+1}, \qquad 2 \le i \le n-1, e_2, e_i] = e_{i+2} + e_{i+2},$$
$$3 \le i \le n-2, e_2, e_{n-2}] = e_n.$$

In this subsection L is the Lie algebra with the above basis. By [13, Proposition 3.2.5], a derivation D on L has the strictly lower triangular matrix $(d_{i,j})$ such that:

$$d_{2,1} = 0,$$
$$d_{i+1,i} = d_{3,2}, \qquad 3 \le i < n;$$
$$d_{ij} = d_{i-j+2,2} - d_{i-j+1,1} - d_{i-j,1} \quad 3 \le j < i-1 < n.$$

Note that the numbers $d_{i,j}$ $(3 \le i, j \le n)$ comlpetely determined by $d_{k,1}, d_{k,2}$ $(k = 3, \ldots, n)$ and the space of all derivations $\mathrm{Der}(L)$ has the dimension $2n-4$.

Theorem 3. *A linear mapping* Δ *on* L *is a local derivation if and only if it has the strictly lower triangular matrix* $(\delta_{i,j})$ *with* $\delta_{2,1} = 0$.

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Rezyume: *Ushbu maqolada filiform nilradikal, rangi birga yoki nolga teng Li algebralarida lokal differentsiallashlarning tavsifiga bag'ishlangan. Biz* W_n^+ *va* R_n^+ *filiform nilradikal rangi birga* W_n *va* R_n *ga teng yechimli Li algebrasining lokal differentsiallashlari ko'rib chiqilgan.* W_n *Witt algebrasi va maxsus* R_n *filiform algebrasi bo'lgan Li algebralarida lokal differentsiallashlarining umumiy ko'rinishi topilgan. Xususan bu holda* $\mathrm{LocDer}(\mathrm{R})$ *Li algebralaridir. Va nihoyat, rangi nolga teng metabel filiform nilradikal yechiluvchan Li algebrasining umumiy ko'rinishi topilgan.*

Резюме: *Настоящая работа посвящена описанию локальных дифференцирований на разрешимых алгебрах Ли ранга один или нуль с филиформным нильрадикалом. Рассматриваются локальные дифференцирования разрешимой алгебры Ли ранга один* W_n^+ *и* R_n^+ *с филиформный нильрадикалом* W_n *и* R_n*. А именно, мы находим общий вид локальных дифференцирований в случае разрешимых алгебр Ли, нильрадикалом которых является алгебра Витта* W_n *и специальной филиформной алгебры* R_n*. В частности, в этих случаях пространства* $\mathrm{LocDer}(\mathrm{R})$ *являются алгебрами Ли. Наконец, мы найдем общий вид разрешимой алгебры Ли ранга нуль с метабелевым филиформны нильрадикалом.*

Kalit so'zlar: *Li algebra, differentsiallash, lokal differentsiallash*
Ключевые слова: *Алгебра Ли, дифференцирование, локальные дифференцирование.*

UDC: 691.32

RESEARCH TO IMPROVE THE DURABILITY AND EFFICIENCY OF CONCRETE IN A DRY HOT CLIMATE

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Summary: *The article argues that in the harsh continental climate of the Republic of Karakalpakstan, buildings and structures built and constructed of solid concrete do not take into account the specifics of this climate, resulting in a decrease in the durability of buildings, leading to increased construction costs. These advantages of building buildings and structures from solid concrete and reinforced concrete will undoubtedly facilitate the use of cities and villages in mass construction, especially in areas with underdeveloped industrial base.*

Analysis of field observations in the Republic of Karakalpakstan shows that one of the main reasons for the defects and deterioration of the structures of buildings and structures made of solid concrete is the lack of consideration for the impact of hot climates. It is written about the construction, taking into account the peculiarities of the climate, the hot dry climate.

Keywords: *solid concrete, dry-hot climate, concrete, building materials, cracks, climate, buildings and structures, reinforced concrete construction.*

To reduce the cost of construction in many countries, including Uzbekistan, the construction of buildings and structures from monolithic concrete is increasingly used.

Observations of buildings and structures made of in-situ concrete under construction and under construction in a sharply continental climate, which includes the climate of the Republic of Karakalpakstan, show that failure to take into account the peculiarities of this climate leads to a decrease in the operational properties of in-situ concrete, and, consequently, to a decrease in the durability of buildings, an increase in operational construction costs.

Based on this research, aimed at increasing the operational properties of in-situ concrete in a sharply continental climate, are relevant, and the purpose of such research work is to increase the operational properties of in-situ concrete in a sharply continental climate by controlling its initial structure formation. To achieve this goal, it is necessary to study the features of the course of physical processes occurring in freshly laid monolithic concrete, depending on climatic and technological factors, as well as to study the influence of a sharply continental climate on the operational properties of monolithic concrete in natural conditions.

Concrete and reinforced concrete from the moment of their inception until the beginning of the 20th century were used mainly for monolithic structures and structures [1]. This is evidenced by numerous examples from construction practice both in foreign countries and in Uzbekistan.

Basically, monolithic reinforced concrete was used in the construction of multi-storey industrial and civil buildings, as well as bridges. However, already in the first third of the XX century. construction practice has proven that the use of prefabricated reinforced concrete allows to increase the pace of construction of buildings and engineering structures, as well as to reliably control the quality during the production of concrete works. The prevalence of precast concrete and reinforced concrete over monolithic over the past period can be explained by climatic conditions and the need to manufacture structures in a factory in closed rooms [14, etc.].

However, since the beginning of the 90s of the XX century. in connection with the market economy, new relations between the customer and the contractor, as well as in connection with the development of low-rise housing construction, the volumes of monolithic concrete and reinforced concrete are increasing. In recent years, in Uzbekistan, as well as in Karakalpakstan, there has been a steady trend towards an increase in the share of residential and public buildings made of monolithic reinforced concrete.

The development of the construction of buildings and structures from monolithic reinforced concrete is facilitated by numerous research and development of methods for accelerating hardening and ensuring the operational properties of monolithic concrete, as well as the durability of structures made of it, carried out in recent years. The use of monolithic concrete and reinforced concrete can be rationally and economically more profitable than using prefabricated reinforced concrete, first of all, in areas with difficult geological conditions, in places where there is no or insufficient capacity for prefabricated housing, without a developed network of roads, in rural areas where there are local aggregates ... The advantage of monolithic concrete and reinforced concrete can be explained by the fact that in some types of construction the level of prefabrication approached the limit value and its further increase becomes economically and technically inexpedient [5, 12, 11, etc.].

In the world at present, the annual production of concrete for monolithic construction exceeds one and a half billion cubic meters / 5 /. In terms of production and use, MB and reinforced concrete are far ahead of other types of building materials. The tallest TV tower in the world was built of monolithic reinforced concrete. A striking example of the building capabilities of monolithic reinforced concrete are offshore platforms for oil production several hundred meters high. The tallest buildings on all continents are built with a monolithic reinforced concrete frame.

The indicated advantages of erecting buildings and structures from MB and reinforced concrete will undoubtedly contribute to its use in the mass construction of cities and villages, especially in areas with an undeveloped industrial base.

The use of monolithic concrete and reinforced concrete, in addition to the above-mentioned advantages, also makes it possible to use solar energy and heat release during the hydration of cement in the structures of buildings and structures themselves, accelerating the strength gain of monolithic concrete and increasing, in general, the pace of construction.

It should be noted that the use of monolithic concrete in construction, in addition to many advantages, entails a number of disadvantages: significant labor costs in the performance of work at the construction site; seasonality of production; overestimated costs of Portland cement and water due to the use of a more mobile concrete mixture; long terms of construction of structures due to the duration of hardening of monolithic concrete, especially in the cold season, as well as the difficult-to-manage process of quality control of concrete work at the construction site, which has a great impact on the operational properties of monolithic concrete and, ultimately, on the durability and overall the cost of buildings and structures.

Until now, there are no statistical data on the causes of defects in repaired concrete structures. However, according to various sources, it is possible to present in general terms a picture of the nature and costs of eliminating defects in buildings and structures made of monolithic concrete and reinforced concrete [3, 2, 9, 11]. For example, in Switzerland, the available information on 800 surveyed damages showed that 37% of defects arose at the design stage and 39% of defects at the construction stage. ... These figures in France and the USA are 37 and 51%, respectively - 57 and 50% / 32 /.

Therefore, there is an acute problem of ensuring the operational properties of monolithic concrete and reinforced concrete, and, consequently, the durability of buildings and structures, both in developing and developed countries.

To date, researchers in this area have accumulated vast experience on the methods of erecting structures and buildings in each area of application of MB, on various optimization of the use of formwork in the production process, on ways to intensify the process of its hardening, and there are numerous methods for calculating loads for assigning technical and operational requirements to each type of structures, etc./4, etc./. The accumulation of this knowledge is necessary, but not sufficient to obtain buildings or structures of a given quality and durability. For the quality and durability of buildings and structures directly depends on the operational properties of the applied monolithic concrete and reinforced concrete /5,8,etc. /. And the operational properties depend on the structure of monolithic concrete, which is formed during their formation in buildings and structures under the influence of industrial and climatic conditions. Therefore, the problem of obtaining monolithic concrete with increased operational properties, and, consequently, the durability of buildings and structures, is very acute both abroad and in the Republic of Karakalpakstan, where specific climatic conditions take place.

Based on this, it can be noted that the climate of the Republic of Karakalpakstan is dry hot and can affect all stages of the production of monolithic concrete;
design, production and operation [especially, at the stage of formation of the structure in the initial period of hardening.] In order to identify the influence of a dry hot climate on the formation of the structure and operational properties of monolithic concrete erected in regions of dry hot climates, it is required to observe buildings and structures built from monolithic concrete in the Republic of Karakalpakstan. In civil engineering structures, according to the results of the survey carried out, the behavior of monolithic concrete is not in the best condition. Cracks are observed with an opening width of 1, 2, 3 mm, a length of up to half a meter or more, and a depth of up to two-thirds of the height of beams and ceilings. In fig. 1 shows an example of a typical early cracking of monolithic reinforced concrete in structures in the summer. (the pictures were taken 2 ... 3 hours after the concrete was placed in the structure). Cracks start from the upper compressed zone of the element and in some cases reach its lower tensioned zone, reaching the working reinforcement, which is especially dangerous for bent elements [6, 7]. rice. one.

Rice. 1. Cracks in a monolithic reinforced concrete beam due to reinforcement restraint [1]

It seems obvious that defects obtained during the formation of the structure of monolithic concrete in the initial period of its hardening and aggravated during operation from the influence of negative climatic influences (moistening and drying, heating and cooling, etc.) can cause the destruction of monolithic concrete in open parts designs. The analysis of the given field examinations of various buildings and structures shows the urgency of the problem of obtaining high-quality and durable monolithic concrete in hot climates. It should be especially noted that the deterioration in the quality and durability of cast-in-place concrete of buildings and structures to a large extent can occur already in the initial period of its hardening.

It can be assumed that this is a consequence of the intensive course of processes of structure formation and physical destructive phenomena in such climatic conditions. The latter adversely affect the state of structures and structures made of monolithic concrete, and due to the appearance of defects and damage caused by climatic factors, such structures and structures often require major repairs. Thus, the analysis of field observations carried out in the Republic of Karakalpakstan shows that one of the main reasons for defects and destruction of structures of buildings and structures made of MB is the neglect of the influence of a hot climate on the process of formation of its initial structure, on which, mainly, the provision of in the subsequent its operational properties. This indicates that it is necessary to control the initial structure formation taking into account the peculiarities of the climate, in this case a hot dry climate.

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11. Nguyen Duc Thang Improving the operational properties of monolithic concrete in a humid hot climate (abstract) 2002, 177 p.

Rezyume: *Ushbu maqoloda Qoraqalpog‘iston Respublikasi iqlimini o‘z ichiga olgan keskin kontinental iqlim sharoitida yaxlit betondan qurilgan va qurilayotgan bino va inshootlarning bu iqlimning o‘ziga xos xususiyatlarini hisobga olmaslik, oqibatida binolarning chidamliligining pasayishi, qurilishning tannarxinig oshishiga olib kelishi haqida aytilgan.Yaxlit beton va temir-betondan bino va inshootlarni qurishning ko'rsatilgan afzalliklari, shubhasiz, shahar va qishloqlarni, ayniqsa, sanoat bazasi rivojlanmagan hududlarda ommaviy qurilishda foydalanishga yordam beradi Qoraqalpog‘iston Respublikasida olib borilgan dala kuzatuvlari tahlili shuni ko‘rsatadiki, yaxlit betondan yasalgan bino va inshootlar konstruksiyalarining nuqsonlari va buzilishining asosiy sabablaridan biri issiq iqlimning shakllanishiga ta’sirini hisobga olmaslikdir. Bu iqlimning o'ziga xos xususiyatlarini, issiq quruq iqlimni hisobga olgan holda qurish haqida yozilgan.*

Резюме: *В статье говориться, что в условиях резко континентального климата Республики Каракалпакстан здания и сооружения, построенные из монолитного бетона, не учитывают специфику этого климата, что приводит к снижению долговечности зданий и увеличению затрат на строительство.*

Преимущества зданий и сооружений из монолитного бетона и железобетона, несомненно облегчает строительство городов и сел, особенно в районах со слаборазвитой производственной базой.

Анализ наблюдений в Республике Каракалпакстан показывает, что одной из основных причин дефектов и износа конструкций зданий и сооружений из монолитного бетона является отсутствие учета воздействия жаркого сухого и резко континентального климата.

Kalit so’zlar: *yaxlit beton, quruq issiq iqlim, beton, qurilish materiallari,darz,bin ova inshootlar, temirbeton konstruktsiya.*

Ключевые слова: *твердый бетон, сухой жаркий климат, бетон, строительные материалы, трещины, климат, здания и сооружения, железобетонные конструкции.*

UDC 677.024

RESEARCH OF CLOTHING FABRICS BREATHABILITY OF THE MAIN

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Summary: *It is advisable to use air permeability as a criterion for assessing the structure of clothing fabrics. Therefore, a design technique was proposed on the basis of a given fabric air permeability. The following parameters of the fabric with a square structure of the main weaves were determined, such as the coefficient of air permeability, the percentage of unfilled and filled area of the fabric with fibrous material, the average number of the yarn, and the density of the fabric. An equation for the coefficient of air permeability of a fabric with a square structure, taking into account the sum of the numerator and denominator of fractions of the main weaves, is proposed.*

Keywords: *thread, warp, weft, fabric, weave, overlap, parameters, air permeability, criterion, assessment, method.*

Introduction

Depending on the structure of the surface of the fabric, they are divided into smooth, pile and felted. Smooth fabrics are called fabrics that have a clear pattern of main weaves, such as plain, twill satin. During the finishing process, smooth fabrics on the front side are usually singed. Depending on the type of weave, density, degree of warp and weft curvature, warp or weft threads may prevail on the surface of the fabric [**1**]. Equally supporting fabrics on the front side have the same area of the main and weft overlaps (Fig. In the weft-supporting fabrics on the front side, weft overlaps prevail, in the base of the supporting fabrics, the main overlaps prevail. In smooth fabrics, the support surface is formed by protruding wave crests of threads. The weave has a significant effect on the area of the supporting surface of the fabric: the longer the overlaps, the greater the area of the supporting surface. When the fabric is abraded, its supporting surface is destroyed in the first place. Fabrics with a larger surface area are more likely to deteriorate from abrasion.

In addition, the surface area of the support surface affects the breathability of the fabric.
The generally accepted characteristic of air permeability is the air permeability coefficient. The air permeability coefficient of a material shows the amount of air passing through 1 m^2 of fabric in 1 second at a certain pressure difference on both sides of the material.

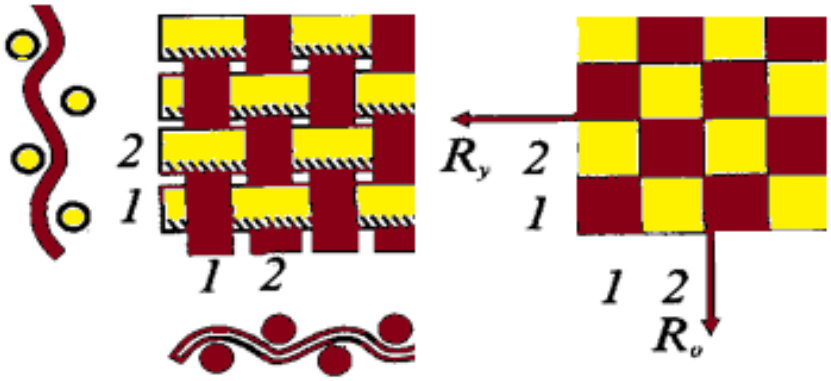


Fig. 1 Plain weave 1/1 overlap.

2. Theoretical part

The work is carried out in the following sequence. We determine the coefficient of air permeability of a plain weave fabric for fabrics with a square structure [3].

$$C_n = \frac{B}{h^{\tau}} \quad (1)$$

The percentage of uncovered tissue area is determined from the formula

$$C_n = 0{,}00588 \cdot f^{2.46} \quad (2)$$

Determine the average yarn number for square fabrics

$$N = \left(\frac{0{,}2 \cdot E \cdot c \cdot \mu}{M_T}\right) \quad (3)$$

where: ***E*** - is the relative density of the tissue in %; c - coefficient of maximum fabric density, equal to 80 for yarn; **μ** - coefficient of attraction in the surface density of the fabric equal to 1.05; $\mathbf{M_T}$ - areal density of 1 m^2 of fabric in gr.

Determine the density of a square fabric

$$P_y = \frac{M_T \cdot N}{21} \quad (4)$$

On the basis of experimental studies in [**4**], an equation of the coefficient of air permeability of the fabric of twill weaves C_C for fabrics of a square structure was proposed

$$C_C = \frac{0{,}263 \cdot \sqrt{n} \cdot C_n}{f_g \cdot N^{0{,}0625}} \quad (5)$$

where ***Cn*** - is the coefficient of air permeability of a plain weave fabric for fabrics with a square structure; ***n*** - is the number of threads in the report of a square twill fabric; ***f,g*** - living section of a tissue with a square structure (within the range of 0.2-0.4); ***N*** - is the average number of yarn in a square fabric.

3. Experimental part

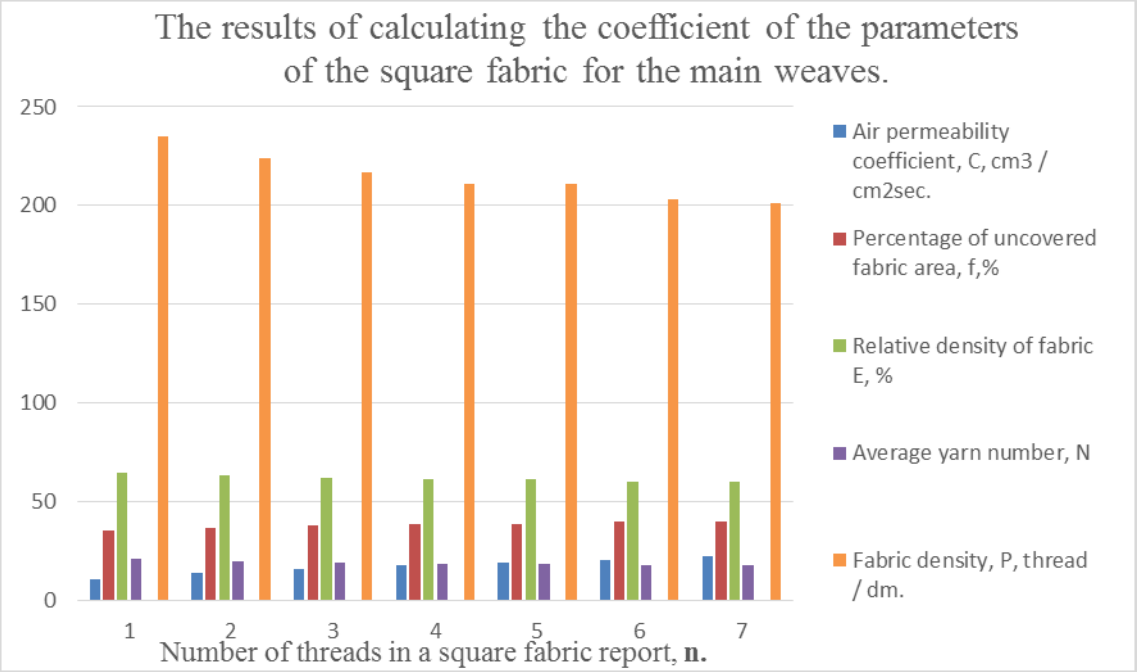
Let it be proposed to develop a fabric of a square structure with air permeability **B** = 50 cm^3 / cm^2sec. According to formulas (1) - (5), we will carry out the calculation, the results of which are presented in table 1.

Table 1 shows the results of calculating the parameters of a square fabric for the main weaves overlapping 1 / 1.1 / 2.1 / 3.1 / 4.1 / 5.1 / 6 and 1/7 (plain and twill).

Table 1

The results of calculating the coefficient of the parameters of the square fabric for the main weaves.

№	Name	Number of threads in a square fabric report, n.						
		2	**3**	**4**	**5**	**6**	**7**	**8**
1	Air permeability coefficient, ***C***, cm^3 / cm^2sec.	10,7	13,4	15,5	17,4	19,0	20,5	21,9
2	Percentage of uncovered fabric area, ***f***,%	35,2	36,7	37,8	38,6	38,6	39,8	40
3	Relative density of fabric ***E, %***	64,8	63,3	62,2	61,4	61,4	60,2	60
4	Average yarn number, ***N***	20,6	19,6	19,0	18,5	18,5	17,8	17,6
5	Fabric density, ***P***, thread / dm.	235	224	217	211	211	203	201

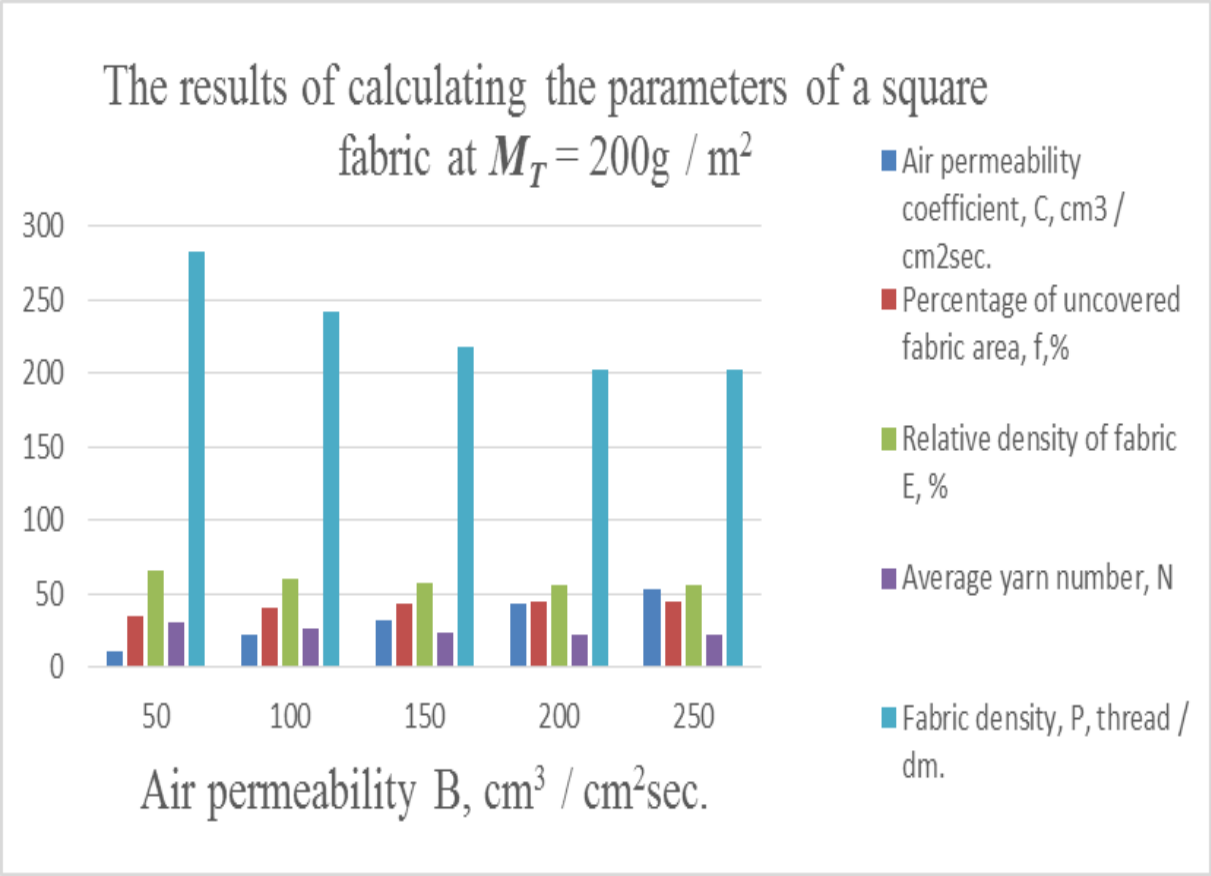


With a constant value of the surface density of a fabric of a square structure M_T = 200gr / m^2 and a variable value of the air permeability of the fabric ***B*** cm^3 / cm^{2}sec, the parameters of a fabric of a square structure were determined. The calculation results are presented in table 2.

Table 2

The results of calculating the parameters of a square fabric at M_T = 200g / m^2

№	Name	Air permeability B, cm^3 / cm^{2}sec.				
		50	**100**	**150**	**200**	**250**
1	Air permeability coefficient, ***C***, cm^3 / cm^{2}sec.	10,7	21,3	32,0	42,6	53,3
2	Percentage of uncovered fabric area, ***f***,%	35	40	43	45	45
3	Relative density of fabric ***E, %***	65	60	57	55	55
4	Average yarn number, ***N***	29,8	25,4	22,9	21,3	21,3
5	Fabric density, ***P***, thread / dm.	283	242	218	203	203

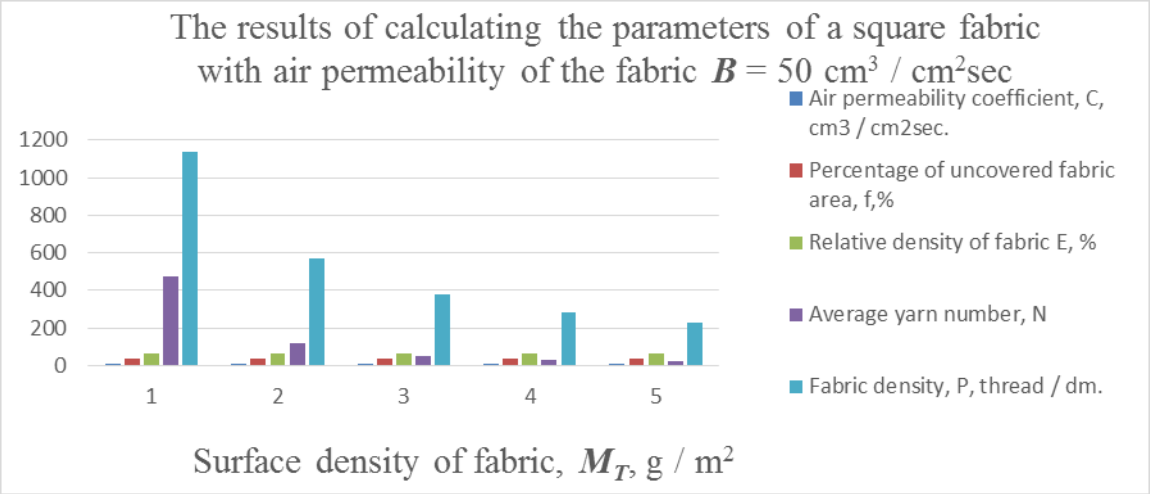


With a constant value of the air permeability of the fabric ***B*** = 50 cm^3 / cm^{2}sec ^{2} and a variable value of the surface density of the fabric of a square structure M_T g / m, the parameters of the fabric of a square structure were determined.

Table 3

The results of calculating the parameters of a square fabric with air permeability of the fabric *B* = 50 cm^3 / cm^{2}sec

№	Name	Surface density of fabric, M_T, g / m^2				
		50	**100**	**150**	**200**	**250**
1	Air permeability coefficient, ***C***, cm^3 / cm^{2}sec.	10,7	10,7	10,7	10,7	10,7
2	Percentage of uncovered fabric area, ***f***,%	35	35	35	35	35
3	Relative density of fabric ***E, %***	65	65	65	65	65
4	Average yarn number, ***N***	477	119	53	29,8	19
5	Fabric density, ***P***, thread / dm.	1135	566	379	284	226



4. Discussion

As a criterion for assessing the structure of clothing fabrics, it is advisable to use air permeability. Therefore, a design technique was proposed on the basis of a given fabric air permeability. Where the following parameters of the fabric with a square structure of the main weaves are determined, such as the coefficient of air permeability, the percentage of unfilled and filled with fibrous material of the area of the fabric, the average number of yarns, the density of the fabric. Linen floors 1/1, twill floors 1/2,1/3,1/4,1/5,1/6 and 1/7 are used as the main weaves in the research. It is advisable to calculate the coefficient of air permeability of fabrics of a square structure using the sum of the numerator and denominator of the fraction of the overlaps of the main weaves according to the formula (5).

From formula (5), the coefficient of air permeability of the fabric of twill weaves CC for fabrics of a square structure is directly proportional to the number of threads in the report of a twill fabric of a square structure and the coefficient of air permeability of a fabric of a plain weave for fabrics of a square structure, and is inversely proportional to the living section of a fabric of a square structure and the average number of yarn in fabrics of a square structure.

Analysis of Table 1 shows that an increase in the number of threads in the report of a fabric with a square structure leads to an increase in the coefficient of air permeability of the fabric and the percentage of uncovered area of the fabric, and to a decrease in the relative density of the fabric, the average number of yarns and the density of the fabric.

From table 2 it follows that as the air permeability of a square fabric increases: firstly, the air permeability coefficient and the percentage of uncovered fabric area increase: secondly, the relative density of the fabric, the average yarn number and the density of the fabric decrease.

For table 3, it is characteristic that an increase in the surface density of the fabric causes unchanged values in all variants of the coefficient of air permeability, the percentage of uncovered area of the fabric and the relative density of the fabric, and the values of the average yarn number and fabric density decrease.

5. Conclusion

1. It is proposed an equation of the coefficient of air permeability of a fabric of a square structure, taking into account the sum of the numerator and denominator of fractions of the main weaves.

2. Research of the parameters of the structure of the fabric with a square structure, depending on the weave, air permeability and surface density of the fabric.

3. It is determined that an increase in the number of threads in the report of square fabric and air permeability decreases the average yarn count and fabric density. Moreover, for air permeability, the values \ u200b \ u200bof such parameters as the coefficient of air permeability, the percentage of the uncovered area of the fabric and the relative density of the fabric, remain unchanged.

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Rezyume: *Kiyim matolarining tuzilishini baholash mezoni sifatida havo o'tkazuvchanligini qo'llash maqsadga muvofiqdir. Shuning uchun, berilgan mato havo o'tkazuvchanligi asosida loyihalash taklif qilindi. Asosiy to'qimalarning kvadrat tuzilishiga ega bo'lgan matoning havo o'tkazuvchanlik koeffitsienti, to'qimaning tolali material bilan to'ldirilmagan va to'ldirilgan maydonining foiz nisbati, iplarning o'rtacha soni va zichligi kabi quyidagi parametrlari aniqlandi*

Резюме: *В качестве критерия оценки строения одежных тканей целесообразно использовать воздухопроницаемость. Поэтому предложена на базе заданной воздухопроницаемости ткани методика её проектирования. Определены следующие параметры ткани квадратного строения главных переплетений, такие как коэффициент воздухопроницаемости, процент незаполненной и заполненной площади ткани волокнистым материалом, средний номер пряжи, плотность ткани. Предложено уравнение коэффициента воздухопроницаемости ткани квадратного строения, учитывающие сумму числителя и знаменателя дробей главных переплетений.*

Kalit so'zlar: *ip, tanda, arqoq, to'qima, o'rilish, to'ldirilishi, omillari, havo o'tkazuvchanligi, baholash, mezonlar, uslub.*

Ключевые слова:, *нить, основа, уток, ткань, переплетения, перекрытия, параметры, воздухопроницаемость, критерий, оценка, методика.*

UDC: 621.313

RESULTS OF EXPERIMENTAL RESEARCH AT 9 KW POWER SOLAR PHOTO POWER STATION

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Summary: *This article examines the requirements and conditions for connecting alternative energy sources to the network. In the test case, the options for connecting a solar photovoltaic power plant with a total capacity of 9 kW were analyzed. According to the results of the experimental study, the results of the study were obtained for each phase and three phases. The requirements and conditions for connecting a solar photovoltaic installation to the distribution system have been studied. An experiment was conducted on whether the solar PV plant was connected to the grid or not, and the results of these two cases were compared with the standard level of demand.*

The observance of the sinusoidal law in the network state, the ranges of frequency, voltage and current changes were studied, experimental studies and the results of sinusoidal behavior in the network and disconnected state were studied, and the results obtained for two cases were analyzed.

Keywords: *renewable energy sources, three-phase symmetric system, inverter, amplitude, solar photovoltaic plant.*

In recent years, special attention has been paid to the development of renewable energy sources in order to diversify the energy sector, introduce renewable energy sources and meet the growing needs of the economy in energy resources. In particular, the Decree of the President of the Republic of Uzbekistan No. PF-4512 of March 1, 2013 "On measures to further develop alternative energy sources" was an important impetus for the development of this sector [1]. This is the first step in increasing the share of "green energy" in our country. It should be noted that the traditional method of generating electricity, ie the method of converting heat energy generated by burning oil products into mechanical energy, mechanical movement into electrical energy, although somewhat harmful to the environment, is a cheap and convenient production process that is mobilized to meet the growing demand from day to year. It can be used at any time of the day (especially in the morning and evening maximum) depending on the need, and in a sense has the ability to reserve (fuel reserve) for different situations. However, the rational use of natural gas, which is currently produced in large quantities and directed to the economy and industry, including the production of various materials and raw materials, fertilizers and minerals in the chemical industry, the export of finished products to meet domestic demand. possible. One of the most important tasks is to meet the needs of the population, to supply natural gas as a fuel to the growing number of cars and machinery. In addition, the underground sources of oil and other carbon minerals are not innumerable. It is also strategically important for future generations to preserve natural resources and use them wisely [2, 8].

It is known that about 85-90% of the electricity generated in the country is produced by burning coal, natural gas and other oil products, which are the natural resources of Uzbekistan. Currently, the share of "green energy" in Uzbekistan is only 10-14%. Annex 1 to the Resolution of the President of the Republic of Uzbekistan No. PQ-4422 of August 22, 2019 provides for increasing the share of renewable energy sources to 25% by 2030 [3, 9].

One of the stations in the green energy sector is a solar photovoltaic plant that is connected to the grid. Experimental research has been conducted at this station and the following results have been obtained.

Criteria for connecting solar power plants to the network.

Requirements and conditions for connection of the solar power plant to the distribution system are as follows [4,10,11]:

1. Criteria of allowable power of the solar station;
2. Permissible vibration criterion;
3. Criteria of permissible harmonic currents;
4. Short circuit power criterion;
5. Criteria for voltage change due to simultaneous connection and
solar station outage;
6. Criteria for voltage change in steady state;
7. The criterion for the constant allowable current of the connecting line conductor [5, 6].

An experiment was performed on a Fluke ScopeMeter 190-104 to study and measure the electrical processes of a solar photovoltaic plant.

A set of three ECCs with the same frequency and amplitude acting simultaneously on a chain and moving 120 ° relative to each other is called a three-phase symmetric system (Figure 1) [7]. The change in electric sources and the change in the linear load current connected to such a source occur according to the sinusoidal law. In this case, the alternating current and voltage can be characterized by four basic parameters: period, frequency, amplitude, and effective value. There are also auxiliary parameters (angular frequency, phase, instantaneous value).

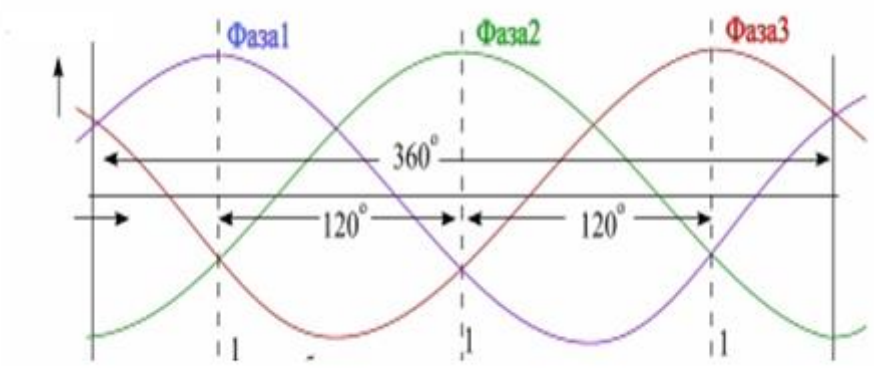

Figure 1. Three-phase symmetric system

Voltage and frequency changes in the local power grid in parallel operation with a 9 kW solar photovoltaic plant were studied on the basis of experimental studies. The photovoltaic plant is connected to the grid via a three-phase On-Grid inverter (10.5 kV). The results showed that the amplitude value of the voltage was 344 V (Figure 2), and the voltage graph did not change the sinusoidal position.

The effective value of the voltage can be determined using formula (1):

$$U=\frac{U_{max}}{\sqrt{2}}=\frac{344}{\sqrt{2}}=243\ B \quad (1)$$

where U is the mains voltage and U_{max} is the maximum signal voltage.

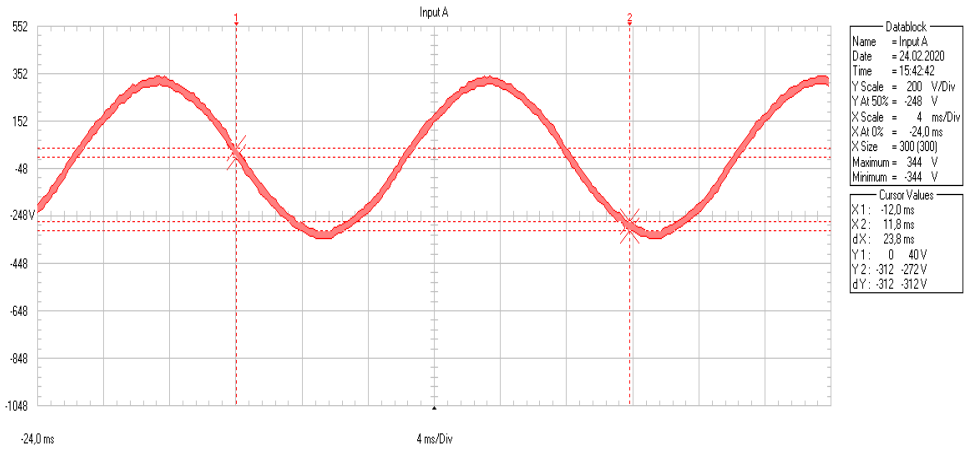

Figure 2. Voltage plot for phase A.

The amplitude values of phases A, B, and C were almost the same and were 344 V, 352, and 344 V, respectively. As shown in Figure 3, the signals of all three phases are symmetrical. The effective quadratic value of the voltage of phases A, B, and C calculated in formula (1) is 243 V, 249 V, and 243 V, respectively.

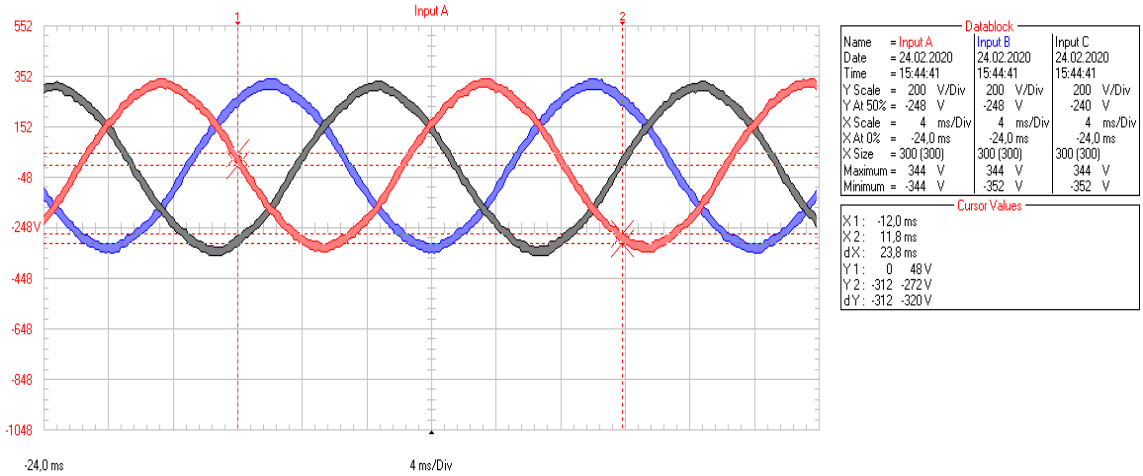

Figure 3. Voltage sections of phases A, B and C.

Figure 4 shows the results of measuring the parameters in the local network when the inverter of the local photovoltaic station is switched off (off). From the voltage graph, it is clear that the amplitude values of phases A, B, and C are the same. 243 V for phase A, 243 V for phase B and 243 V for phase C.

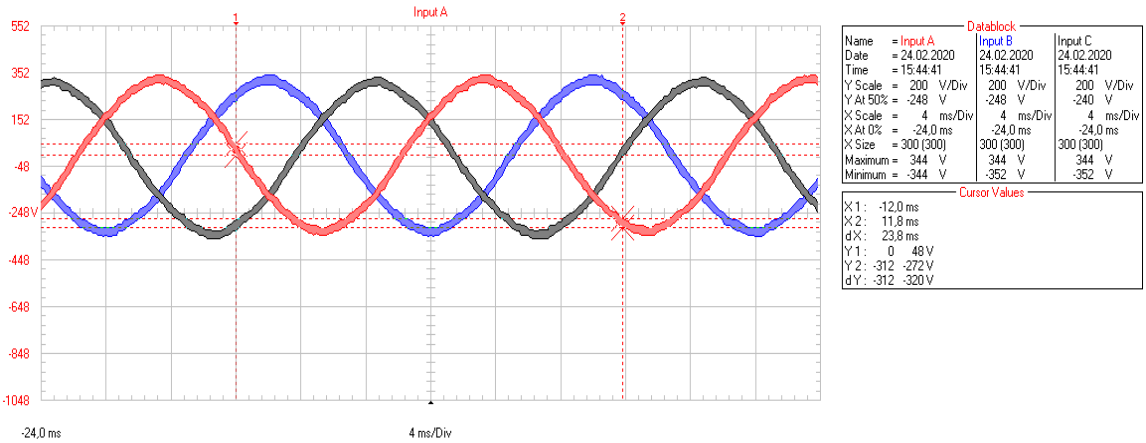

Figure 4. Voltage sections of phases A, B and C when the inverter is switched off.

Thus, it can be concluded from the above figures and evidence that one of the most important tasks today is to increase the share of renewable energy sources in the energy sector of Uzbekistan. Large-scale projects of alternative energy sources at the national level, in turn, serve as a kind of impetus for the independent use of "green energy" sources in households, country houses, small and medium-sized businesses. Today's challenge is to solve the problem of connecting large power plants to the network. In short, no matter how expensive and difficult, "green energy" is the demand of the time! Uzbekistan has all the opportunities to develop it and use it wisely for the benefit of our people and the development of our country. In general, although the effect is positive, reversible and non-reversible distributed generators can lead to system failures, short-circuit currents, increased harmonic levels, and voltage fluctuations in the network [12,13,14,15].

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Rezyume: *Ushbu maqolada muqobil energiya manbalarini tarmoqga ulashdagi talablar va shartlar o’rganilgan. Sinov tajriybasi umumiy quvvati 9 kVt bo’lgan quyosh fotoelektrik stansiyasining tarmaqga ulanish holatlari tahlil qilingan. O’tkazilgan eksperimental tadqiqot natijalari asosida har bir faza va uchta faza bo’yicha tadqiqot natiyjalari olingan. Quyosh fotoelektrik stantsiyasining taqsimlash tizimiga ulanishi uchun talablar va shartlar bajarilishi o’rganilgan. Quyosh fotoelektrik stansiyasining tarmoqga ulangan va ulanmagan holatlarda eksperiment o’tkazilib, ushbu ikkita holat natiyjalari standart talab darajasi bilan solishtirilgan.*

Tarmoqga ulangan hollatdagi sinusoidal qonuniga muvafiqligi, chastota, kuchlanish va tok kuchlarining o’zgarish diapazonilari o’rganilib, tarmoqga ulangandagi va tarmoqdan uzilgan

holatdagi sinusoidal harakatlari eksperimental tadqiqotlar va natiyjalar o'rganilib, ikkita holat uchun olingan natiyjalar tahlil qilingan.

Резюме: *В данной статье исследуются требования и условия подключения альтернативных источников энергии к сети. В тестовом примере были проанализированы варианты подключения солнечной фотоэлектрической электростанции общей мощностью 9 кВт. По результатам экспериментального исследования были получены результаты исследования для каждой фазы и трех фаз. Были изучены требования и условия для подключения солнечной фотоэлектрической установки к распределительной системе. Был проведен эксперимент с подключением солнечной фотоэлектрической установки к сети и без нее, и результаты этих двух случаев сравнивались со стандартным уровнем спроса.*

Были изучены соблюдение синусоидального закона в сетевом состоянии, диапазоны изменения частоты, напряжения и тока, изучались экспериментальные исследования и результаты синусоидального поведения в сетевом и отключенном состоянии, а также были проанализированы результаты, полученные для двух случаев.

Kalit so'zlar: *qayta tiklanuvchi energiya manbalari, uch fazali simmetrik tizim, invertor, amplituda, quyosh fotoelektrik stansiyasi.*

Ключевые слова: *возобновляемые источники энергии, трехфазная симметричная система, инвертор, амплитуда, солнечная фотоэлектрическая установка.*

UDC: 621.313

DEVELOPMENT STUDY OF THE THEORY OF FORECASTING ELECTRICITY CONSUMPTION IN INDUSTRIAL ENTERPRISES

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Summary: *The article analyzes the methods of forecasting the power consumption of industrial enterprises and examines the theory of its development. In addition, the article discusses the limits of production in technological processes and the laws of forecasting electricity for the entire enterprise.*

Keywords: *agricultural enterprises, cotton-textile cluster, "industrial cluster", electricity consumption, forecasting.*

There is a great need for forecast indicators of electricity consumption in the design and reconstruction of agricultural power supply systems. Electricity supply systems for agricultural consumers are characterized by errors in the accounting of electricity, violation of the balance of transmitted power and electricity, resulting in the payment of additional fines by the enterprise [2; 3]. All this is directly related to the state of electricity metering systems, in particular, the accuracy of electricity metering in agricultural production or large consumer facilities [5; 32; 7]. In this process, first of all, the accuracy, correctness or probability of the initial data of the network and consumer nodes and partial inaccuracy of the given data are of great importance. [8; 9].

The research examines the problems of forecasting the volume of electricity consumption by agricultural enterprises and their effective solution. The following recommendations are given by the authors in solving the existing problems. All problems are considered in the example of a single system, generalized at the technological processes, shop, and factory stages, and implemented in a step-by-step solution. When forecasting certain values, they are based on the empirical dependence of the specific power consumption on the amount of production. The disadvantages of the proposed method are that in forecasting the volume of electricity consumption, this method has not been tested under specific conditions in enterprises consuming electricity in the production of basic types of products, as well as the inability to take into account many parameters affecting electricity value. The proposed method is based on a more theoretical set of knowledge, and a number of shortcomings arise in the practical solution of problems.

In these studies [5; 6; 7] discusses the scientific and methodological issues of forecasting electricity consumption by large power consumers. A systematic approach is used in forecasting the absolute and relative values of electricity consumption. However, this method has a number of disadvantages: the presence of a large amount of uncertainty and resource-intensive parameters; low flexibility in any conditions (external factor, weather, increase in errors in measuring instruments in the deviation of state parameters from normal conditions), the complexity of modeling nonlinear processes in practice.

Depending on the specifics of the power consumed and energy consumption, the issues of energy characteristics related to the loading of equipment for a number of industries are fully developed by K.L.Solomaxo et al [8; 9; 10].

Energy saving and its efficiency begin, first of all, with accurate forecasting of electricity consumption and proper management and operation of equipment and optimal modes. For example, the use of improperly selected equipment (devices) leads to the consumption of tens, hundreds, even

thousands of times more than the savings in production over the years. This is the logical conclusion on this issue.

Until scientifically based methods for calculating and forecasting energy indicators in the textile industry are proposed, the types of products produced to optimize electricity consumption have not been studied in relation to the interaction of aggregates.

Many publications are published in the CIS countries, especially in the coal, machinery, non-ferrous and ferrous metallurgy and textile industries. [1; 2; 3; 4; 5] shows that energy saving studies have been conducted. However, it should be noted that the level of use of mathematical methods of accounting, management and control of energy consumption and the use of appropriate technical means in solving this problem has not been sufficiently studied.

In the scientific work of local scientists in this field [6; 7; 8; 9; 10] methods of forecasting electricity consumption of heavy and light industrial enterprises in the short, medium and long term have been studied. Electricity consumption in these enterprises is considered as a random process at different levels (hourly, shift, monthly, annual).

To analyze the effect of power consumption factors, it is proposed to use multidimensional extrapolation methods of calculating energy consumption parameters, which allows to obtain mathematical models that determine the power consumption regimes using full statistical data. In these studies, a methodology was developed, and when energy consumers of enterprises were analyzed to evaluate models of static non-uniform modes of electrical loads, a study of energy consumption was conducted and energy characteristics of key energy consumers were identified. Recommendations have been developed to improve the methods of determining the calculated loads of electricity consumers with static uncertain power regimes, to calculate electricity consumption, to synthesize mathematical models to determine the prospective level of energy consumption under data probability or partial uncertainty [11; 12].

In the works of BN Avilov - Karnaukhov and A.Ya. Dzeventsky [11; 8] were the first to consider energy descriptions representing the state of mechanisms and the requirements for their use as multidimensional statistical links. Based on the application of mathematical statistics and probability theory, a method for analyzing and forecasting electricity consumption in manufacturing enterprises, including agricultural gins and textile mills, has been developed. It should be noted that in this research work, only a limited number of factors influenced the electricity consumption of the enterprise and a large amount of initial data was used. This in itself leads to a significant increase in the difference between the actual and forecast indicators of electricity consumption.

The results of research on the development of the theory and practice of forecasting electricity consumption in manufacturing enterprises, namely in the cotton-textile industry I. V. Voronov [7; 9; 11] is evident in his works. For the first time, a quantitative assessment of the effect of the level of the factor of production on electricity consumption was considered on the basis of the criterion for distinguishing the most optimal factors. The reliability of the energy characteristics identified in these methods is very high, and in the case of a specific enterprise, the application of electricity in subsequent design processes, as well as increasing the efficiency of electricity consumption, leads to the expected result. The results of research conducted on the example of a set of several enterprises show that it significantly complicates the calculation work and reduces the accuracy in forecasting electricity consumption.

In this study [5; 8] considered the limits of production in technological processes and the laws of electricity forecasting for the whole enterprise. Using mathematical statistics and probability theory in constructing and analyzing energy descriptions, the effects of several technological and regime parameter factors of production were studied and quantified. Based on this, the adequacy of the mathematical model in forecasting the actual electricity consumption was tested and proved to have the least error. This makes it possible to study issues not only for the

purpose of determining the electrical load calculation, cost planning and standardization, but also in terms of optimizing electricity consumption, evaluating various technological processes and determining the optimal number of equipment.

Production was carried out in the field of forecasting electricity consumption in enterprises for short and medium term intervals. The results of research work are also of practical importance. In this study, it is recommended to apply the links between the forecast of electricity consumption and technological indicators of production, mainly by studying the energy characteristics of individual mechanisms in the internal divisions of the enterprise and their generalization as a result of the whole enterprise. As a result of the study, the laws of electricity consumption forecasting were developed not only for a single agricultural textile production enterprise, but also for enterprises of different categories of production.

[7; 9; 10] examines the different types of energy characteristics and gives specific descriptions of the energy equipment used in the ginnery on the example of cotton-textile enterprises. In research studies [3; 5; 6] studied the laws of electricity consumption forecasting, taking into account the specific conditions and regimes of large-capacity consumers for a whole complex of agricultural production enterprises. Based on the results of this work, measures have been developed and recommended for cost analysis, regulation of electricity consumption and economy of electricity consumption, use of equipment in efficient operating modes. In the above-mentioned research works, only a part of different types of large mechanisms (separate large power-consuming shops of the enterprise) are considered to have sufficiently studied specific characteristics. These recommendations and laws can only be applied to assess electricity consumption at the sheep levels of management.

Methods of optimizing electricity consumption for high-power units, taking into account several indicators of electricity consumption, product volume, its quality and others are discussed in detail in the works. It is clear from the above tasks that in order to achieve the set goal, a method of selecting the optimal (compromise) option that meets the requirements of all criteria is recommended, bypassing some criteria in achieving the optimal solution of the problem.

The analysis of the existing methods used in forecasting and planning of electricity consumption in the near or long term shows that today for these purposes mainly computational-analytical, experimental and computational-statistical methods are widely used. If we look at the current practice, it is in the forecasting of electricity consumption in the cotton textile enterprises that the reports use statistical expert assessment methods. That is, the value of electricity consumed in previous reporting periods (month, quarter, year) is taken as the base and adjusted by making changes if necessary. Disadvantages of this and similar common approaches have also been mentioned several times in research. Exactly high errors in forecasting electricity consumption, or large differences from actual consumption, lack of energy characteristics for most mechanisms and technological processes, neglect of the main and auxiliary factors influencing these processes, or specific features of the enterprise, as well as electricity consumption indicates the absence of a methodological manual used for forecasting and standardization of specific energy consumption.

Problems related to the use of equipment in enterprises and the increase in costs in the power supply system due to the forecast of electricity consumption in the medium and long term, the determination of specific electricity consumption and design loads in deterministic methods summarized by the authors in the research work. As a result of the analysis of the nature of the method considered in the author [8], taking into account each process at the lower levels of the shop in forecasting electricity consumption in the enterprise leads to the complication of mathematical connections. Therefore, such an approach to the issue does not justify itself in the conduct of accounting work at the highest levels of the enterprise.

Thus, due to the complexity and significant error in predicting electricity consumption and determining the specific consumption of electricity using deterministic methods, mathematical-statistical methods have emerged that have a probabilistic characterization of changes in electricity consumption for these purposes. This is a universal method for calculating energy costs and forecasting electricity consumption at the highest levels of the enterprise, including for cotton and textile enterprises, and is very common in solving these and similar problems. As a result of the introduction of these methods, statistical models are used that represent the dependence of electricity consumption on the influencing factors.

It is recommended to use the main component model to avoid errors in forecasting electricity consumption when changing the parameters and conditions of electricity consumption forecast indicators in agricultural production enterprises. The main component method allows the implementation of a predictive model, taking into account the effect of parametric factors that determine the harmonic synthesis and dynamics of change of spectral analysis and objective function [9; 12].

Thus, we can conclude from the above that solving the problem of forecasting electricity consumption in agricultural enterprises, especially in the cotton and textile industries, is a complex task. In addition to forecasting electricity consumption by textile enterprises, it requires forecasting indicators such as accuracy of calculations, reliability. Consequently, the most optimal model for forecasting the electricity consumption of an industrial enterprise is such a forecast model that is well adapted to rapidly changing environmental conditions and takes into account the production performance of the enterprise [7].

On this basis, the development of methods and algorithms for forecasting the parameters of electricity consumption, taking into account the specific characteristics of agricultural enterprises is an urgent issue.

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Rezyume: *Maqolada sanoat ishlab chiqarish korxonalari elektr energiya iste'molini prognoz qilish usullarini va uning rivojlanish nazariyasining tadqiqi tahlil qilingan. Bundan tashqari, ushbu maqolada texnologik jarayonlarda ishlab chiqarishning chegarasi va butun korxona uchun elektr energiyani prognozlashning qonuniyatlari ko'rib chiqilgan.*

Резюме: *В статье анализируются методы прогнозирования электропотребления промышленных предприятий и исследуются теории его развития. Кроме того, в статье рассматриваются пределы производства в технологических процессах и законы прогнозирования электроэнергии для всего предприятия.*

Kalit so'zlar: *qishloq xo'jaligi korxonalari, paxta to'qimachilik klasteri, "sanoat klasteri", elektr energiya iste'moli, bashorat qilish.*

Ключевые слова: *сельскохозяйственные предприятия, хлопково-текстильный кластер, «промышленный кластер», потребление электроэнергии, прогнозирование.*

UDC 677.024

STUDY OF THE PARAMETERS OF EXTENSIVE TISSUES

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Summary: *The article presents experimental studies of refueling parameters on looms* in *the production of stretchable tissues, where a combined nit is used as a duck. Also given are experimental studies of the process of obtaining stretchable tissue using a combined thread as a weave were carried out on a weaving machine STB2-180, tucked with fabric* of *evenyreh remiz twill weave.*

Keywords: *warp, weft, mechanisms, combined, thread, dressing, parameters, fabric.*

The field of application of fabrics using elastane threads has expanded so that these fabrics with their specific properties are used for almost all types of textile products. The remarkable properties of extensibility and restoration of the size of the elastic fiber increase the quality of all types of fabrics and clothing products in which it is used, giving them convenience and freedom of movement, improving tightness, preservation of shape [1-2].

The material and type of fiber is the most important specification that defines the comfort of the final product and the properties of the product, such as strength, durability, elasticity, friction properties, moisture absorption, thermal insulation and abrasion resistance.

From world experience, it is known that the use of highly stretchable yarn made of polyester and lycra fibers makes it possible to produce convenient and hygienic, elastic and compression products.

In order to select a technology for obtaining fabrics with the insertion of stretchable combined threads in the laboratories of the Department "Technology of Textile Canvases" of the Tashkent Institute of Textile and Light Industry, samples of stretchable mixed fabrics were developed. Experimental studies of the process of obtaining stretchable tissue using a combined thread as a weave were carried out on a WEAVing machine STB2-180, tucked with fabric of eventwill weave.

According to the experimental results of the study, a technical calculation of the fabric was made, and the filling parameters of the tissues were selected (Table 1).

Table 1

Fabric filling parameters

Name of indicators	Samples of harsh fabric		
	Option-1	**Option-2**	**Option-3**
Raw material composition: - base - Ducks	 100% x/b 41.6% PE 5.7% PU	 100% x/b 41.6% PE 5.7% PU	 100% x/b 41.6% PE 5.7% PU
Linear density, tex - base - Ducks	 25x2 16,6x3 9x2	 25x2 16,6x3 9x3	 25x2 16,6x2 9x3
Weave	Sarge 1/3		

Number of threads per 10 cm - base - Ducks	 240 180	 240 240	 240 200
Surface density, g/m^2	329,0	428,5	393,0

According to the calculated refueling parameters, experimental samples of stretchable fabric for clothing purposes were developed.

Cotton yarn of linear density 25x2 tex is used as the main thread in all variants. In the development of 1 fabric variant, mixed threads of linear density 68 tex were used as shear threads, consisting of three polyester threads of linear density of 16.6 tex and two polyurethane threads of linear density 9x2 tex.

In the development of 2 fabric variants for weed thread, a mixture thread of linear density 77 tex was used, consisting of three polyester threads of linear density of 16.6 tex and three polyurethane threads of linear density of 9x3 tex.

In the development of 3 fabric variants, mixed threads of linear density 60 tex were used as threads, consisting of two polyester threads of linear density of 16.6 tex and three polyurethane threads of linear density 9x3 tex [3-5].

The physical, mechanical and consumer properties of tissue prototypes were investigated. The results of the study are shown in Table 2.

Table 2

Physical-mechanical and consumer indicators of tissue prototypes

Name of indicators	Variants of finished fabrics and their raw material composition for weave		
	Option-1	Option-2	Option-3
Breaking load fabric 50x200 mm N(kgf) - base - Ducks	 661,0 456,6	 585,7 467,5	 765,0 503,0
Elongation at break, % - base - Ducks	 4 % 6 %	 6,5 % 8 %	 8 % 12 %
Fabric abrasion	SV25000	SV 25000	SV26000
Air permeability Cm^3/cm^2 sec	17,7	5,56	6,39
Change of linear dimensions after washing, % - base - Ducks	 -2% -4%	 0 -2%	 0 -2%
Change of linear dimensions after bleaching, % - base - Ducks	 -4% -8%	 + 4% -3%	 -4% -12%

CONCLUSIONS

1.Experimental samples of stretchable fabric for clothing purposes were developed. Cotton yarn of linear density 25x2 tex is used as the main thread in all variants. In the development of 1 fabric variant, mixed threads of linear density 68 tex were used as shear threads, consisting of three polyester threads of linear density of 16.6 tex and two polyurethane threads of linear density 9x2 tex. In the development of 2 fabric variants for weed thread, a mixture thread of linear density 77 tex was used, consisting of three polyester threads of linear density of 16.6 tex and three polyurethane threads of linear density of 9x3 tex.

In the development of 3 fabric variants, mixed threads of linear density 60 tex were used as threads, consisting of two polyester threads of linear density of 16.6 tex and three polyurethane threads of linear density 9x3 tex [3-8].

2.With increasing density on the weed, the breathability of the fabric decreases. With a decrease in the linear density of the filament, the breathaemia increases.

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Rezyume: *Maqolada cho'ziladigan matolarni ishlab chiqarish uchun to'quv dastgohlarida to'ldirish parametrlarini eksperimental o'rganish keltirilgan, bu erda birlashtirilgan ip to'quv sifatida ishlatiladi.*

Резюме: *В статье приведены экспериментальные исследования заправочных параметров на ткацких станках при выработки растяжимых тканей, где в качестве утка использована комбинированная нить. Также приведены экспериментальные исследования процесса получения растяжимой ткани с использованием в качестве утка комбинированной нити проведены на ткацком станке СТБ2-180, заправленном тканью четырех ремизного саржевого переплетения.*

Kalit so'zlar: *tanda, arqoq, mexanizm, aralash, ip, taxtlash, omillar, to'qima.*

Ключевые слова: *основа, уток, механизмы, комбинированная, нить, заправка, параметры, ткань.*

UDC 665.5

METHOD FOR REDUCING AROMATIC HYDROCARBONS IN COMPOSITION OF GASOLINE

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Summary: *In recent years, with an increasing number of ground vehicles with internal combustion engines, the need for fuel, including motor gasoline, has increased significantly. It is known that during the operation of vehicles, a large number of exhaust gases are emitted into the atmosphere, containing such substances as carbon oxides, nitrogen oxides and benzapyrenes. The main source of education benzapyrene are aromatic hydrocarbons, primarily benzene. In this regard, the content of aromatic hydrocarbons in motor gasoline is subject to strict environmental requirements Euro-5. As the object of research was taken gasoline AI-80. All studies were conducted in accordance with State standards and generally accepted practical guidelines for the analysis of petroleum products.*

Keywords: *gasoline, aromatic hydrocarbons, azeotropic distillation, extraction, rectification, adsorption.*

I. INTRODUCTION

Motor gasoline is one of the most multi-tonnage refined products. The ubiquitous and socially significant gasoline has undergone great changes in the component, hydrocarbon and chemical composition over the past period in accordance with the constantly growing requirements for the quality and environmental safety of vehicles [1.256].

One of the conditions for preserving the ecological safety of the state is “ensuring a favorable state of the environment as a necessary condition for improving the quality of life and public health” [2].

Road transport is one of the most unfavorable environmental factors in protecting public health and the environment. In fact, in our time, he has become a rival of man for living space. An urgent task in solving environmental and transport problems is the preservation and development of an air basin protection system. Improvement of the country's ecological system, compliance with international standards for the qualitative characteristics of fuels and emission standards of toxic substances are those steps that can positively affect the ecology of airspace [3.192].

The EU Euro-1 environmental standard has become the first step towards improving the environmental situation [4.212]. Since 1995, it has been replaced by the Euro-2 Environmental Standard [5]. In the Euro-3 standard, permissible emission indicators were reduced by 30 - 40%, and in the Euro-4 standard by 65 - 70% [6].

In 2000, the EU introduced toughened gasoline specifications related to the Euro-3 environmental program for motor vehicles, and since 2005, Euro-4 [7.6-7]. Since 2009, the EU Directive on the introduction of even more stringent Euro-5 requirements has been adopted (Table 1) [8.144].

In this regard, there is a need to develop processes for refining AI-80 gasoline - partial dearomatization and denormalization in order to meet gasoline with Euro 5 Euro specifications [9.593-598].

Table 1

Modern requirements for the quality of gasoline

Indicators	Requirements			
	Euro 2 1995 y	**Euro 3 2000 y**	**Euro 4 2005 y**	**Euro 5 2009 y**
Benzene content, not more than, %	5.0	1.0	1.0	1.0
Sulfur content, %	0.05	0.015	0.005	0.001
The content of aromatic hydrocarbons, %	–	42	35	35
The content of olefinic hydrocarbons, %	–	18	14	14
Oxygen content, %	–	2.3	2.7	2.7
Fractional composition, %:				
distilled up to 100 ° C, not less	–	46	46	46
distilled up to 150 ° C, not less	–	75	75	75
Saturated vapor pressure, kPa, no more	–	summer 70 winter 90	summer 70 winter 90	summer 70 winter 90

The Euro-5 environmental standard has been in force in Europe since 2009. For this class, a new type of fuel has already been produced that minimizes environmental pollution [10.313-320].

Environmental requirements for fuels are as follows:

- strict restriction of benzene content in motor gasolines;
- limiting the content of aromatic hydrocarbons in gasoline and diesel fuel, polycyclic in diesel fuels;
- limiting the content of olefinic hydrocarbons in gasoline;
- restriction of sulfur content in gasolines and diesel fuels up to thousandths of a percent;
- gradual limitation of the emission of products of incomplete combustion: carbon monoxide, hydrocarbons, particulate matter and nitrogen oxides [11.181-183].

Starting July 1, 2016, all vehicles imported into Europe must comply with the Euro-5 environmental class, i.e. concentrations of harmful substances in the exhaust gases should not exceed the levels established for this ecological class (table. 2) [12].

Table 2

Technical standards of environmental standards Euro 1-5

Ecostandard	**Carbon monoxi-de (II) CO**	**Hydrocar-bon**	**Volatile organic substances**	**Nitric Oxide (NO_X)**	**$HC+NO_X$**	**Suspended particles (PM)**
Euro 1	2.72 (3.16)	-	-	-	0.97 (1.13)	-
Euro 2	2.2	-	-	-	0.5	-
Euro 3	2.3	0.20	-	0.15	-	-
Euro 4	1.0	0.10	-	0.08	-	-
Euro 5	1.000	0.100	0.68	0.060	-	0.005

In connection with the foregoing, the following goal has been set in this work - the study of AI-80 motor gasoline to improve its environmental and operational characteristics.

II. RELATED WORK

Jones EM, Smith LA, Emelyanov V.E., Akhmetov A.F., were engaged in scientific research on the development of technologies to improve the physicochemical, environmental and operational properties of motor gasoline, to reduce the content of aromatic hydrocarbons, in particular benzene, in its composition. Byakov A.G., Petrov I.Ya., Abdulminiev K.G., Kazakov M.O., Kapizova N.B.,

Soloviev A.S., Gerasimov D.N., Kaldygozov A.E., Poletaeva O.U., As well as domestic scientists Saydakhmedov Sh.M., Khamidov B.N., Yunusov MP, Narmetova G.R. and etc.

III. METHODS

A complex of classical and modern research methods was used in the work, which allows one to determine the physical, physicochemical characteristics, functional composition, study the processes occurring in the original automobile gasoline and gasoline subjected to various refinement processes, in particular, dearomatization, and also establish chemical compositions, structure, chemical nature and their stability. It should be noted that the AI-80 industry gasoline does not meet the European standard quality requirements.

As the object of study was taken AI-80 gasoline. All studies were conducted in accordance with State standards and generally accepted practical guidelines for the analysis of petroleum products [13].

The study of AI-80 gasoline was carried out using a set of physical and chemical methods [13]:

1. Method for determining the acidity of fuel by titration with KOH;
2. Determination of water content by the method of Dean and Stark;
3. Determination of solids by weight method;
4. Test method on a copper plate;
5. Method for the determination of water soluble acids and alkalis;
6. Method for determining the density (pycnometer);
7. Determination of the refractive index (IRF-22);
8. Determination of molecular weight by cryoscopic method.
9. The molecular weight and group hydrocarbon composition of gasoline were determined by the adsorption - cryoscopic method [14.38].

The hydroisomerization of the benzene-containing gasoline fraction AI-80 was carried out in a special high pressure autoclave.

The connection scheme of the equipment during hydrogenation processes in a laboratory autoclave is shown in Fig. 1.

The autoclave is a thick-walled steel vessel designed for high pressure. The dimensions of the autoclave with a capacity of 1 liter are designed for an operating temperature of 450 - 500 °C and a pressure of 300 *atm.* The supply of hydrogen in the autoclave is carried out either directly from the bomb, or using a compressor. Heating is done either by gas or by electricity.

The height of the casing (to the lower flange) is 340 mm, the inner diameter is 100 mm, the wall thickness is 10 mm, the diameter of the flange and cover is 270 mm, and the thickness is 46 mm.

The autoclave body is made of steel; the flange is screwed onto the housing by thread. The lid of the autoclave is attached to the flange with twelve bolts, it is equipped with a thermocouple pocket, a pressure gauge and a pressure-reducing valve, which serves to release hydrogenation products from the autoclave. The tightness of the lid to the flange is ensured by a red copper shutter.

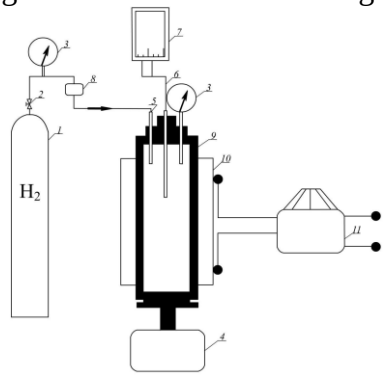

Figure 1. Experimental equipment scheme

1 - cylinder with hydrogen; 2 - needle valve; 3 - pressure gauge; 4 - rotary motor; 5 - tube for supplying raw materials and gas; 6 - thermocouple; 7 - millivoltmeter; 8 - gearbox; 9 - an autoclave; 10 - electric oven; 11 – transformer

The investigated raw materials (1 l.) were loaded into an autoclave. After pouring the product, the autoclave was closed with a lid, the nuts were tightened with a wrench (the nuts should be tightened gradually and be sure to properly, and not in a row to avoid skewing the lid). Then, a coil was screwed to the nipple of the pressure reducing valve, it was checked whether the pressure reducing valve was closed, and the autoclave was installed in a special stand with slots for the burners.

The temperature of the autoclave was kept constant with an accuracy of ± 1 ° C using a temperature controller. The temperature of the reaction zone was controlled using a chromium - aluminum thermocouple placed in the catalyst bed. The pressure of the autoclave was determined by a pressure gauge, which is mounted on the autoclave. Each experiment lasted 2 hours.

Before each experiment, the used catalyst was activated by a stream of hydrogen for 4 hours.

IV. RESULTS

Table 3 shows the physical and chemical characteristics of the object of study.

Table 3

Physical and chemical characteristics of the object of study

№	Indicators	gasoline AI-80
1.	Colour	Light yellow, clear, transparent
2.	Knock resistance:	
	Octane number by research method	80
	Octane number by motor method	76
3.	Density at 20 °C, g/cm3	0,770
4.	Refractive index, n_D^{20}	1,4631
5.	Copper plate test	withstands
6.	Water content	absence
7.	Solids content	absence
8.	Fractional composition: distillation start temperature, °C	36
	distillation limits, ° C: 10%	50
	50%	104
	90%	150
	The end of the boil, ° C	180
	The residue in the flask, %	1,5
	Loss%	3,0
9.	Mass fraction of sulfur, in%	0,02
10.	The content of water soluble acids and alkalis	absence
11.	Acidity, mg KOH on 100 cm^3 of gasoline	3,0
12	The content of actual resins, mg/100 cm^3	1140

13	Hydrocarbon composition, % mass.: aromatic hydrocarbons	48,24
	n-paraffin hydrocarbons	15,3
	iso-paraffin + naphthenic hydrocarbons	36,46

As can be seen from the data presented, gasoline has a light yellow color, it is transparent, O.Ch. according to the research method 80, motor - 76, with a density of 0.772 g / cm3 and a refractive index of 1.4632, it withstands the test on a copper plate, there is no water and no mechanical impurities. According to the fractional composition, 50% is distilled at 104 ° C, 90% is distilled at 150 ° C, the end of boiling is 180 ° C.

It should be noted that in connection with changes in the ratio of the composition of crude oil: gas condensate, from which automobile gasoline AI-80 (A-80) is obtained at the Bukhara oil refinery, the content of aromatic hydrocarbons and benzene also changed. A sample of gasoline in 2014, which was produced from oil and gas condensate raw materials, where the ratio of oil to gas condensate was 7: 3, and the content of benzene (5%) and aromatic hydrocarbons (not normalized) corresponded to the European standard. This sample practically corresponded to Eurostandard-3 - when determining the group content of aromatic hydrocarbons by the adsorption-cryoscopic method, it amounted to 44.7% of the mass.

But subsequently, when the composition of the oil and gas condensate feed was changed in the direction of increasing gas condensate to 65-70% due to a reduction in oil reserves, the total aromatic hydrocarbon content reached 48.78% and, in particular, benzene, increased to 8.46 (in% mass.).

In this regard, there was a need to develop processes for dearomatization and refinement of AI-80 gasoline in order to comply with European specifications Euro-4 and Euro-5.

In order to reduce the content of benzene and aromatic hydrocarbons in the composition of the object of study, we distilled low boiling fractions from which AI-80 gasoline by fractional distillation, in which a high content of benzene is observed.

Although the boiling point of benzene is 80 ° C, the distillation was carried out to 120 ° C. the elasticity of its vapor was taken into account.

To study the individual composition of low-boiling gasoline fractions in order to determine the quantitative benzene content in each obtained fraction, gas-liquid chromatography was used. The results are shown in table. 4.

Table 4

Material balance of distillation of AI-80 gasoline by fractions and benzene content

No.	Fraction	Amount, ml	Amount of benzene %, vol.
1.	AI-80 gasoline	100	8,11
2.	start of boil - 80ºC	28,5	17,4
3.	80 – 90ºC	9,7	15,5
4.	90 – 100ºC	11,2	11,35
5.	100 – 110ºC	2,4	7,8
6.	110 – 120ºC	7,5	4,7
7.	120 – 130ºC	8,4	0,04

As can be seen from the data presented, benzene almost does not remain after 120 ° C, and there is also a part of toluene in this gasoline fraction. Since our goal in gasoline is to reduce not only the amount of benzene (up to 1%), but also reduce the content of aromatic hydrocarbons (up to 35%), therefore, for the hydroisomerization process as a raw material, we used the NK fraction of gasoline - 120 ° C.

The results of the study of fractional distillation of AI-80 gasoline and some physico-chemical characteristics of gasoline fractions are presented in table. 5.

Table 5

The hydrocarbon content in gasoline AI-80 and its fractions

№	Name of samples	Volume, ml	Refractive index	Density, g/cm^3	The hydrocarbon content, % of the mass.			The amount of benzene, %, vol.
					aromatic	*n-paraffin*	iso-paraffin + naphthenic	
1	AI-80 gasoline	100	1,4631	0,770	48,24	15,3	36,46	8,11
2	Fraction from start of boil - 120 °C	49,4	1,4455	0,740	42,12	12,2	45,68	13
3	Fraction above 120 °C	50,6	1,4850	0,790	55,32	6,89	37,79	0,03

According to the above data (Tables 4 and 5), it can be seen that during the rectification of gasoline, the amount of benzene decreased to the requirements of European standards. At the same time, the amount of gasoline decreased significantly.

To replenish the lost fraction and improve the hydrocarbon composition, the following tasks were set and solved:

- a change in the hydrocarbon composition of the isolated benzene-containing fraction with the conversion of benzene and toluene to naphthenic hydrocarbons and the addition of this fraction to gasoline as a high-octane and modifying component;
- the selection of catalysts and their optimal choice for the hydroisomerization process;
- determination of optimal conditions for the process of hydroisomerization.

Based on the foregoing, at the next stage of the studies, the benzene-containing fraction of AI-80 gasoline was hydroisomerized on a nickel-tungsten-containing catalyst, which is basic nickel and tungsten supported on chlorinated alumina. High acidity supports are used for many isomerization processes. To do this, during its preparation, various zeolites or a carrier are added, which are treated with halogens (Cl or F). We treated the support (γ-aluminum oxide) with HCl.

The AlNiW-Cl catalyst contains: 4.0% NiO, 5.0% WO_3, and 91% chlorinated Al_2O_3. The results of the hydroisomerization of the benzene-containing fraction of gasoline are given in table.6.

As can be seen from the table, the content of aromatic hydrocarbons and n-paraffins in the catalysis significantly decreased at a pressure of 5 MPa and a temperature of 200-220°C.

Table 6

Group hydrocarbon composition of raw materials and products obtained using AlNiW-Cl catalyst

Hydrocarbons	The composition of the raw materials, % of the mass.	The composition of the products obtained at various temperatures, % of the mass.					
		160	180	200	220	240	260

Pressure, 3 MPa							
Aromatic hydrocarbons	42,12	38,25	36,45	33,44	32,67	35	36,24
n-paraffin hydrocarbons	12,2	11	9,98	8,14	8,94	8,12	8,18
iso-paraffin and naphthenic hydrocarbons	45,68	50,75	53,57	58,42	58,39	56,88	55,58
Pressure, 4 MPa							
Aromatic hydrocarbons	42,12	34,55	32,15	29	23,95	24,19	26,12
n-paraffin hydrocarbons	12,2	9,12	8,75	7,98	7,32	7,14	8,12
iso-paraffin and naphthenic hydrocarbons	45,68	56,33	59,1	63,02	68,73	68,67	65,76
Pressure, 5 MPa							
Aromatic hydrocarbons	42,12	28,45	22	16,1	15,8	20,4	24,55
n-paraffin hydrocarbons	12,2	7,41	5,22	1,4	0,7	0,5	0,4
iso-paraffin and naphthenic hydrocarbons	45,68	64,14	72,78	82,5	83,5	79,1	75,05

Table 6 shows that with increasing pressure of the hydroisomerization process in the catalysis, the content of aromatic and n-paraffin hydrocarbons decreases, and the amount of iso-paraffin and naphthenic hydrocarbons increases. Based on this, it can be argued that the hydrogenation of aromatic hydrocarbons and the isomerization of n-paraffin hydrocarbons on the alumina-tungsten catalyst proceeds most actively at 5 MPa.

The yield of catalyzate to 200 ℃ decreases slightly, and with increasing process temperature the gas yield increases significantly. Based on this, we can say that with an increase in temperature above 200 ° C during hydroisomerization an increase in the hydrocracking reaction is observed. This can lead to significant loss of gasoline resource.

At the next stage, the obtained hydroisomerization product and heavy gasoline fractions were compounded with the ratio: modifier - 62.7%, heavy gasoline fraction 37.3% to obtain new modified gasoline samples. After that, the physical and chemical properties and group hydrocarbon composition of the obtained gasoline were determined. Physical and chemical characteristics of the resulting gasoline are given in table. 7.

Table 7

Physical and chemical characteristics of gasoline obtained using the AlNiW-Cl catalyst

№	Specification	Indicators
1	Colour	Light yellow, clear, transparent
2	Octane number by research method	95,8
3	Density at 20 °C, g/cm3	0,760
4	Refractive index, n_D^{20}	1,4370
5	Copper plate test	withstands
6	Water content	absence

7	Solids content	absence
8	Actual resin content, mg/100 cm^3	absence
9	Hydrocarbon composition, % mass.: aromatic hydrocarbons	30,12
	n-paraffin hydrocarbons	3,44
	iso-paraffin + naphthenic hydrocarbons	66,44
10	The benzene content, % vol.	0,32

As can be seen, from the results of the analysis of the obtained modified gasoline, according to the content of benzene and aromatic hydrocarbons, it meets the standards of European standards.

On the basis of the conducted enlarged experiments on improving the environmental and operational characteristics and on bringing local AI-80 gasoline to Euro-4 and Euro-5 standards, a circuit diagram has been drawn up.

V. CONCLUSION

So, a method has been developed for modifying AI-80 motor gasoline in an enlarged pilot plant in the laboratory using the hydroisomerization method to bring the content of aromatic hydrocarbons to 35% of the mass. and benzene 1% vol., i.e. compliance of gasoline with Euro-4 and Euro-5 requirements.

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Rezyume: *So'nggi yillarda ichki yonuv dvigatellari bo'lgan er usti transport vositalarining ko'payishi bilan yoqilg'iga, shu jumladan avtobenzinga bo'lgan ehtiyoj sezilarli darajada oshdi. Ma'lumki, transport vositalarining ishlashi vaqtida atmosferaga ko'p miqdorda chiqindi gazlar chiqariladi, ular tarkibida uglerod oksidi, azot oksidi va benzapirenlar kabi moddalar mavjud. Benzapirenning asosiy ta'lim manbai aromatik uglevodorodlar, birinchi navbatda benzoldir. Shu munosabat bilan, avtobenzin tarkibidagi aromatik uglevodorodlar Evro-5 qat'iy ekologik talablarga*

bo'ysunadi. Tadqiqot ob'ekti sifatida AI-80 benzini olindi. Barcha tadqiqotlar Davlat standartlari va neft mahsulotlarini tahlil qilish bo'yicha umumiy qabul qilingan amaliy ko'rsatmalarga muvofiq o'tkazildi.

Резюме: *В последние годы с увеличением количества наземных транспортных средств с двигателями внутреннего сгорания потребность в топливе, в том числе автомобильном бензине, значительно возросла. Известно, что при эксплуатации автомобилей в атмосферу выбрасывается большое количество выхлопных газов, содержащих такие вещества, как оксиды углерода, оксиды азота и бензапирены. Основным источником образования бензапирена являются ароматические углеводороды, в первую очередь бензол. В связи с этим содержание ароматических углеводородов в автомобильном бензине соответствует жестким экологическим требованиям Евро-5. В качестве объекта исследований был взят бензин АИ-80. Все исследования проводились в соответствии с Государственными стандартами и общепринятыми практическими рекомендациями по анализу нефтепродуктов.*

Kalit so'zlar: *benzin, aromatik uglevodorodlar, azeotrop distillash, ekstraktsiya, rektifikatsiya, adsorbsiya.*

Ключевые слова: *бензин, ароматические углеводороды, азеотропная перегонка, экстракция, ректификация, адсорбция.*

SYNTHESIS AND PROPERTIES OF THE PHOSPHONIUM POLYMERS

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Summary: *The article discusses some possibilities for the synthesis of new phosphonium polymers with unique properties. The main regularities of the spontaneous polymerization process are revealed.*

Keywords*: polymer, polymerization, polyelectrolyte, viscosity, heat resistance, fire resistance.*

The Experimental Part.

The ECG before using was twice outrun (Boiling T=389 K, n_{fl}^{20}=1.4350; JI,$_n^{20}$=l,1807). In IR-spectrum the line of absorbtion at 2870-3000 sm^1 'is reliable to group (CH_2). The middle- intensively absorbing line in 850-800 sm^1. is relating to the valents oscillation of CC1 structure group.

In PMR - spectrum the ECG is characterized by two multiplete signals at 2.5 and 2.75 m.p.

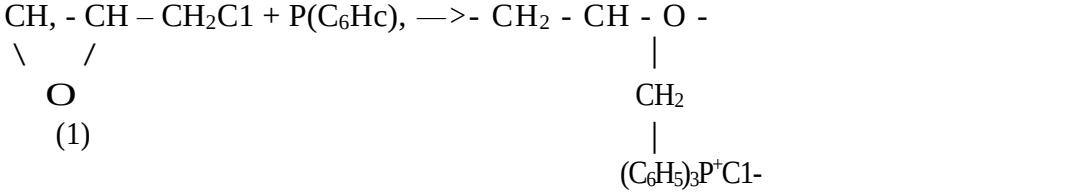
This is explained by the form of these signals which is the same with the signals in PMR spectrum of propilen oxide. [4-6].

The multiplete complex signal situated in more weak fields with a centre 3.45 is reliable to the two proton metilen groups which are connected with chloride atom.

Triphenilphosphin is the white crystals recrystalized twice before using from the mixture of ethanol and diethyl ester.

There are some absorbed zones of weak activity in IR - spectrum.

IR -, PMR - and UV- spectroscopic investigations show that this product is a linear polymer, containing guarternary phosphonium groups in its external bonds.



(1)

Accordind to potentiometric titration of the polymers water solution, the polymer contains chlor ions 10+1.0%, that is near the theoretical content of chlor ions in polymer, received of equimolecular composition. Thus the 1-st stage of the polymersization is Menshutkin reaction - the quarternization of TPP by epychlorhydrin.

For the investigation of TPP and ECG interaction the IR and UV-spectrums of the 1-st and final products were registered, so as PMR spectrum of the 1-st components, their mixtures during start and time. In the polymer IR - spectrum, made on the basis of TPP and ECG interaction, the stripe of deformation oscillation P-Ph is in the low - frequent zone up to 1350 sm^{-1} in comparision with the zone in TPP- spectrum. This fact is explained by the low strength of P-Ph unit because of quarternizied phosphor.

The valent oscillation C- Cl unit (850 - 800 sm^{-1}) of ECG CH_2- group disappears because of formation new stripe in 1350 sm^{-1}, zone.

In the zone 1050 - 1100 sm^{-1} new intensive absorbtion stripes appear and they are the result of valent oscillation of the simple ester unit (C - O - C) because of the opening of epoxy – groups (1260,93 sm^{-1}) ECG during interaction with TPP. The stripe in the zone of

930 sm^{-1} is partially reserved, characterizing epoxy -groups, that was proved by the definition of epoxy number which was equal to 1,18 according to the method [7].

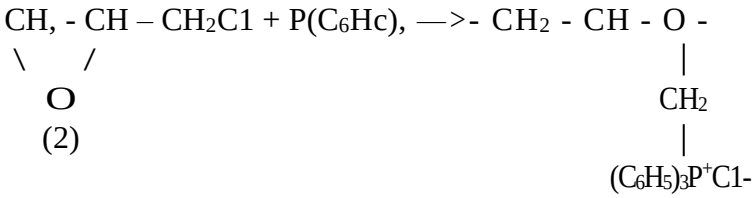
In PMR - spectrum of the polymer the signals of phosphonium benzene rings protons appear by 7,80 m.d. as a multiplete and protons of the qroups O - CH_2 -CH and P^+- CH_2 ECG as a multiplete with a centre 3,8 m.d. The groups of multiplete signals by 2,33 m.d. probably because of the polymer chains formation, in which CH and CH_2 groups are more shield than in the first components. The ratio charge of the protons signals of benzene and non - benzene rings is about 1:2,2, that practically corresponds to the proposed structure.

The presence of quarternary phosphonium group in the polymer structure was proved by UV - spectrum. So in the zone of 240 - 260 nm there are absorption stripes which are typical for the quarternary phosphonium group. The spectrum investigation shows that the beginning of TPP and ECG interaction is the quarternization (Menshutkin reaction which involves the epoxy cycle into this one and the opening of this process leads to the receiving of the linear polymers. What is the mechanizm of this process?

The kinetic regularity of TPP and ECG interaction by dilatometrical method was received. It is proved, that efflctive ingibitors of the radical polymerization such as hydroquinone, air oxygen, stable imine oxide radicals, 2.2.6.6 -tetramethylpiperidine - 1 - oxide don't influence on the polymerization speed and that proves the non - radical character of the process. In EMR - spectrum of TPP and ECG system with different conditions the formation of radical is not seen. The influence of solvent nature on the starting speed of TPP and ECG interaction has been studied. The investigations were made taking into account the homogeneity of the medium. The results showed that the more the solvent dielectric penetrability the more the reaction speed (fig.3) and that is connected with the increasing of Menshutkin reaction which is the first stage of the process

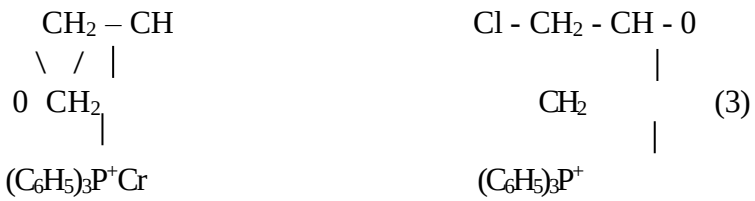
The study of the temperature influence on the interaction velocity of TPP and ECG proves that the temperature which is move than 10° increases the interaction velocity in 3 times, and its dependence on the temperature is under the meaning in accordance with Arenius equation. The effective energy of activation in accordance with the table in ethanol is 12,79 kkal / mol, that is the same with the activation energy according to Menshutkin reaction and is the 1-st stage of the process. So we may suppose that Menshutkin reaction is the limited stage of the process.

On the basis of the experimental results (9, 10) we may suppose the following interaction scheme of ECG with TPP. The atom of ECG haloid makes connected with it carbon of chlormethyl group the place of the first nucleophilic attack and the 1-st stage of the process is the quarternization reaction (Menshutkin reaction):



(2)

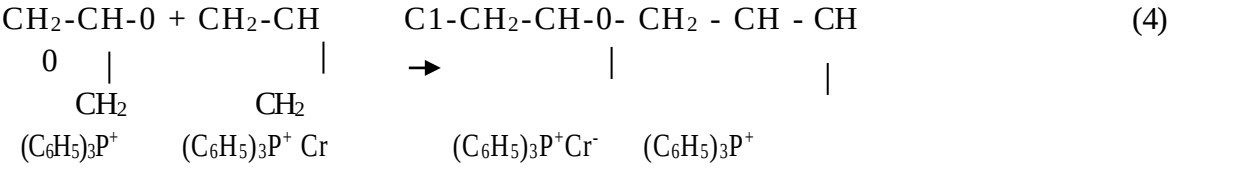
As a result of electron density moving in the quarternization molecular the tense of three nominal cycle becomes low and under the pressure of anione haloid active ion pair of oxirane cycle the opening reaction of the polar carbon - oxygen link is taken place.



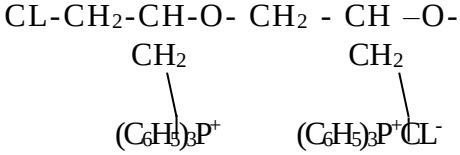
(3)

The quarternization and the opening reaction are the stages influencing on velocity according S_N2.

The chain growing is according to anione polymerization while acting particle and then with dimer and trimer, etc.



The chain break is taken place probably because of acting equimolecular substances or by adding of the solvent proton with macroanione according to schemes



For the experimental test of the received kinetic scheme, the kinetic order regularities of the interaction TPP and ECG were investigated. The results are shown in Table 1

Table 1

The dependence of the starting velocity of the process TPP and ECG interaction on the components concentration. T = 323 K, ethanol.

№	[ECG]m ol/l	TFF mol/1	v 10^6 mol 1 c	- 6 + lg^v	n ndl / r	reaction order n
1	0,5	0,05	0,62	0,79	0,105	
2	0,5	0,075	1,17	1,06	0,122	1,1
3	0,5	0,1	2,06	1,31	0,183	
4	0,5	0,125	3,17	1,47	0,21	
5	0,25	0,5	4,66	0,66	0,247	
6	0,5	0,5	9,83	0,962	0,18	0,88
7	0,75	0,5	12,10	1,04	0,166	
8	1,00	0,5	17,3	1,23	0,131	
9	0,25	0,25	3,07	0,127	0,342	
10	0,5	0,5	9,83	0,962	0,122	1,9
11	0,75	0,75	17,71	1,27	0,118	
12	1,00	1,00	39,28	1,59	0,117	

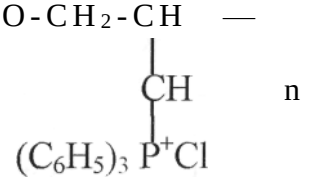
1,80 So on the basis of kinetic data (table 1) of TPP and ECG interaction the reaction order was determined according to components which are equal 1,1 and 0,88 correspondingly, so as the general order of reaction which is equal 1,9. The summary 2 - nd order and the components order, which is near 2, confirm our suggestion aboutbimolecular substitution reaction. The equation of general polymerization ECG and TPP is the following :

$$V_{common} = K_{common} [ECG] [TPP]'$$

This equation is the same as in Menshutkin reaction, which is limited stage of polymerization process, except the difference in reaction order by monomer. The highest meaning of the order proves that with quarternarized chains of ECG there are non-quarternarized chains. This is confirmed by study of IR - spectres of polymers received during ECG and TPP

intereaction and we see that the absorbing zone is not disappeared absolutely at the level of 850 -- 880 sm, relating to the deformation oscillation C-Cl-group.

The difference in the Cl-ion meanings, detennined by potentiometric titration (Cl - 10,01 %) in comparison with the element analysis (Cl = 13,6 %) is also proves our suggestion.



This is explained by the following together with Zwitter-ion polymerization there is anionic polymerization of the non- quarternarized ECG molecules with the opening of high - polar carbon - oxygen chain of the epoxy cycle as oxides olefines. Thus the synthesized polymer is a powder of brown colour, stable to long storage with 428 K, the density determined by pycnometer method is 1,388 g/sm^3, it is solved in dymethilphormamid, ethanol, methanol, water and in the other polar solvents. The study of viscosity proved that it is the typical polyelectrolyte and the dependence of c/n from c for water solvents of the synthesized polyelectrolytes is of linear character which proves that water solvents behavior is described by Fuoss - Strauss equation [12]. The dependence of polymer solution viscosity on the concentration of phosphonium polymers in the presence of strong electrolyte 0,25 KC1 solution is of straight - line character, because of creation screen "fur coat " anti-ions around macromolecular ions. The polymers obtained in various conditions are also heat resistant. The Vicat heat resistance of a polymer based on ECG with TPP synthesized in ethanol at T = 333K - 406K of the same polymers and at T = 303K, respectively - 420K The flow temperature of the latter polymers is also high — 497K and 481K, while the polymers synthesized at T = 333K are 467K, respectively. An increase in the thermal and heat resistance of the polymer is associated with the formation of highly ordered structures under the conditions of spontaneous polymerization at a relatively low temperature.

The molecular weight and molecular weight distribution (MWD) of polymers obtained on the basis of the interaction of ECG with TFF was determined by the method of speed sedimentation and viscometry, since speed sedimentation is the simplest and most accessible method of sedimentation analysis of polymers of practical interest. Determination of molecular weight by sedimentation rate is based on the use of sufficiently large accelerations, providing such a rate of sedimentation of molecules that can be measured. The advantage of this method is the high sensitivity of the parameters obtained in the experiment to the degree of heterogeneity of the drug according to molecular masses, with this you can get an idea of its purity and quantitative data on the degree of polydispersity, calculate the sedimentation constant and molecular weight of polymers, find out the possibility of various transformations of macromolecules associated with conformational shape changes. The sedimentation coefficient, as well as the characteristic viscosity, at a certain molecular weight depends only on the size and shape of the macromolecules.

Therefore, studying the dependence of the characteristic sedimentation constant on temperature and solvent composition, one can obtain information on the conformational transformations of macromolecules in solutions. The polydispersity index M_w/M_n was calculated directly from the sedimentation diagrams using an approximate method [8–9] based on the established relation linking the sedimentation coefficient S01 to the MM fraction. The research results are summarized in table 2.

Extrapolation of the sedimentation coefficient to infinite dilution shows that at low concentrations of dissolved polymer, the constant Ks for a fairly wide range of molecular weights can be represented with sufficient accuracy as a product of Ks S0. In addition, in most cases, the value of Ks, in the relation S = S0 (1-KsC) is positive, i.e. when diluted S increases. This position is not surprising, since for many linear polymers, it is shown that the value of Ks is proportional to the characteristic viscosity of the polymer, and in ideal conditions [η] is proportional to the

sedimentation constant. During the experiments, a strong diffusion effect was found for both the unfractionated samples studied, which is probably due to the rather low values of sedimentation coefficients.

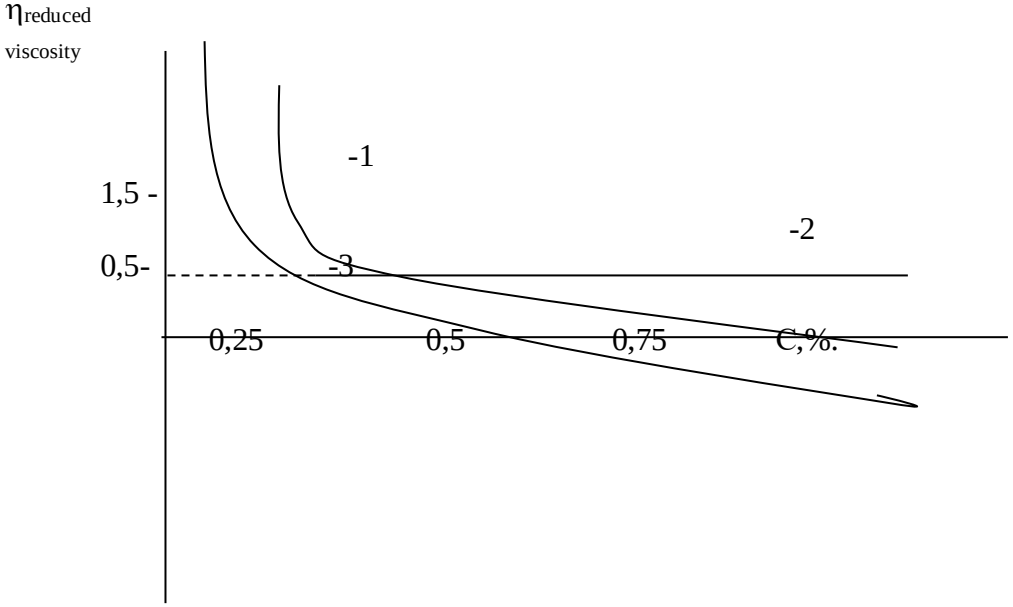


Fig. 1. 1 - dependence of reduced viscosity on polymer concentration in water, 2- dependence of reduced viscosity on polymer concentration in a mixture of water + ethanol, 3- dependence of reduced viscosity on polymer concentration in a 0,25N KCl solution.

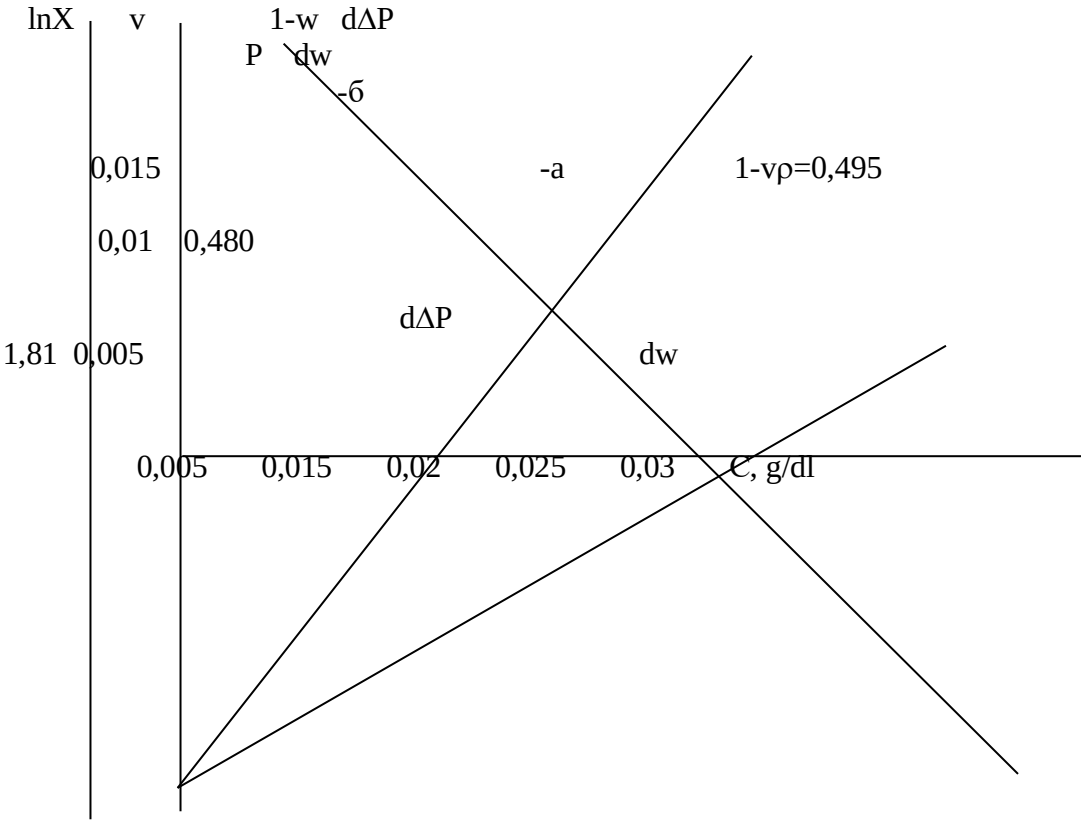


Fig. 3. Determination of the molecular weight of the polymer based on ECG and TPP. a) determination of sedimentation coefficient; b) determination of partial-specific volume. By constructing the dependence of LgSo on LgM, we found constants in the Flory-Mandelkern equation for phosphonium polymers in ethanol at 298 K (Table 2.).

Table 2.

The effect of polymerization conditions on the molecular mass characteristics of phosphonium polymers in ethanol (*) and DMF (').

№	The polymers obtained with equimolar. components of output,	Tempera-ture, K	Output ,%	η reduced viscosity dl/g	V 10^6 мol/l s	Mn*10^{-3}	M_w/M_n
1.	ECG : TPP *	268	71,2	0,268	0,120	56	1,2
2.	ECG : TPP *	273	67,9	0,262	0,314	55	1,3
3.	ECG : TPP *	293	66,4	0,26	0,68	53	1,5
4.	ECG : TPP *	303	63,0	0,25	1,42	52	1,7
5.	ECG : TPP 1	313	61,3	0,24	2,73	51	1,8
6.	ECG : TPP 1	318	56,1	0,22	4,04	47	2,3
7.	ECG : TPP 1	323	52,4	0,20	6,72	41	2,5
8.	ECG : TPP 1	333	48,2	0,19	15,15	36	2.6

Note: * - data obtained in ethanol, 1 - obtained in DMF. These studies were conducted at KEIO University (Japan).

As can be seen from the data presented in Table 2. with increasing polymerization temperature, under other constant conditions, the molecular weight of phosphonium polymers decreases, the Mw / Mn increases and the solubility deteriorates. The decrease in the yield of polymers appears to be associated with a decrease in the concentration of effective active centers and an increase in the rate of growth of molecular chains at these centers caused by an increase in temperature should contribute to an increase in the proportion of molecules with high molecular weight.

In addition, with increasing polymerization temperature, the role of chain restriction reactions increases, the temperature coefficient of which is higher than that of chain growth reactions. As a result, in all likelihood, the proportion of low molecular weight fractions in polymers increases.

There is a direct connection between the viscosity and the form of the macromolecule in the solution. Therefore, of particular interest is the study of viscosity in mixed solvents. It has been established that with an increase in the content of ethanol and dimethylformamide in the mixture, the viscosity decreases, but at the same time a dependence characteristic of polyelectrolytes is observed. According to the results of experiments, dimethylformamide effectively reduces the viscosity of aqueous solutions of phosphonium polymers than ethanol, i.e. polymeric macromolecules in dimethylformamide coagulate more than in ethanol.

Determination of viscosity in mixed solvents suggests that when the solvent composition changes, the structured formations of polymer macromolecules are destroyed. The greatest influence on the conformation of macromolecules in solutions is exerted by a change in the concentration of hydrogen ions, which is associated with a change in the charge and hydration of the macromolecules. As a result, the dependence of the viscosity of the synthesized phosphonium polymers on pH is complex. The viscosity of 0.1% aqueous solutions of phosphonium polymers

based on ECG with TPP with a pH increase passes through a maximum (Fig. 3). To a pH of 5.5, a slow increase in viscosity occurs, and then a steep rise in the dependence of η s / C on pH begins. The maximum is usually achieved with full neutralization of functional in the case of phosphonium polymers based on ECG and TPP having a higher viscosity. With complete neutralization, as well as with an excess of alkali, the dependence of water flow ratio on the pH decreases. In the neutral pH range, the size of macromolecules of phosphonium polymers is greatly increased.

The picture of the change in the dependence of з/C on pH reflects the state of the polymer in solution: the lowest pH values are characterized by the maximally curtailed types of structures formed because of the interaction of macromolecules of phosphonium polymers and due to the complete screening of charges when electrolyte is added. As the screening of charges on the macromolecule and hydration decrease, these structures swell and unfold, which is accompanied by a sharp increase in viscosity.

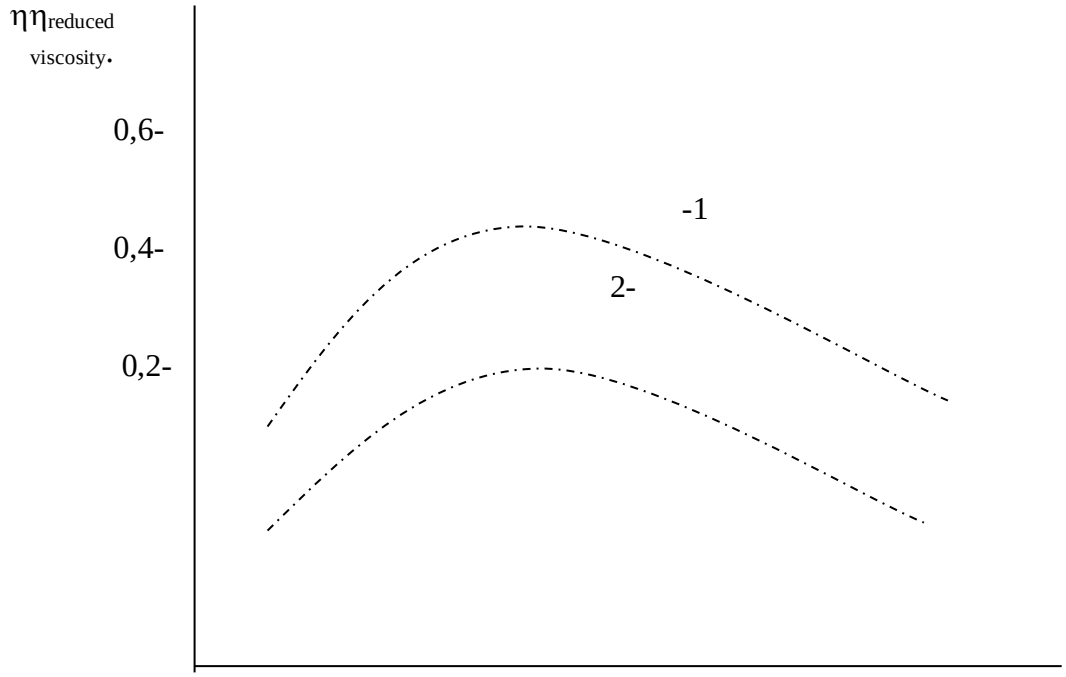


Fig. 3. Dependency ηпр. pH for 0.1% aqueous solutions of phosphonium polymers. 1-polymer based on ECG and TFF, 2- polymer based on Methacrylchloride (MAX) and TFF.

This is fixed by the maximum value on the viscosity curve, which decreases with a lower degree of ionization, which indicates the beginning of the disintegration of aggregates of macromolecules. With the further introduction of alkali, it appears that the screening effect of the charge of the phosphonium polymer macromolecule reappears and the dissociation of the polyelectrolyte is suppressed, which naturally leads to a decrease in viscosity.

The molecular mass of polymers was determined by the method of high - speed sedimentation using the equation of Flory -Mandelkern which was equal to 51000.

Thus on the basis of kinetic, spectral and chemical methods was studied the reaction of interaction ECG and TPP and supposed polymerization process was shown, that is able to receive the catione polyelectrolyte, contained in the side chains the quarterized groups.

The obtained research results were the basis for the development of the technology for the production of phosphonium polymers, the peculiarities of which are the carrying out of the polymerization process by a periodic method. The features of the developed technology are simplicity in technological design, high efficiency of technological processes. The polymers obtained by the developed technology are more homogeneous in molecular weight and, therefore, have a lower degree of polydispersity.

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Rezyume: *Ushbu maqolada EKGning trifenilfospin [TPP] bilan o'zaro ta'siri kamroq toksik ekanligi o'rganilgan.*

Резюме: *В этой статье были изучены что реакция взаимодействия ЭКГ с трифенилфоспином [ТФП], которые менее токсичен.*

Kalit suzlar: *polimer, polimerizatsiya polielektrolit, yopishqoqlik issiqlikka chidamlilik, yong'inga chidamlilik*

Ключевые слова: *полимер, полимеризация, вязкость, жаростойкость, огнестойкость.*

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TO THE QUESTION OF STUDYING LIQUID LEVELS IN THE COLUMNS OF CARBONIZATION OF SODA PRODUCTION

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Nukus Branch of Tashkent University of Information Technologies named after Muhammad al Khwarizmi

Summary. *The main features of level meters used in industrial conditions are analyzed. The functional structure of the carbonization column and the characteristics of the liquid in the production of soda have been studied. A general view of the equation for calculating a sealed tank has been formed and, on the basis of this equation, the relative values of computational experiments are given in a tabular form.*

Keywords: *level meters, level, pressure, algorithm, level meter with differential manometer, piezometric level meter, carbonation column.*

Introduction. Liquid level measurement plays an important role in the automation of technological processes in many industries [1]. In some cases, the measurement must be carried out with high accuracy and in a wide range, covering the entire working height of the tank, sometimes without access for the maintenance personnel from the side walls and bottom (for example, underground gas storage facilities) [2]. To measure the level, many different methods and devices are used (float, hydrostatic, ohmic, capacitive, thermal, acoustic, radioisotope, etc.), the use of which is determined, on the one hand, by technological requirements (range, accuracy, fire and explosion safety, etc.), and on the other hand, the influence of non-informative parameters (pressure, density, viscosity, electrical conductivity, etc.).

Therefore, in many technological processes, it is necessary to use a complex of methods and devices that are dissimilar in principle of operation, which significantly complicates the design of secondary measuring devices and increases the cost of measuring systems.

Formulation of the problem. In the carbonation columns, the third stage of carbonation occurs, as a result of which sodium bicarbonate crystals are formed and precipitated. The process in the carbonation column is very complex. The quality of the suspension is determined by the quality of the sodium bicarbonate that it contains. The evaluation of the operation of the carbonation column is given according to the dimensionless technical criterion of optimality, which takes into account the flow rate of the hydrocarbonate suspension from the column, the concentration of bound ammonia in the clarified part of the suspension and the content of residual moisture in sodium bicarbonate. Therefore, the higher the productivity of sodium bicarbonate and the lower the residual moisture in the product, the better the carbonization column works, that is, it is necessary to strive to increase the absolute value of the optimality criterion.

The temperature regime of the carbonation column significantly affects the formation process of sodium bicarbonate crystals.

In this technological process, along with such parameters as gas pressure (vacuum), liquid flow rate, gas flow rate, additional ammonia flow rate, the liquid level in the column also plays an important role in temperature control.

For the carbonation section of soda production, it is given a fragment of functional scheme of automated control of technological process (fig.1).

The carbonation section is completed with a series of eight units, and the capacity of each series is equal to the capacity of the absorption column.

The most widespread series are those consisting of four carbonation columns (CC) (1), the first column gas scrubber (CGS) (2), a liquid cooler and pumps for pumping liquid from the CGS to

the specified cooler. Of the four CC - three 72 hours each perform the functions of workers (working CC) (1) a, b, c, one - 24 hours each - pre-carbonation columns (PCC) (3).

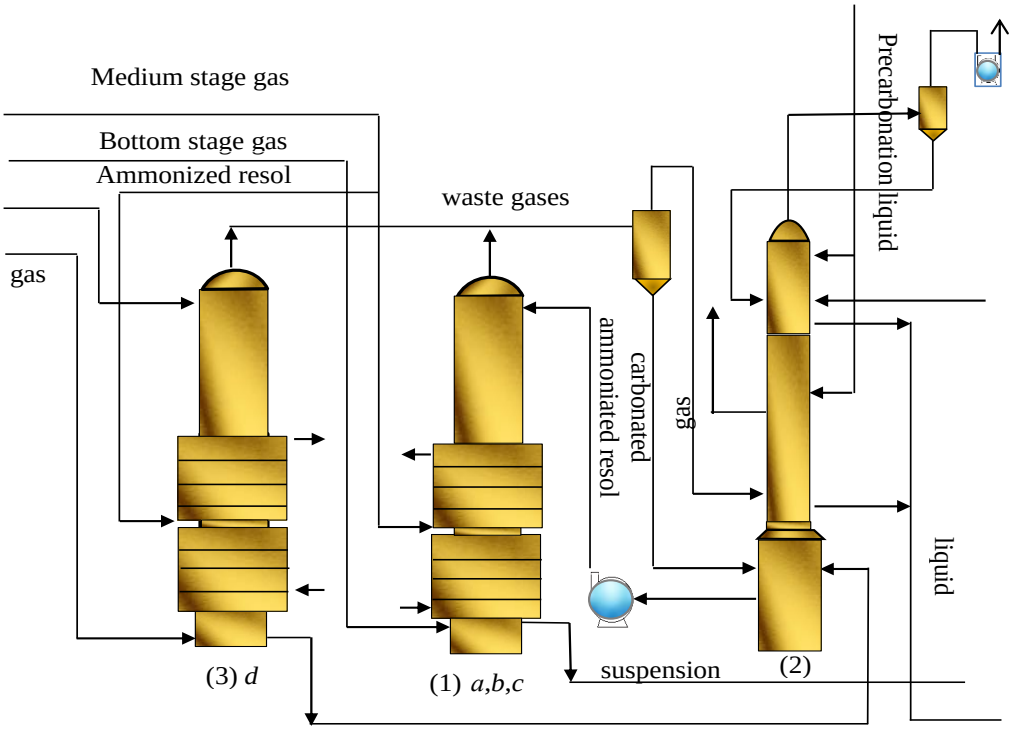

Fig. 1. Functional diagram of the automated control of the technological process of carbonation of soda production.

Taking into account the above given, in order to ensure the regulatory value of the temperature of the CGS liquid entering the three working CC, it is advisable to implement automatic control of this temperature with the calculation and issuance of control actions to control the specified temperature by changing the flow rate of cooling water into the refrigerator with correction for the flow rate of this water [3].

To ensure the required temperature of the bicarbonate suspension from the working cable lines, it is advisable to implement automatic control of these temperatures with the calculation and issuance of control actions to control the indicated temperatures by changing the flow rates of cooling water into the refrigerating circuits of the working cable lines that form the cooling zones, with correction for the flow rates of cooling water (for example, one working CC).

To ensure the specified values of the levels of liquids in the CGS, PCC, working CC, it is relevant to implement automatic control of the indicated levels with the calculation and issuance of control actions to change the flow rates of liquids entering these.

1. The specified value of the liquid level in the PCC is provided by a change in the flow rate of ammoniated brine in the PCC with a correction for this flow rate;

2. The specified value of the liquid level in the working CC is ensured by changing the flow rate of the liquid from the CGS to the working CC;

3. The predetermined value of the liquid level in the CGS is provided by changing the flow rate of the pre-carbonized liquid into it.

Solving the problem. In all three cases, it is necessary to have information about the liquid level in the column in order to control the flow. Currently, various level meters are used in production to determine the height of the liquid in the column. This has been studied in the work of many scientists to determine the liquid level in a column. Including in [4] and [6] a device for high-

resolution liquid level control using a device based on a pulsating sensor is presented. Data on these level meters are shown in Table 1.

A high resolution liquid level monitoring device using pulsating sensor based instrument is presented [5].

A simple water level measurement method based on wavelength division multiplexing (WDM) is proposed and demonstrated. The measurement principle is based on the change of Fresnel reflection occurring at the end facet of the optical fiber tip (OFT) [7].

A simple method for measuring water level based on wavelength division multiplexing (WDM) is proposed and demonstrated in [8,9]. The measuring principle is based on the change in Fresnel reflection that occurs at the end surface of an optical fiber tip (OFT).

Certain technical and operational characteristics, such as different design of columns, liquid temperature measured in them, electrical conductivity, pressures, composition, chemical aggressiveness, flow turbulence, cause problems when

Table 1. Features of level meters used in production.

Device type	**Buikovye**	**Hydroststic**	**Conductometric**
Nutrition	Requires	Requires	Requires
Maintenance	Requires float inspection depending on working conditions	Suitable for corrosive and abrasive environments	Does not require
Functional	Level measurement, interface assessment, density measurement	Pressure gauge connected at height	Level measurement of liquids with foam formation
Metfod of measurement	Indirect, environment sensitive	Piezometric tube differential pressure gauge	Not sensitive to turbulence
Assuracy	Average	Accuracy: ± 1.5%	Accuracy: 4 mm
Range	Limited by the movement of the float in the chamber	Up to several hundred meters	Minimum measuring range 0-2,5 m
Measured medium	Fuel, oils, petroleum products	Homogeneous, viscous liquids	Conductive fluids
Medium characteristics: temperature, pressure	from minus 60 to plus 400 ^{0}C up to 700 bar	minus 10 to plus 16^{0}C 0,1 to16 bar	up to plus 350 ^{0}C up to 6,3 MPa
Measuring range	Up to 10 m	2 to 100 m	Up to 25 m
Dignity level meter	Measurement accuracy in foaming liquids	Low price; simplicity of design	Capable to measure at high pressure and temperature, insentive to turbulence, robust and easy to use

Disadvantages of the level meter	The dependence of the reading on the density of the liquid; costly installation and further	Low measurement accuracy; limited use	Inability to measure in the presence of dielectrics and adhesives

choosing a level meter. and its adaptation to the process. In Figure 2. an algorithm for setting up measuring instruments is given, taking into account the technical and operational characteristics of the object.

The structure of the carbonation column and the characteristics of the liquid in the production of soda for this task are as follows:

The gases from the compression section are directed to common collectors, from which they are automatically distributed to the carbonation columns. Gas is supplied to the carbonization column through two inputs - upper and lower.

The lower inlet is supplied with a lower-stage gas with a CO_2 content of at least 77%, and an upper inlet with a medium-stage gas with a CO_2 content of at least 40%. The second gas injection was used with a twofold purpose: first of all, to prevent suspension (flooding) of the columns of the thick slurry column descending downward, and also to reduce the column resistance to gas.

The column is a vertical cylindrical apparatus, consisting of 3 sections with flanges. Each carbonation column is equipped with 9 cooling water blocks with 31 large compartment inside and a gas supply apparatus at the bottom.

Taking into account the condition of the column and the liquid, as well as the special characteristics of the level meters, it is advisable to carry out measurements using hydrostatic level meters.

This method of level measurement is based on the determination of the hydrostatic pressure exerted by the liquid at the bottom of the tank.

The value of the hydrostatic pressure at the bottom of the tank (P) depends on the height of the liquid column above the measuring device (h) and on the density of the liquid (ρ): $p=\rho gh$, respectively, $h=p/\rho g$, where g=9,81m/s^2.

Differential pressure gauges are widely used to measure the liquid level in technological devices under pressure. If the densities of the liquids filling the impulse tubes and the reservoir are equal, and under the condition $h_1 = h_2$, the pressure drop measured by a differential pressure gauge is

$$\Delta P = \rho_{ж} gh \tag{2}$$

Static pressure P in the apparatus enters both impulse tubes; therefore, the measured pressure drop ΔP *can be represented as*

$$\Delta P = \rho_{*ж} gh_{\max} - \rho_{ж} gh. \tag{3}$$

for $h = 0$, $\Delta P = \Delta P_{\max}$, and for $h = h_{\max}$, $\Delta P = 0$.

Measurement of hydrostatic pressure is carried out:

- a pressure gauge connected at a height corresponding to the lower limit value of the level;

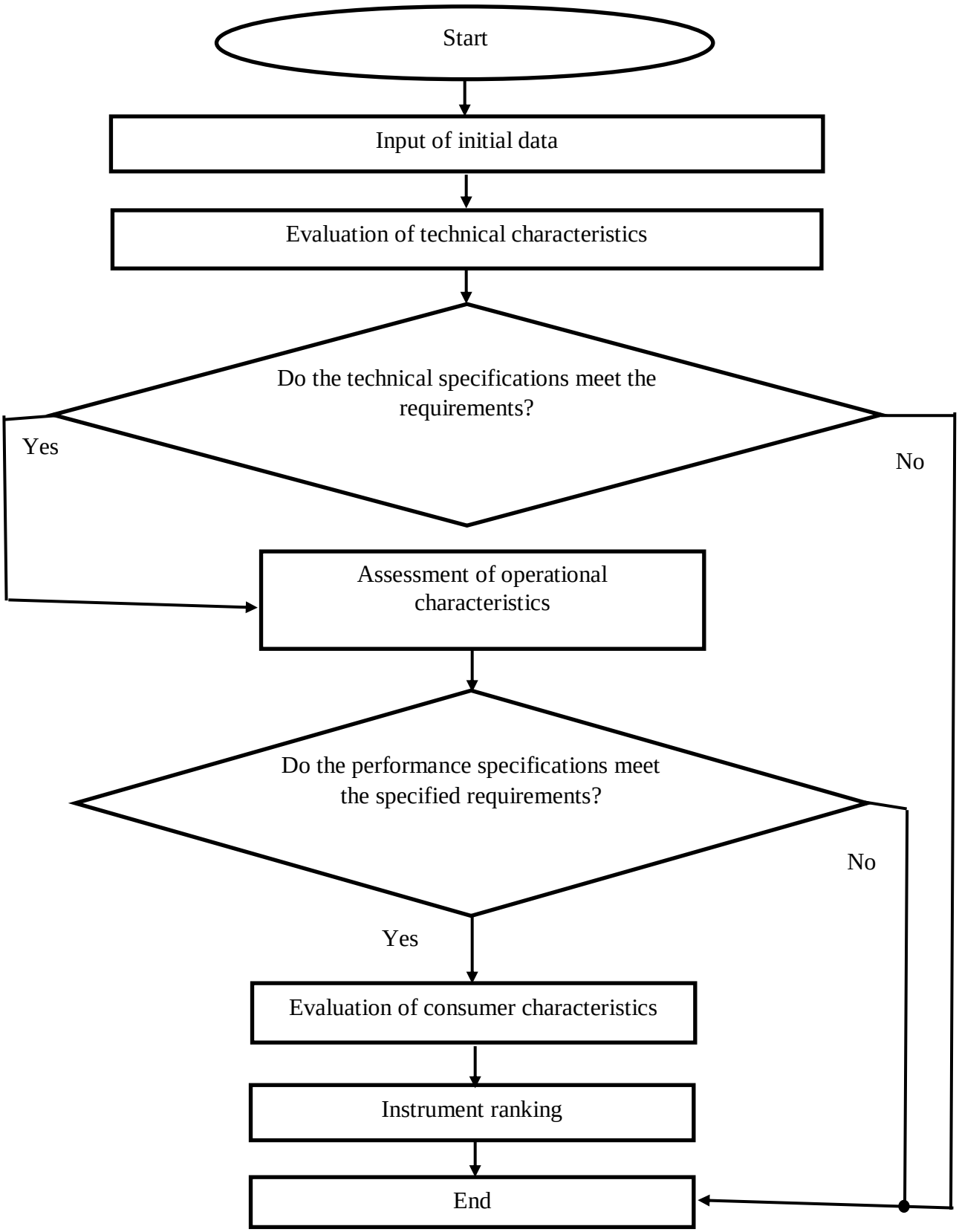

Fig 2. Algorithm for installing and configuring the level meter

• a differential pressure gauge connected to the tank at a height corresponding to the lower limit value of the level, and to the gas space above the liquid;

• measuring the pressure of the gas (air) pumped through the tube, which is lowered into the liquid filling the tank at a fixed distance.

Equation (3) indicates that the scale of the gauge will be reversed. In the considered schemes, differential pressure gauges with a unified current or pneumatic signal can be used.

If the liquid filling the reservoir is aggressive, then the differential pressure gauge is connected to the reservoir through the separating vessels. At a higher flow rate, the pressure measured by a differential pressure gauge can be somewhat higher than the hydrostatic pressure due to the additional pressure drop arising from the friction of the gas against the tube walls during its movement.

At very low gas flow rates, the measurement inertia increases. Both factors can increase the level measurement uncertainty. In piezometric level meters, with large changes in level, the gas flow rate can change significantly, which, in turn, can cause additional measurement error.

To stabilize the gas flow rate in piezometric level meters, the industry produces a membrane flow stabilizer.Piezometric level meters allow measuring the level over a wide range (from several tens of centimeters to 10-15m), and when used to measure pressure in a piezometric tube of a differential pressure gauge with a unified output signal, they have a relative reduced error of ± (1.0-1.5)%.

Level measurement in sealed gas-tight containers, which is often used in the chemical industry, requires compensation of the pressure of the closed gas phase above the liquid. The applied gas phase pressure acts as an additional force on the liquid and distorts any measurement of hydrostatic pressure at the base of the vessel.

This offset can be done with two separate sensors or an integrated differential pressure sensor. This application uses either relative pressure (atmospheric pressure compensated transmitter) or absolute pressure transmitter (sealed reference vacuum transmitter).

Thus, the filling height of a sealed tank or vessel is calculated using the following equation:

$$h = \frac{P_2 - P_1}{\rho \cdot g};$$

P_1 - pressure of the enclosed gas in the vessel [MPa];
P_2 - hydrostatic pressure [MPa];
ρ - density of the fluid [kg/m³]
g - gravitational force or grav. acceleration [m/s²]
h - height of the liquid column [m]

$$P = P_2 - P_1;$$

$$P = 0{,}471MPa - 0{,}143MPa = 0{,}328MPa;$$

$$h_1 = \frac{P}{\rho \cdot g} = \frac{0{,}328 \cdot 10^6 Pa}{1378kg/m^3 \cdot 9{,}81m/s^2} = \frac{300000Pa}{13518{,}18kg/m^2s^2} = 24{,}3m.$$

P_1, MPa	P_2, MPa	P, MPa	p, kg/m^3	h, m
0,143	0,471	0,328	1378	24,3
0,135	0,466	0,331	1388	24,3
0,143	0,462	0,319	1394	23,3
0,126	0,468	0,342	1379	25,2
0,133	0,472	0,339	1372	25,1
0,135	0,463	0,328	1384	24,1

0,136	0,461	0,325	1386	23,9
0,123	0,475	0,352	1374	26,1

Conclusion. On the basis of these calculations and experiments carried out at the plant, the specific properties of the carbanization column and the chemical aggressiveness of the liquid were investigated using hydrostatic level meters with differential monometers.

The obtained calculations can be applied to objects of this type of hydrostatic level meters with differential monometers.

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Rezyume: *Sanoat sharoitida qo'llaniladigan sath o'lchagichlarning asosiy xususiyatlari tahlil qilinadi. Karbonizatsiya kolonnasining funksional tuzilishi va soda ishlab chiqarishdagi suyuqlikning xususiyatlari o'rganildi. Muhrlangan tankni hisoblash tenglamasining umumiy ko'rinishi shakllantirildi va ushbu tenglama asosida hisoblash tajribalarining nisbiy qiymatlari jadval shaklida berilgan.*

Резюме: *Анализированы основные особенности уровнемеров применяемых в производственных условиях. Изучены функциональная структура колонны карбонизации и характеристики жидкости при производстве соды. Сформирован общий вид уравнении расчёта герметичного резервуара и на основе данного уравнении даны относительных значений вычислительных экспериментов на табличном виде.*

Kalit so'zlar: *sath o'lchagichlar, sath, bosim, algoritm, differensial manometrli sath o'lchagich, pyezometrik sath o'lchagich, karbonizatsiya kolonnasi*

Ключевые слова: *уровнемеры, уровень, давление, алгоритм, уровнемер дифференциальным манометром, пъезометрический уровнемер, карбонизационная колонна.*

SOCIAL SCIENCES

UDC 37.017.92

THE PURPOSE AND PRINCIPLE OF HUMANISTIC EDUCATION

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Summary: *The purpose of humanistic education, the principle of fundamentalization of content, a new understanding of the ideas of the modern state of humanization of pedagogical education as a personality-oriented cultural activity is revealed.*

Keywords: *humanistic education, socio-cultural skills, Karakalpak folklore, humanistic ideas, ethnopedagogy.*

The generally accepted goal in the world theory and practice of humanistic upbringing has been and remains the ideal of the personality, coming from time immemorial, comprehensively and harmoniously developed. This ideal goal gives a static characterization of the personality. Its dynamic characteristics are associated with the concepts of self-development and self-realization. Therefore, it is these processes that determine the specifics of the goal of humanistic education: the creation of conditions for self-development and self-realization of the individual in harmony with himself and society.

The goal of humanistic education allows us to set tasks adequate to it:

• philosophical and ideological orientation of the individual in understanding the meaning of life, his place in the world, his uniqueness and value;

• rendering assistance in the construction of personal concepts, reflecting the prospects and limits of development of physical, spiritual inclinations and abilities, creative potential, as well as in the awareness of responsibility for life creation;

• familiarizing the individual with the system of cultural values, reflecting the wealth of universal and national culture, and developing his own attitude towards them;

• disclosure of universal human norms of humanistic morality (kindness, mutual understanding, mercy, sympathy, etc.) and the cultivation of intelligence as a significant personal parameter;

• development of the intellectually moral freedom of the individual, the ability to make adequate self-assessments and assessments, self-regulation of behavior and activity, worldview reflection;

• revival of the traditions of the Uzbek (Karakalpak) mentality, a sense of patriotism in the unity of ethnic and universal values, fostering respect for the laws of the country and civil rights of the individual, striving to preserve and develop the prestige, glory and wealth of the fatherland;

• the formation of an attitude towards work as a socially and personally significant need and a factor that creates the country's material assets and its spiritual potential, which, in turn, provide opportunities for personal growth;

• development of valeological attitudes and ideas about a healthy lifestyle.

To overcome the dehumanization of general education allows the principle of fundamentalization of its content. It requires the integration of humanitarian and natural science knowledge, the establishment of continuity and interdisciplinary ties, the reliance on students' awareness of the essence of the methodology of cognitive and practical transformative activity. In this regard, training appears not only as a way of acquiring knowledge and forming skills and abilities, but also as a means of equipping trainees with the methods of obtaining new knowledge, independent acquisition of skills and abilities.

The humanistic philosophy of education, nourished by the principles of new pedagogical thinking, is based on a broad theoretical foundation built by representatives of various scientific schools, which in a new way consider the mechanisms for the formation and verification of new concepts and knowledge, the features of the construction of modern theories. The consequence of this is that everywhere there is a change in the leading pedagogical concepts or their significant correction.

Modern approaches to education are determined by the processes of humanization, that is, by an orientation towards spiritual and moral values. The new humanistic consciousness, which is formed in the processes of transforming civilization as a whole, is naturally focused on a different style of pedagogical activity and communication than before, on the interactive mode of teaching and upbringing, on the cultural principles of the child's lifestyle, on the democratic norms of self-organization of all his activities. Thus, in such phenomena, there is a tendency for the synthesis of humanistic, democratic and cultural values of education.

The humanization of education is a turn of all links of the educational process towards the student's personality, respect for his human dignity, overcoming the alienation of the student and teaching staff from the educational process, eliminating the orientation towards the average student, creating conditions for the development of his social activity and the disclosure of creative potential.

The humanization of education is a reorientation towards a personal orientation, as a process and result of the development and self-affirmation of an individual and as a means of his social stability and social protection in the conditions of market relations.

The principle of humanization makes it possible to develop the education system, identify all contradictions, stimulate the search for optimal and justified solutions that generate innovative types of educational institutions, norms, values and ideas. The humanization of education is associated with the rejection of the old outdated subject-objective relations and their transfer to the subject-subjective, into a new organization of education and, in particular, the pedagogy of cooperation. In the field of education, this phenomenon is also caused by the emergence of a fundamentally new understanding of the ideas of the current state of humanization of pedagogical education as a personality-oriented cultural activity. This new type of pedagogical culture is focused on human dignity. In such a culture, the leading value is the value of a person's personality. At the center of the educational process is the student himself, the formation of his personality as a consequence of this particular academic subject.

Thus, at present there is a reorientation of the principles of self-awareness and reflection of teachers, a new understanding of humanism is being developed, where the current state of humanization of pedagogical education determines a democratically organized pedagogical process that is unlimited in the socio-cultural space. The main meaning of such a pedagogical process is the satisfaction of the student's personal needs, the enrichment of his creative potential, the role of

essential forces and abilities. Of course, the measure of this satisfaction is also an indicator of the humanization of society and the individual.

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Rezyume: *Gumanistik ta'lmning maqsadi, mazmunining fundamentalizatsiyasi tamoyili, pedagogik ta'lmni shaxsga yunaltirilgan madaniy faoliyat sifatida insonparvarlashtirishning hozirgi holati g'oyalarining yangi tushunchasi aniqlandi.*

Резюме: *Раскрывается цель гуманистического воспитания, принцип фундаментализации содержания, нового понимания идей современного состояния гуманизации педагогического образования как личностно-ориентированной культурной деятельности.*

Kalit so'zlar: *gumanistik-ta'lim, ijtimoiy-madaniy maxorat, Qoraqalpoq folklori, gumanistik g'oyalari, etnopedagogikasi.*

Ключевые слова: *гуманистическое образование, социокультурные навыки, каракалпакский фольклор, гуманистические идеи, этнопедагогика.*

UDK: 903.2 (903.01/ 903.21)

THE ANCIENT STONE AGE WORKSHOP OF THE SOUTH-EAST USTYURT IS ABOUT ESEN-2

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Summary: *Territory of Uzbekistan is considered one of the countries rich in Stone Age flint-knapping workshops. The article is devoted to the history of the study of the workshop Esen-2, one of the main types of monuments of the Stone Age. The author reveals that the level of knowledge about the sites varies due to their discoveries in various time periods. Moreover, the author discusses the importance of the issues such as new technological-typological analyses andelaboration of type-lists for the numerous newly found sites in Uzbekistan in the last years.*

Keywords: *Paleolithic, Late Paleolithic-Neolithic, Stone period, flint-working workshop, Esen-2, Karakuduk, Shakhpakty, specialized workshop, E.B. Bizhanov, M.R.Kasimov, L.Ya. Krizhevskaya, workshop parking.*

Stone is one of the most important materials in the life of primitive man. When choosing good and high-quality raw materials, the evolution of economic activity in the stone period disappears, which contributed to the development of this stone processing technique. Primitive people, first of all, live near water sources, that is, around fountains, rivers, lakes and waterfalls. However, near these sources there were not always high-quality stones. Therefore, primitive artisans constantly searched for high-quality material stone raw materials, which mainly produced primary processing of stones, and then exported them to their habitats. Workshops after such activities are called abandoned stone products, waste and emissions, as well as places with primary products and sometimes stone weapons. Among the finds found in the workshops are stone fragments with fuel traces, fragments, primary fractures, various stages of work on distant rock fragments, technical fractures, plates and debris are usually predominant. Among them will be weapons that are mostly unusable during the manufacturing process. The lack of products with certain links in the technological chain is a characteristic feature of workshops. The emergence of Stone Age workshops is a necessity arising from the long and slow development of mineralogical knowledge and skills of primitive man.

The regions of Central Asia are one of the richest carpentry workshops for stone cultivation of the Earth. Most workshops are located in Uzbekistan. The discovery and study of stone workshops of the stone period in our country falls on the 60-70s of the XX century [1.18; 2, 1-160]. Here were discovered the first, middle and last workshops of the Paleolithic and Neolithic. This will allow you to track the evolution of workshops. As you know, stone period monuments are divided into two large groups: spaces and stone processing workshops. Spaces have foci (sometimes residential remains), kitchen waste, stone and bone products and other remains.

The Ustyurt Plateau on the Aral Sea coast is one of the richest Paleolithic monuments in Uzbekistan. Ustyurt is a common arid-dedunatory plateau, genetically linked to the Mangyshlak, but separated from the last closed Karinjarik basin. A characteristic element of the Ustyurt plain is the shallow hills (Barsa-Kelmes, Assake-Audan, etc.). Almost all of the Paleolithic sites in Ustyurt are open areas and are associated with these hills [3, 32]. The Ustyurt Plateau is one of the regions rich in monuments of different stages of the Stone Age. The paleoecological conditions present here

have been conducive to the development of mankind as well as the creation of various cultures since the early Paleolithic period. Esen-2, Karakuduk, Shakhpakti and other ancient Stone Age monuments were discovered and studied in this area. But almost half a century has passed since these monuments were put into circulation. Now, with the emergence of new research methods, there is an opportunity to re-examine existing archeological materials, to obtain new information about them, and at the same time to raise the study of the Paleolithic period in Karakalpakstan to a new modern level.

The Esen-2, Karakuduk and Shakhpakti monuments in Ustyurt, which were previously identified and published as early Paleolithic, were initially identified as belonging to different stages of the Paleolithic, but later studies revealed that they were all specific to the Late Paleolithic [4, 35] and are not fully substantiated.

In 1977, in the Karakalpak part of Ustyurt, the settlements of Esen-2, Karakuduk and Shahpakti belonging to the first Paleolithic period were discovered. Especially important and remarkable is the first Paleolithic discovery Esen-2, the most famous Paleolithic site in Ustyurt [5, 48]. The monument was discovered by E.B. Bijanov and A.V. Vinogradov [6, 522]. The location corresponds to the flat surface of a low hill of 90x40 square meters. The materials obtained in archeological research have identified the stages of settlement in this large area of the Paleolithic period, which is still unknown on the archeological map of Eurasia in the early Paleolithic period of Ustyurt. Finally, a chronological gap can be filled in the monuments of the Ustyurt Stone Age.

In the initial data, Esen-2 materials were conditionally dated to the Late Paleolithic period [6, 522]. For such enumeration, a comparison with the materials of Central Kazakhstan is taken as a basis. However, these Central Kazakhstan materials have not been sufficiently published and do not allow for a full comparison with them. E.B. Bijanov in his later articles based on the above comparative data, the materials of Esen-2 are considered to be the end of the first Paleolithic or the heads of the Middle Paleolithic [7]. Thus, Esen-2 and the materials of Kazakhstan, compared to it, also again require careful study [8, 56].

A.V. Vinogradov did a lot of work on the study of Esen-2 materials. The enumeration proposed by E.B. Bijanov for the Esen-2 collection is based on a comparison with the monuments in South Kazakhstan (Borikazgan, Tanirkazgan, etc.). It should be noted that there are more differences than similarities between the materials of the monuments compared above, and South Kazakhstan, especially the Karatag region, is characterized by completely different cultural and technical traditions [9, 189-190]. Bifas or hand claws do not play an important role in this. In A.A. Alpisbaev's articles, only one of the early Paleolithic finds (found in the Akkol site) can be cited here, and only this sediment can be compared with the Esen-2 bifas. Other materials from South Kazakhstan are typologically closer to choppers or double-sided flanged weapons.

The territory of Uzbekistan is one of the richest regions in the world with stone processing workshops of the Stone Age. Kapchigay (Fergana Valley), Uchtut, Idjont, Vaush (Zarafshan Valley), Qizilolma 1-4, Jarsay, Gishtsay (Ahangaron Valley), Esen-2, Karakuduk, Shakhpakti workshops and Kyzylkir (Kyzylkum) workshop are located here. It is known that the monuments of the Stone Age are divided into two major groups: sites and stone processing workshops. The spaces will have stoves (sometimes house remnants), kitchen waste, stone and bone items, and other debris.

All of these workshops were opened and inspected at different times, so their level of learning is at different levels. For example, the distribution of Paleolithic stone processing workshops in Uzbekistan has not yet been mapped. The cultural and chronological qualities of these

monuments have not been determined, and no round sheets of stone objects found in these workshops have been created.

Thus, based on the above shortcomings and taking into account the fundamental importance of these monuments in the study of the Paleolithic of our country, as well as the emergence of a number of new Paleolithic workshops in the Kyzylkum region, it was necessary to publish a special study. At the same time, it is necessary to raise the study of stone processing workshops of the Paleolithic period of Uzbekistan to a new modern level and to determine the importance of stone processing workshops in the general scheme of development of Paleolithic cultures of Uzbekistan.

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Rezyume: *O'zbekiston hududi tosh davrining toshga ishlov berish ustaxonalariga boy o'lkalaridan biri hisoblanadi. Maqola tosh davrining asosiy yodgorliklari turlaridan biri bo'lgan Esen-2 ustaxonasini o'rganish tarixiga bag'ishlangan. Unda muallif ushbu yodgorlikning o'tgan asrda ochib o'rganilganligi va shuning uchun ham uning o'rganilish darajasi turlicha ekanligini, bundan tashqari, keyingi yillarda O'zbekistonda qator yangi ustaxonalarning aniqlanganligi munosobati bilan bu turdagi topilmajoylarning kartografiyasini ishlab chiqish, ulardagi materiallarning yangicha texnik-tipologik tahlilini, tip varaqalarini ishlab chiqish kabi masallalarning dolzarbligini qayd qiladi.*

Резюме: *Территория Узбекистана является одной из стран, богатых камнеобрабатывающими мастерскими каменного века. Статья посвящена истории изучения мастерской Есен-2, одного из основных типов памятников каменного века. В нем автор отмечает, что этот памятник был открыт в прошлом веке и поэтому уровень его изучения отличается, кроме того, в Узбекистане в последующие годы началось развитие картографии этих типов находок в соответствии с определением ряда новых мастерских, новым технико-типологическим анализом материалов в них, развитием картографии этих типов находок.*

Kalit so'zlar: *Paleolit, so'nggi paleolit-neolit, tosh davri, toshga ishlov berish ustaxonasi, Esen-2, Qoraquduq, Shaxpaqti, ixtisoslashgan ustaxona, E.B. Bijanov, M.R. Qosimov, L.Ya. Krijevskaya, makon-ustaxonalar.*

Ключевые Слова: *Палеолит, поздний палеолит-неолит, каменный период, кремнеобрабатывающая мастерская, Есен-2, Каракудук, Шахпакты, специализированная мастерская, Е.Б. Бижанов, М.Р. Касимов, Л.Я. Крижевская, стоянки-мастерские.*

MANAGEMENT OF THE QUALITY OF EDUCATION IN NON-GOVERNMENT PRE-SCHOOL EDUCATIONAL ORGANIZATIONS ON THE BASIS OF PUBLIC-PRIVATE PARTNERSHIP

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Summary: *In the article, the importance of quality management of education at non-governmental pre-school educational institutions based on public-private partnerships has been substantiated, the author's approaches to the quality of pre-school education and its structure have been worked out, internal and external factors affecting the quality of pre-school education have been described, the need to improve the content of criteria for assessing the quality of pre-school education has been justified.*

Key words: *pre-school education, the quality of pre-school education, quality management, non-governmental pre-school educational organization based on public-private partnership, factors affecting the quality, component, quality assessment, criteria for assessing the quality of pre-school education.*

Throughout the globe, particular attention is paid to the effective organization and management of pre-school education in order to provide an early development of children and preparing them for primary education. In this regard, the United Nations Sustainable Development Goals 2030 set the task of "raising to a new level of quality, that ensure effective learning outcomes, creating opportunities for qualitative preparation of children from pre-school to primary education." [8] Based on this task, there is a need to develop the public and private sectors in the field of pre-school education in the Republic of Uzbekistan, so as to improve the quality of pre-school education on the basis of creating a healthy competitive environment between them, as well as to implement quality management into the system.

A number of foreign and domestic researchers have conducted research in the areas of improving the quality of education in the system of continuing education, including the assessment and management of the quality of pre-school education.

In particular, researchers of our republic R.Akhlidinov, R.Djuraev, U.Inoyatov, M.Yuldashev, Sh.Kurbanov, CIS scientists P.Anisimov, G.Bordovsky, D.Gorbachevskaya, O.Nazarova, M.Potashnik, L.Redko, P.Tretyakov, as well as foreign scientists L.Harvey, J.Goldberg, Ch.Peng, D.Westerheijden, R.Wright have studied the issues of quality management, quality assessment and quality control of education at general secondary, secondary special, vocational, higher education and advanced training institutions.

Research on the organization of pre-school educational processes and comprehensive development of pupils in our country have been conducted by D.A. Abdurahimova, M.K. Abduhakimova, O.K. Adamova, Z.Azizova, M.Askarova, M.Askarhojaeva, D.R. Babaeva , N.X.Begmatova, U.Bo'taeva, F.B.Valikhojaeva, B.Djuraeva, G.Nazirova, N.Rejametova, T.S.Usmonxo'jaev, M.Fayzullaeva, D.J.Sharipova, Q.S.Shodieva, F.R.Kadyrova, Sh. Shodmonova, P. Yusupova and others.

Furthermore, the researcher G. Omanova have also studied the issues of improving the quality management of education in public pre-school organizations [4].

In spite of the fact that researches have been conducted by scientists in various fields on the management of the quality of education, the fact that this is a relatively new institutional structure, in terms of insufficient control tools, training and methodological base and experience required in the field as a business entity, in non-governmental pre-school educational institutions based on public-private partnership, the study of education quality management issues, especially in family non-governmental pre-school educational organizations, is of great importance nowadays.

Scientific sources put forward a number of approaches to the quality of pre-school education, as well as its structure and content.

The researcher O.Safonova states the quality of pre-school education as a monitoring object, noting that it consists of four following parts: the quality of the educational process; the conditions created and the quality of the tools; the state of the quality management system; and the quality of learning outcomes [5].

As for I.Rybalova, she notes that the quality of pre-school education is a managed, goal-oriented, controlled process, which can be achieved as a result of coordinated, clearly focused activities of the entire teaching staff.

In addition to that, the researcher G.Omanova comes to a conclusion that that the quality management in pre-school education consists of the process of projecting the quality of education on the basis of social order, creating adequate conditions for pupils, organizing the developing environment and learning process, monitoring changes, analyzing results, correcting and managing the inconsistencies.

Summarizing the above, it can be affirmed that the quality of pre-school education is – the level of provision of educational services that meet the requirements of consumers and the State. It consists of the following:

1. The quality of developing environment and the organization of the educational process, which guarantees the achievement of the minimum requirements for the level of education of pupils in the organization of pre-school education.

2. Clear definition of educational and developmental goals by the subjects of education (educator, pupils) and the quality of achieving them. This can be the quality of a child's health, physiological indicators, mental development, or personal accomplishments in proportion to his age.

3. Quality of pre-school education results responding to the demands and needs of customers and concerned parties, primarily parents, as well as meeting the requirements of the State.

4. The quality of systematic activities and actions (quality management system) aimed at ensuring the quality of education in the pre-school organization.

Non-governmental pre-school educational organizations based on public-private partnership are established by business entities. In this regard, attracting consumers by ensuring the quality of education in a highly competitive environment is important, primarily for the business entity.

The party that has the greatest interest in the quality of pre-school education is the parents. One of the indicators of the quality of pre-school educational services is that these services are mutually compatible with the interests of customers – parents, as well as being focused on them. Improving the competitiveness of a pre-school organization depends not only on its current but also on its ability to meet the future needs of consumers.

Thus, in order to ensure the uniqueness and attractiveness of educational services, pre-school organizations should not only think about the services that may be of interest to parents, but also pay attention to its form and quality.

It is important to develop evaluation criteria to assess the quality of education in non-governmental pre-schools established on the basis of public-private partnership.

In the "Explanatory Dictionary of the Uzbek language" the criterion is interpreted as a measure, a template for comparison or evaluation [7]**.**

Today, the State Inspection for quality control in education under the Cabinet of Ministers of the Republic of Uzbekistan, the Ministry of pre-school Education, the Ministry of Public Education, the Ministry of Higher and Secondary Special Education and the Ministry of Innovative Development, the quality of education in public pre-school educational institutions will be assessed on the basis of the criteria for attestation of educational institutions approved by the Resolution No. 16-mh, 19-mh, 12-2019 and 18 dated December 16.

According to that, the activities of pre-school educational organizations are assessed up to 500 points on the following criteria and indicators:

a) on organization of the educational process in accordance with state requirements (up to 105 points);

b) on the development level of pupils (up to 55 points);

c) on the potential of managerial and pedagogical staff (up to 140 points);

d) on the condition of the material and technical base and the conditions created for the development of pupils (up to 75 points);

e) compliance with sanitary rules, norms and standards of hygiene, aesthetic requirements and quality of nutrition (up to 65 points);

f) based on the results of a public survey conducted among parents or their surrogates on the activities of pre-school educational organizations (up to 45 points);

g) on the implementation of training programs for the next stage of education (up to 15 points).

In addition to agreeing with the above-mentioned criteria and indicators for assessing the quality of pre-school education, we emphasize the need to improve them, taking into account modern trends and the specifics of non-governmental pre-school educational organizations established on the basis of public-private partnership.

It is advisable to include the following criteria for the quality in the evaluation criteria based on the requirements of modern management:

1. Client-oriented services of non-governmental pre-school education organizations. One of the indicators for the quality of pre-school educational services is the compatibility of these services with the interests of customers - families, focused on meeting their needs and requirements.

The organization of pre-school education should allow the family to choose the programs, technologies, forms of pre-school education, and accordingly meet the educational needs of parents.

2. The prestige of the non-governmental pre-school organization in society. This indicator is manifested by a decrease or drop-out in the flow (demand) of pupils at the pre-school organization. This is characterized by dissatisfaction with the activities of the pre-school organization or discontentment with the educational services provided.

3. Social cooperation of non-state pre-school education. The relevance of this criterion is explained by the growing tendency to expand ties between pre-school education and health care, educational and cultural institutions, social protection, strengthening the interaction with the next stages of education - schools, colleges and others.

4. Pupils' health. The non-governmental pre-school organization should create favorable conditions for the health and harmonious physical development of the child. Educational programs should also focus on maintaining the child’s health and his or her physical development.

In order to attract more parents to the institution in a highly competitive environment, non-governmental pre-school educational organizations are trying to provide more educational overload to pupils, absorb a large amount of academic knowledge, and use the school-lesson system. In this regard, today it is important to protect students from overload in the learning process, so as not to harm the mental and physical development of a child.

5. Running a non-governmental pre-school educational organization. It is known that a non-governmental pre-school educational organization based on a public-private partnership is directly managed by its founder. The head of the pre-school organization is assessed on his having the organization's development strategy, how the team perceives it, and the availability of organizational and financial resources for this strategy.

It should be noted that the founder, who is most interested in the growing demand for educational services in public-private partnerships, taking the initiative should conduct an annual internal assessment of the quality of education and present its results to higher organizations. As for the higher-level organizations it is advisable to announce the annual ranking of pre-school educational organizations by mutual agreement, and to mark the places with signs of recognition in order to make them more understandable for citizens.

The aforementioned analysis and research allow us to draw the following conclusions about

the criteria for quality assessment, quality management in education in non-governmental pre-school educational institutions on the basis of public-private partnership:

Today it is necessary to develop and implement clear mechanisms and tools for managing and evaluating the quality of education in non-governmental pre-school educational institutions on the basis of public-private partnership;

Criteria for quality assessment of non-governmental pre-school educational organizations on the basis of public-private partnership should be developed from the business entity point of view, with quality assessment of pre-school education based on non-traditional, socially significant quality criteria related to education;

in the pre-school educational system of developed countries, in most cases, children's learning achievements are not the basis for drawing conclusions about the quality of the educational institution. The main criteria for the quality of education are the educational environment, social relations, equipment and tools, safety and staff qualifications;

different criteria for evaluating the quality of education can be developed for different assessment objects (pupil, parent, non-government pre-school organization).

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Rezyume: *Maqolada nodavlat maktabgacha ta'lim muassasalarida ta'lim sifatini davlat-xususiy sheriklik asosida boshqarish muhimligi asoslab berilgan, maktabgacha ta'lim sifati va uning tuzilishiga mualliflik yondashuvlari ishlab chiqilgan. maktabgacha ta'lim sifatiga ta'sir etuvchi ichki va tashqi omillarni tavsiflaydi, maktabgacha ta'lim sifatini baholash mezonlarining mazmunini takomillashtirish zarurligini asoslaydi.*

Резюме: *В статье обоснована важность управления качеством образования в негосударственных дошкольных образовательных учреждениях на основе государственно-частного партнерства, разработаны авторские подходы к качеству дошкольного образования и его структуре. описаны внутренние и внешние факторы, влияющие на качество дошкольного образования, обоснована необходимость совершенствования содержания критериев оценки качества дошкольного образования.*

Kalit so‘zlar: *maktabgacha ta’lim, maktabgacha ta’lim sifati, sifat menejmenti, davlat-xususiy sheriklik asosidagi nodavlat maktabgacha ta’lim tashkiloti, sifatga ta’sir etuvchi omillar, komponent, sifatni baholash, ta’lim sifatini baholash mezonlari. maktabgacha ta'lim.*

Ключевые слова: *дошкольное образование, качество дошкольного образования, управление качеством, негосударственная дошкольная образовательная организация на основе государственно-частного партнерства, факторы, влияющие на качество, компонент, оценка качества, критерии оценки качества образования. дошкольное образование.*

THE PLACE OF INFORMATION PROGRAMS IN AIRTIME AND THE USE OF MODERN PLATFORMS TO ATTRACT AN AUDIENCE: ON THE EXAMPLE OF STATE AND NON-STATE TV CHANNELS

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Summary: *This article examines the order of placement of information programs on the air, the place of these programs on state and non-state TV channels, as well as the opinions of world practitioners in the field of television journalism, theoretical knowledge of programming television programs based on comparison.*

Keywords: *information, News programs, state and non-state TV channels, "hot spots", airtime, mobile applications, social networks.*

The audience's demand for information is growing day by day. This poses such a responsible task for media workers as searching for news that causes public opinion, operational work, ensuring high-quality images on television, preparing the latest news from the "hot spots" of events taking place in our country and around the world, based on the style of the TV channel. As a result, a "competitive field" for the transmission of information has appeared among 72 state and non-state TV channels [1] operating in our country.

It's no secret that news programs in their relevance have come to the forefront of attracting people's attention compared to other TV channel programs. In the textbook "Television Journalism" authored by G.V.Kuznetsov, V. L. Tsvik and A. Ya. Yurovsky, information programs are described - the "face" of any TV channel, the reference point of the broadcast day." [2.273]

The importance of information programs in our country is evidenced by the results of a social survey conducted by the nationwide movement “Yuksalish” to determine "the most popular national television resources in Uzbekistan and their formats" from March 5 to March 15, 2020. [3]

According to the survey, 12.1% (1,354 participants) out of 6,467 respondents across the country voted for information programs. The number of votes received for information programs is more than the votes cast for entertainment and other programs (13 directions were selected in the social survey).

Also, according to the results of this social survey, the most popular news programs among the population were recognized:

in the first place - "Markaziy studiya" (in "My5" Tv channel),
in the second place - "Zamon" (in “Sevimli” Tv channel),
in the third place - "Ахборот 24" (in "O'zbekiston 24" Tv channel),
in the fourth place - "UzReport news" (in "Uzreport TV" Tv channel) and
in the fifth place - "Yangi Davr" (in "Yoshlar" Tv channel).

The time spent by these information programs in the broadcast network (a newly prepared program and its re-broadcast), as a rule, is from 6 am to 12 am [4.5]. On weekdays (from Monday to Friday), in the activities of state and non-state TV channels of universal subjects in our country, new editions of information programs will be released mainly from **19:00 to 22:00**, and repeated broadcasts -in the first half of the next day.

From the state TV channels on the TV channels "O'zbekiston", "Yoshlar" "Qaraqalpaqstan" (local), from non-state TV channels on the TV channels "Zo'r TV", "Sevimli", "Mening yurtim" new editions of information programs are placed on weekdays from **19:00 to 22:00** (except for the information program "Hudud" on the TV channel "Mening Yurtim"). Table 1 below provides additional information.

Table 1

№	Name of the TV channel	Name of news program	Airtime of the new edition of the news program	Recurring airtime
1.	"O'zbekiston"	"Ахборот 24"	21:00	7:00
2.	"Yoshlar"	"Yangi davr"	19:00	8:00
3.	"Qaraqalpaqstan"	"Xabar"	18:00 (in Russian)	-
			19:00 (in Uzbek)	9:00 (in Uzbek)
			20:00 (in Karakalpak language)	7:40 (in Karakalpak language)
4.	"Zo'r Tv"	"Bu kun"	20:00	-
5.	"Sevimli Tv"	"Zamon"	20:00	7:00
6.	"Mening yurtim"	"Hudud" "Markaziy studiya"	16:00	-
			19:00	6:30

The news programs of each TV channel are broadcast at a strictly defined time. His compliance with this rule gives grounds to train his audience for a certain period of time. The exclusion of these programs from traditional airtime is an emergency. The airtime of other TV shows gives way to the intervals of news programs.

On state TV channels, changes in the broadcasting time of these information programs are rare compared to non-state TV channels. In particular, in the period from November 11 to November 11, 2021, there will be no changes in the airtime of the news programs of the TV channels "O'zbekiston", "Yoshlar", "Qaraqalpaqstan" ("Ахборот 24", "Yangi davr", "Xabar"), except for changes caused by any political reasons (public holidays, international events and other important dates).The constancy of airtime during this period can also be observed in the activities of the program "Bu kun" of the "Zo'r Tv" TV channel. The program "Bu kun" airs from July 2020 at 20:00.

Changes were repeatedly made to the airtime of the "Zamon" news program of the "Sevimli" TV channel. The first edition of the program airs in January 2018 (January 22) at 20:45, from March 2019 at 20:50, from September 2, 2019 to this day at 20:00.

Taking into account the demand of the population for news, two information programs will be broadcast on the "Menin Yurtim" TV channel - "Hudud" and "Markaziy studiya". The information program "Hudud" began broadcasting on November 10, 2018 at 19:00. The airtime of this information program, which broadcasts news in short (no more than 2 minutes) compared to the "Markaziy studiya", from March 2019 it will be broadcast at 17:00, and from November 2021 - at 16:00. Changes in airtime were gradually introduced into the "Markaziy studiya" program in the following order: the first edition of the program was broadcast in March 2017 at 22:00, in June 2020 at 21:30, in August 2020 at 20:00, from November 2021 at 19:00.

The airtime of information programs on state (as well as local) and non-state universal TV channels since November 2021,

- at 19:00, the News programs: "Yangi davr" of the TV channel "Yoshlar, "Markaziy studiya" of the TV channel "Menin Yurtim", "Xabar" (in Uzbek) of the TV channel "Qaraqalpaqstan";
- at 20:00, the News programs: "Zamon" of the TV channel "Sevimli", "Bu kun" of the TV channel "Zo'r TV", "Xabar" (in Karakalpak language) of the TV channel "Qaraqalpaqstan";

- at 21:00, the News programs: "Ахборот 24" on the "O'zbekiston" TV channel.

Broadcasting news programs on several TV channels simultaneously allows the auditor to compare, analyze and choose. Where there is competition for development, as well as for quality, in the marketing activities of TV channels, one can see attempts to further increase their audience, trying to promptly and publicly cover sensational news that is interesting to many.

The use of information technologies in order to attract the audience of today with the help of mobile phones has become apparent in recent years. The ability to watch TV channels even without a Television set is created by internet broadcast sites, mobile applications, pages of TV channels in social networks.

1. The service of online broadcasting sites of state TV channels has been launched. For example: https://www.uztv.tv , https://mediabay.uz/tv /. But on these sites there is no possibility to watch of local TV channels and non-public TV channels.

Online broadcasting site uztv.tv was organized by National Television and Radio Company of Uzbekistan. On the site you can watch 16 state TV channels, historical Uzbek films, TV series, telenovelas, old editions of the program " Otalar so'zi - aqlning ko'zi", humorous programs, historical performances, modern music clips, sports programs, cartoons for children.

2. State TV shows can also be watched via mobile apps. Since May 2021, a mobile application of the site has been used https://www.uztv.tv. [5.] An archive of past shows and movies is also available for viewing through the app.

In addition, TV channels can be watched through the mobile applications "All play", "Mediabay". Expect "Sevimli TV", four TV channels: "Zo'r TV", "Mening yurtim", "Milliy TV", "Uzreport" (paid service) can be watched through the mobile application "Mediabay". Also, 15 state TV channels are hosted in this mobile application.

3. Viewers can also watch TV channels through their social media pages (mainly Youtube, Telegram). In particular, due to the fact that news in information programs require efficiency, it is necessary to work quickly when placing on pages. The placement of TV channels and programs on them can be viewed in Table 2 below.

Table 2

№	Name of the TV channel and News program	Page in the social network "Telegram"	Placement of the broadcast program on the page	Page in the social network "Youtube"	Placement of the broadcast program on the page
	"O'zbekiston" and "Yoshlar" TV channels				
1.	**"Ахборот 24"**	https://t.me/mtrkuzofficial	On the day of airtime	https://www.youtube.com/channel/UCWCThSM0ntBV9lQQ4PnIesg	On the day of airtime
2.	**"Yangi davr"**		After one (two) day		After one (two) day
	"Qaraqalpaqstan" TV channel				
3.	**"Xabar"** (qoraqalpoq tilidagi)	https://t.me/qaraqalpaqstan_telekanali	After one (two) day	https://www.youtube.com/c/MEGALINEuz	On the day of airtime (in some cases after one (two) day)
	"Zo'r Tv" channel				
4.	**"Bu kun"**	https://t.me/bu_kun	Does not fit permanently (Not updated since September 7, 2021)	https://www.youtube.com/channel/UCkFI9U268MBsErm612vf2uw/about	Not updated since 2 months
	"Sevimli Tv" channels				
5.	**"Zamon"**	https://t.me/zamonuz	Used to declare a program	https://www.youtube.com/c	Does not fit permanently

				hannel/UCL8U-WhAm_bfiJ40SkWM6aw	(Not updated since November 1, 2021
	"Mening yurtim" TV channel				
6.	**"Hudud"**	https://t.me/hududtv	On the day of airtime	https://www.youtube.com/channel/UC41Us0K5ricL6TJe0D9QL_g	Does not fit permanently (Not updated since May 1, 2020)
7.	**"Markaziy studiya"**	https://t.me/markaziytv	On the day of airtime	Does not exist	-

Therefore social networks occupy the main place in the activities of the media. They give each user the opportunity to get information at a convenient time for him, express his personal opinion and become the author of a sensation. [6.156] In this table, you can see how state TV channels ("O'zbekistan" and "Yoshlar" TV channels) and non-state TV channels, effectively using the capabilities of the "Mening yurtim" TV channel's social networks, update their pages daily. The introduction of modern platforms and other information programs into its activities will serve as a basis for further expansion of its audience.

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Rezyume: *Mazkur maqolada informatsion dasturlarning efirda joylashtirilish tartibi, davlat va nodavlat telekanallarda mazkur dasturlarning o'rni, shuningdek, televizion jurnalistika bo'yicha jahon amaliyotchilarning fikrlari, televidenieda ko'rsatuvlarni dasturlash bo'yicha nazariy bilimlar taqqoslash asosida o'rganiladi.*

Резюме: *в данной статье изучается порядок размещения информационных программ в эфире, место этих программ на государственных и негосударственных телеканалах, а также мнения мировых практиков в области телевизионной журналистики, теоретические знания по программированию телепередач на основе сравнения.*

Kalit so'zlar: *Axboriy dasturlar, davlat va nodavlat telekanallar, "qaynoq nuqtalar", efir vaqti, mobil dasturlar, ijtimoiy tarmoqlar.*

Ключевые слова: *информационные программы, государственные и негосударственные телеканалы, "горячие точки", эфирное время, мобильные приложения, социальные сети.*

MAIN DIRECTIONS OF INDUSTRY DEVELOPMENT IN THE CONDITIONS OF THE GLOBAL ECONOMIC SPACE

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Summary: *The article examines the main directions of industrial development in the context of globalization. The problems of industrial development in the territory of the Republic of Karakalpakstan are determined.*

Keywords. *Industrial sector, innovative development, strategic priority*

Introduction. In a market economy, industry remains among the priority sectors, since the world scientific and technological achievements in the economy and the strategic interests of the state, society and business owners are concentrated in the production sector.

Unfortunately, the industrial sector in the Republic of Karakalpakstan is not sufficiently developed in the region, and this factor is obvious in the implementation of the foreign policy course. The situation is also aggravated by the global crisis phenomena, leading to a deterioration in relations with partner countries, as well as the loss of sales markets; lack of support for innovative development of production; the underdevelopment of financial markets for a free flow of capital, as well as the difficulties associated with attracting investment funds necessary to renew the production of the extractive and processing industries, the implementation of innovative projects, etc. This fact determines the need to solve a number of problems based on the innovative development of the industrial sector.

Main part. The conceptual foundations of industrial policy and industrial development, as well as future reference points are described in the works of V.P. Vishnevsky, A.I. Amosha, L.A. Zbarazskaya, A.A. Okhten, D.Yu. Cherevatsky, K.V. Filippova. The strategy for the development of the country's industry was proposed by N. Yakubovskiy, V. Novitskiy, Yu. Kindzerskiy. The innovative vector of industrial development is highlighted in the works of G.A. Morozova, L.I. Fedulova. From domestic scientists A. Kadyrov, R. I. Nurimbetov, M. Makhkamova B. S. Kalmuratov and other authors.

At the same time, there are a number of unsolved problems associated with the need to develop the industry industrial enterprises.

Results. The development of industry in many countries of the world is carried out with the active support of both public and private structures that use various regulatory mechanisms.

For example, in the United States, the state does not directly influence the development of industry and relies on market mechanisms. However, it actively uses tax and monetary policy instruments and finances R&D through various funds. The largest government agencies that manage the innovative development of the United States: the National Science Foundation (finances basic science, a budget of about $ 7 billion), the National Institutes of Health (an institution of the US Department of Health, includes 27 divisions, a budget of $ 35 billion), the Pentagon (Department of Defense), The Agency for Advanced Defense Research Projects (DARPA, on behalf of the government is engaged in the most risky, radical projects), IARPA (Agency for Advanced Research in Intelligence), etc. Total direct government spending on innovation reaches $ 60 billion [2; 3, p.51]. The state is implementing an innovative policy aimed at introducing advanced technologies such as robotics, nanoelectronics, materials with specified properties and biotechnology [3, p. 52; 6]. That is, the United States does not develop government programs for

the development of industry, since it mainly applies measures of targeted impact on the innovative development of industry.

In the EU, the main instruments of industrial policy are the “High Level Groups” [9], “European Technology Platforms” [4], Joint Technology Initiatives [8]. High-level groups are advisory bodies that provide advice and interests of stakeholders (industrial enterprises, member countries, etc.) for the development of strategic decisions in the implementation of industrial policy "European Technology Platforms" are projects aimed at priority research, development and implementation advanced technologies while concentrating joint efforts and resources. To create technological platforms, it is necessary to comply with such criteria as: strategic importance and the possibility of obtaining a specific result, public benefit, the possibility of introducing technologies into the production activities of enterprises, etc. [3,p. 53–55].

Joint Technology Initiatives are legally structured structures designed to fulfill the objectives of the technology platforms. The creation of joint technological initiatives contributes to the acceleration of the generation of new knowledge in strategic technological areas and the verification of the commercial opportunities of the technologies being developed [3,p. 56].

In Japan, industrial development is managed through a policy of administrative guidance of a recommendatory nature in the form of tax incentives, loans, guarantees, grants, subsidies, licenses, etc. The priority areas of Japanese industrial policy are science-intensive sectors: robotics, semiconductors, electronics. In addition, industrial development is based on socio-economic development plans, which include expenditures for the development of individual sectors. An important role in the development of industry in Japan is played by government bodies that coordinate and control industrial and trade policy, energy security, as well as control over the export of arms [3, p. 58-59].

In South Korea, the development of industry is controlled by a government body, which has been transformed into the Ministry of Strategy and Finance; its task is to manage economic, tax, and financial policies [6].

In China, industry is governed by national plans. The state uses instruments such as lending by state banks for export operations and the acquisition of technology, implicit and explicit subsidies for exports, the use of protective duties on imported industrial products, the practice of providing a market for products to foreign corporations in exchange for providing advanced technologies [10].

The main efforts of the state are reduced to the redistribution of financial resources in favor of national Chinese capital and the acquisition of advanced technologies by local manufacturers in order to change the current status of a production site and sales market for Western companies to a new status of an independent player. In addition, China acts as a partner of exclusively large enterprises, taking into account the interests of the state [3, p. 61]

The state uses the following mechanisms to influence the development of industry: tax incentives, subsidies and direct financing of R&D, attracting foreign direct investment, infrastructure projects and ensuring the needs of industry for labor [4].

Thus, the experience of foreign countries has shown that developed countries use the most effective regulatory mechanisms based on public-private partnerships, annual budgets, innovation, concentration of efforts and resources on key technologies that allow you to get the most out of the technologies used to improve production efficiency and enhance national competitiveness.

In the Republic of Uzbekistan, the development of industry is carried out mainly in the direction of cotton-textile, fuel and raw materials orientation of state farms, which is unpromising

and vulnerable from external competitors. Various concepts for the development of industrial policy are being developed systematically at the state level, but until now they have been predominantly of a declarative nature, and, unfortunately, an effective industrial policy has not been formed.

In modern conditions, the strategic direction of industrial development in the Republic of Uzbekistan in the conditions of export restrictions are the focus on import substitution, the transition to their own resources. The main dominants in the development of industrial policy include: orientation towards innovative development, stimulation of the development of science and high-tech industries that contribute to the economic growth of the Russian economy, which is extremely necessary for a prompt response in the face of global challenges.

It should be noted that industrial development at the state level has been regulated exclusively by economic methods for a long time. In addition, state programs for the development of industry are periodically applied, within the framework of which separate sectoral and intersectoral target programs operate. But, as practice has shown, the applied policy was mainly of a recommendatory nature, since the designated strategic priorities in state programs have not been fully implemented [1, p.104].

Among the main problems of industrial development in the semi- island, you can add unequal competitive conditions of enterprises, the lack of effective protection of property rights, a variety of forms of ownership, which makes it difficult to control the financial and economic activities of business entities and determine whether enterprises belong to domestic or foreign business.

The development of industry in the Republic of Karakalpakstan is carried out mainly along an inertial path, which is associated with a number of unresolved problems that complicate the implementation of priority areas of industrial development. Despite the fact that the region adopted resolutions and programs regarding the development of this area, there have been no significant changes in the direction of modernization and innovative development in the industry.

In our opinion, insufficient activation of the innovative development of industrial enterprises is associated with the inertial development of the scientific and technical base of production, poor training of qualified personnel, as well as the unwillingness of enterprises to independently generate innovations, due to the weak protection of patent legislation in the country.

In accordance with the decree of the President of the Republic of Uzbekistan dated November 11, 2020 No. 4889 "On measures for the comprehensive socio-economic development of the Republic of Karakalpakstan in 2020 - 2023", by the end of the scheduled period, almost all indicators are expected to grow mainly due to their own sources, excluding FDI.

Conclusions. Thus, an analysis of the development of industry in developed countries showed that this industry is supported by both public and private structures using variable instruments and methods of support, as well as determining promising directions of competitive development. In the Republic of Karakalpakstan region, the industrial sector is developing mainly along an extensive path, the existing programs to support the development of the industrial sector are declarative in nature. For domestic industrial enterprises to enter foreign markets, it is necessary to ensure a favorable investment climate and focus on the innovative vector of development.

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Rezyume: *Maqolada globallashuv sharoitida sanoat rivojlanishining asosiy yo'nalishlari ko'rib chiqiladi. Qoraqalpog'iston Respublikasi hududida sanoat tarmog'ini rivojlantirish muammolarini echish yullari tanglab olingan.*

Резюме: *В статье рассмотрены основные направления развития промышленности в условиях глобализации. Определены проблемы развития промышленной отрасли на территории Республики Каракалпакстан.*

Kalit so'zlar. *Sanoat sektori, innovatsion rivojlanish, strategik ustuvorlik.*

Ключевые слова. *Промышленная сфера, инновационная развитие, стратегический приоритет.*

UDK: 903.2 (903.01/ 903.21)

MESOLITHIC OF USTYURT AND KYZYLKUM

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Summary: *The article examines the history of archaeological study of the Mesolithic monuments of Ustyurt and Kizilkum and the possibility of revising existing archaeological materials, as well as raising the study of the Mesolithic period in Uzbekistan to a new modern level.*

Keywords: *Ustyurt, Kyzylkum, archaeological research, Mezolithic, E.B. Bizhanov, A.V. Vinogradov, N.U Kholmatov, Machai, Kushilish, Sazagan 1, Aydabol, Churuk, Kartpaykum.*

On the territory of present-day Uzbekistan, 10,000 years ago, a new era in the history of primitive society took shape - the Mesolithic (lat. Middle Stone Age).

In the Mesolithic era, a more humid climate existed in the vast expanses of the plain zone of Central Asia. Tugai forests grew along the rivers and in marshy lowlands. Here were found microlithic items, small flint tools of geometric outlines, characterizing the Mesolithic era.

Several monuments are known on the territory of Uzbekistan: Machai, Kushilish, Sazagan 1, Ustyurt and Kyzylkum monuments and Obishir 1-5, Ashchi-kul, points 2, 3 and 16 in Fergana.

To date, about 30 stratified sites and more than 200 sites of the Mesolithic era have been identified in Central Asia, most of which correspond to the territory of Uzbekistan. These monuments can be divided into two groups: the first group consists of cave monuments Obishir 1-5, Machai, Kushilish, Karakamar and Ochilgor; the second group of monuments is the discovery of the site: Aydabol 25, Lavlakon 24, Charbakti, etc. In general, the Mesolithic of Central Asia covers the 11th-7th millennia BC. [1, 58; 2, 74-77; 3, 34; 4, 48; 5, 60].

Mesolithic of Ustyurt. The territory of Ustyurt is of great importance in the study of the Mesolithic of Uzbekistan. In the second half of the twentieth century, E. B. Bizhanov and A.V. Vinogradov discovered about 20 Mesolithic monuments here. They are mainly monuments [4, 48].

According to researchers, these monuments are located in takyrs, salt marshes, sandy massifs, on the banks of the dry riverbed of ancient water sources. The sites of Aydabol, Churuk, Kartpaykum, Alan massif and Tailak and others have such a topography. Long-term monuments include Aydabol 25 (more than 2000 finds), Aktaylak (14000 finds), Kiyikshingrav 2 (12000 finds). Short-term monuments are Aydobol 15 (83 finds), Churuk 2 (84 finds), Sumbetimer 1 (263 finds) [4, 29]. In addition, there are hundreds of medium-sized monuments, such as Aydabol 10 (about 400 finds), Aydabol 16 (about 5000 finds), Aktyube 2 (more than 5000 finds) [6, 33].

According to A.V. Vinogradov among these monuments with 200 to 1000 artifacts are one-time or seasonal sites [4, 28]. According to the classification of K. Flannery and F. Hole, the Mesolithic monuments of Ustyurt are divided into three types [7, 162-163].

1. seasonal, main camps;
2. shelters for the separation of prey hunting;
3. short-term intermediate parking.

Numerous and multifunctional stone tools were found from the sites of the first group. The second group of monuments is intended for finishing the hide and carcass of hunting objects, and therefore they are limited to a set of special stone tools. The tools of the third group, although similar to the first group, are characterized by a small number of stone products.

According to E. B. Bizhanov, the sites of Aydabol 16, 25, 6, 9, 11, 21, 22 can be confidently attributed to the Mesolithic, and the memorial location of Zharinuduқ is conventionally considered the Mesolithic. Locations Aktaylak 1 (complex 1), Aktobe 2, Churuk 2 (complexes 1 and 2),

Churuk 7, Sulama, Churuk 3 (complex 2) E.B. Bizhanov attributed it to the Late Mesolithic [8, 74-75] or the Early Neolithic.

The sites of the Mesolithic of Ustyurt are characterized by a large percentage of microlithic technology of cleavage. In the secondary processing in most of the projects, blunt retouching was used. Also in the set of these industries are shell ornaments.

The origin of the Ustyurt Mesolithic is still unknown. According to E.B. Bizhanov, a mixed and peculiar local culture was formed in Ustyurt under the influence of the Mesolithic of the Caspian and Southern Urals (Bizhanov E.B., [6, 33; 9, 23].

As an example, he cites the presence and similarity of the Mesolithic trapeziums of the Caspian and Ustyurt. At the same time, E.B. Bizhanov also pauses about the differences. Between them, and speaking about the peculiarities of the Ustyurt Mesolithic, he notes that the Ustyurt Mesolithic grew from local Middle Paleolithic monuments, such as Esen 2 and Churuk 12 [10, 522; 11, 76].

On the territory of Surkhandarya, separate points of the Mesolithic epoch were discovered [12, 10-11; 13, 243]. These include finds around the ancient settlement of Ayrtam and near Old Termez. These finds consist of wedge-shaped and prismatic cores for microblades, side-scrapers, retouched flakes and blades, incisors and large points. A.P. Okladnikov and U.I. Islamov genetically link them with the Samarkand site and the Obishir 1-5 monuments [13, 12; 14, 9-11].

Kyzylkum Mesolithic. In recent years, the Khorezm archaeological and ethnographic expedition headed by A.V. Vinogradov, there are many Mesolithic localities without cultural strata on the territory of Kyzylkum, such as Lalyakan, Daryasai, Echkiliksay, Ayakagitma, Charbaқti (protozarafshan) in Central Kyzylkum.

The industry of the Lalyakan sites (Lyavakan 13, 24, 41, 54, 87, 107, 212 \ 11, 222 \ 1, 348, 418 and, in some cases, the Lalyakan sites 120 and 121) are characterized by the technique of splitting prismatic micro-plates. Among the secondary processing, products with blunt retouching prevail. Also, these industries are characterized by the retouching from the ventral side of blanks. Stone tools include microliths, scrapers, notched-notched microplates, penny points, short trapezoids and parallelograms, elongated segments, asymmetric triangular tools, and leaf-shaped points with a special insert.

The industry of the Mesolithic monuments of Daryayosai and Echkiliksai looks different (Uchashi 84, 85, 159, etc.). They contain many scrapers processed from flakes of plates, blunt plates resembling Chatelperron knives, plates with notched-notched retouch, incisors, asymmetric triangular tools, trapeziums of the yangel type, and there are also asymmetric trapezoids.

Mesolithic items were also found in Ayakagitma (Ayakagitma 5, 86, 367, etc.). Among them there are single elongated trapezoids, “horned”, rectangular, asymmetric and elongated large triangular tools.

The industries of the Karakir 1 and Charbakti 1 monuments in the Charbakti valley look still differently. They are characterized by blunt-edged micro-blades, blades with dentate-notched retouch, points with retouched edges, scrapers processed on truncated flakes and blades, trihedrally processed symmetric and asymmetric short trapezoids, elongated and short triangular tools.

From the territories of Central Kyzyl Kum, only the Kokpatassoy 1 locality is known. Its industry is characterized by the presence of microlitoid cutting techniques. Conical cores predominate among the cores. The industry set also includes knife-like blades, end-scrapers, large blades with notched-notch retouching, incisors, micro-blades with blunt edge retouching. Geometric microliths are not found. A.V. Vinogradov explains the diverse appearance of the Mesolithic monuments of Lalyakan, Daryasai, Echkiliksai, Ayakagitma, Charbaқti and Central Kyzylkum by the fact that they belong to different chronological periods and, together with them, they are, possibly, different versions of one single culture. But the origin and cultural identity of these monuments is not yet clear enough.

Peculiar Mesolithic localities were also found in the valley of the Zarafshan River, in its middle and lower reaches. Archaeological research carried out in the Charbakti valley of the

ancient lower Zarafshan revealed more than 60 sites of the Mesolithic and Neolithic times [15, 12-13; 16, 27-43; 17, 25-34].

Among them, the industries of the Charbakti monuments 11, 12, 23, 27, 41 differ sharply from the neighboring Keltaminar complexes. These industries contain cores, high-shaped end-scrapers, chisel and pebble tools, retouched flakes and triangular points that are characteristic of the mountainous Late Paleolithic and Mesolithic of Central Asia. Therefore, researchers relatively date back to the early Mesolithic era. The emergence of Mesolithic complexes from Charbakti makes it possible to fill the void between the Samarkand Late Paleolithic site and the Sazagan Neolithic culture.

In recent years, Mesolithic monuments have been discovered in the Karatepa mountain range in the middle reaches of the Zarafshan. These include the cave monuments Karakamar Ochilgor. N.U Kholmatov discovered from these sites chisel tools, high-form scrapers worked on flakes, cores and rough tools on blades.

The Mesolithic monuments in the middle reaches of the Zarafshan include Sazagan 1 and the lower layers of Sazagan 2, located in the Karatepa mountains. The Sazagan 1 site is located on the second terrace of the left bank adyrs of the valley of the same name. The monument was studied in 1966-1977. in the first stage of the study, the collection of materials and stratigraphic studies were carried out here. The excavations were carried out in 1971-1972, first by D. N. Lev, then by M. Dzh. Dzhurakulov. It turned out that the cultural layers of Sazan 1 were destroyed by agricultural work in historical time. Nevertheless, two cultural horizons have been identified here, of which 2,300 specimens have been collected. stone products. Among the materials are prismatic, cone-shaped, butt cores, blades, micro-blades, chippers, retouchers, devices for squeezing equipment, scrapers, cutters, retracted flakes and blades. Lifting materials are very similar to those that were obtained as a result of excavation of the cultural horizons of the Sazagan 1 site, with the exception of one leaf-shaped biface from the excavation. The industry of the site is both flake and blade (74% flakes and 20.1% blades). The share of micro-plates is large, they make up 36.3% of all plates and 22.2% of all processed stones of the complex. In this respect, the industry of Sazagan 1 differs from the “mountainous Neolithic” and approaches the Neolithic industry of Central Fergana.

The industry of Sazagan 1 is characterized not by geometric tools, but by thick scrapers, chisel tools, and incisor-shaped products. These tools, although they do not constitute a large number among the items with secondary processing (most of the tools are retouched otzepas and blades), are defining elements of the nature of this industry [18, 41].

Comprehensive paleogeographic and archaeological studies in the territories of Uzboy, Amu Darya, Zarafshan, Kyzilkum and the Central Asian Mesopotamia indicate that these territories were densely populated during the late Pleistocene and early Holocene. The discovered monuments in various ecological conditions indicate that there were favorable natural conditions for human existence. The Mesolithic tribes living in these territories lived in different natural conditions, continued their cultural development and laid the foundation for the further evolution of the Stone Age cultures.

Economy of the Mesolithic tribes. Of course, the importance of studying the Mesolithic monuments of Uzbekistan is great, or it gives us for the first time an idea about the types of economy, about the life of the Mesolithic tribes of Uzbekistan.

Man has made great strides in improving the tools of labor. Already in the Paleolithic, throwing spears - darts were invented. Then man acquired a bow and arrow, which was a huge achievement in the history of mankind. Now it was possible to hunt birds, small swift-footed animals that rarely fell prey to humans in the Paleolithic era.

The bow was essentially the first mechanism invented by man. In the Mesolithic era, the microlitization of guns reaches a height of. Different shapes of geometric tools appear. The era from the appearance of onions to the invention of ceramics covers the period from about the 10th to the 5th millennium BC. e. and is called the Mesolithic.

The animal world has also changed. Before that, hunting in mountainous areas, like the previous era, was roe deer, mountain goats and rams, and in the lowland areas - bison, gazelle, horses, hares. Hunting could not be a reliable source of food. This set before the person the task of finding new forms of economy, new means of subsistence. Following the change in the landscape and fauna, the way of life of the people of the Stone Age also changed.

According to the faunal remains, paleogeographic and functional data of the materials of the Obishir 1-5 site, representatives of this culture were hunters and gatherers. They hunted Siberian deer, argali, gazelle, deer, etc. animals. The main hunting weapon was a bow and arrow; individual arrows were found from the sites of Obishir and Central Fergana. Stone tools also indicate that hunting was the main business of the economy. In the economy of this culture, the processing of skins and the manufacture of various things from them played an important role. In the economy of representatives of this culture, leather processing played an important role. The existence of collecting is evidenced by stone sickles and grain grinders found from the Mader locality [19, 127-142; 20, 112].

In general, representatives of the Obishir culture were engaged in wandering hunting in the foothill and desert zones [21, 163].

According to the quantitative indicators of labor tools, it can be said that there were main long-term camps (Obishir 5, Sarиқ-Suv, etc.), short-term shelters (point 3, Ittak-Kala 1, etc.) and locations for cutting hunting prey (Ashi - Cool, Mader 11, 2 and point 16, Taipak 3).

To study the economic activity of the Mesolithic tribes of Central Asia, we use a number of sources. This information about the natural environment of the study area, about the visible and quantitative composition of the fauna, the nature of its distribution in the layer, the functional purpose of tools, etc.

Cattle breeding in their economy in this era did not yet exist or did not play a decisive role. The bones of small ruminants from domestic animals were found in the upper layer at Obishir 5 Cave and Machai Cave. The most famous are the presence of cattle bones in both layers of Machai Cave. Hence, it remains to accept that the inhabitants of the cave raised sheep, goats, and possibly cattle. At least there is reason to talk about the initial stage of the timing of large horned animals. Now it is difficult to decide with certainty the question of whether the territory of Uzbekistan will be found as an independent center for the development of cattle breeding or be part of the Central Asian cattle breeding center.

In the economy of the Mesolithic populations of Ustyurt, traceological data testify, and it is mainly of an appropriating nature. The main occupation of the population in this era was hunting and gathering. In the household, the main place was occupied by the processing of bones, wood and hides. The Mesolithic population of Ustyurt lived in cultural contacts with the cultures of adjacent territories and played an important role in the development of the subsequent Neolithic era.

On the basis of the achievements made by the Mesolithic tribes of the south, it became possible for their transition from gathering to the cultivation of cultivated plants - to agriculture and breeding of domestic animals. Equally naturally, in the course of time, the inhabitants of the steppes and mountain regions, probably with the help of their settled neighbors, switched from hunting wild animals to cattle breeding. The first farmers and pastoralists owe all this to their predecessors, the people of the Mesolithic time, in which the first cracks in the ancient consuming economy, which dominated for several million years, began, when the search for new sources of livelihood, new forms of life and culture. These first timid steps of the Mesolithic people prepared a great turning point - the transition to a productive economy, and with it many other progressive changes in all areas of culture and human life.

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Rezyume: *Maqolada Ustyurt va Qizilqum mezolit yodgorliklarini arxeologik o‘rganish tarixi va mavjud arxeologik materiallarni qayta ko‘rib chiqish, shuningdek, O‘zbekistonda mezolit davrini o‘rganishni yangi zamonaviy bosqichga ko‘tarish imkoniyatlari ko‘rib chiqiladi.*

Резюме: *В статье рассматривается история археологического изучения мезолитических памятников Устюрта и Кызылкума и возможность пересмотра существующих археологических материалов, а также поднятия изучения мезолита в Узбекистане на новый современный уровень.*

Kalit so’zlar: *Ustyurt, Qizilqum, arxeologik tadqiqotlar, mezolit, E.B. Bijanov, A.Vinogradov, N.U. Xolmatov, Machay, Kushilish, Sazag’on 1, Aydabol, Churuk, Kartpaykum.*

Ключевые слова: *Устюрт, Кызылкум, археологические исследования, мезолит, Е.Б. Бижанов, А.Б. Виноградов, Н.У. Холматов, Мачай, Кушилиш, Сазаган 1, Айдабол, Чурук, Картпайкум.*

THE PARADISM OF CONSTRUCTIVISM AS A METHODOLOGICAL STRATEGY FOR THE STUDY OF SOCIAL REALITY

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Summary: *The various theories and paradigms of understanding social reality in modern times are closely related to the search for an adequate methodology in the arsenal of methods for the study of social reality. Because the manifestation of complexity, diversity, versatility, non-linearity in the current social reality, the methodological strategy of traditional paradigms in its study showed one-sidedness, and the need to develop a new methodological strategy arose. This article examines the essence of the paradigm of social constructivism as a methodological strategy for the study of social reality.*

Keywords: *social reality, constructivism, social constructivism, paradigm, construct, subject-object relationship, building a new society.*

The classical paradigm of social reality was formed within the framework of industrial society, and its theoretical model depended on the peculiarities of the social reality of that period.

However, the transition to an information model of the development of social reality, in turn, necessitated a new paradigm that adequately describes the essence of this society. This leads to a crisis of the classical methodology of understanding social reality and requires the development of new postindustrial or paradigms that reflect the reality of the information society. The reason is the result of the transformation of social reality in such a society. Our President Sh.M.Mirziyoyev noted: "The new Uzbekistan is a new stage in the further strengthening of the independence of our country, a new era of freedom and liberty, the path of creativity and prosperity" [1, P.26].

Different theories and paradigms of understanding social reality in modern times are closely related to the search for an adequate methodology in the arsenal of methods for the study of social reality.

The paradigm of social constructivism is widely used in modern scientific social philosophy as one of the methodological approaches to the study of social reality. This paradigm is the methodological basis for the analysis and understanding of social reality. In particular, P. Berger, in T. Lukman's research work, showed the one-sidedness of the classical paradigm of social reality. That is, in the classical paradigm, social mechanisms and subjective factors were not taken into account. The classical paradigm stems from the monistic model of the universe and ignores its aspect of diversity. Most importantly, in this paradigm, the influencing subject was not exposed to his ability to construct his own social reality. That is, it studies the influence of society and its institutional structures on the process of socialization of the subject. But he did not pay attention to how the subject affected them.

In this sense, the theoretical and methodological approach of P. Berger, T. Lukman serves to fill this gap. Based on A. Schutz and K. Mannheim's view that the social world corresponds to the imagination of the individual and his motives, especially everyday knowledge, P. Berger and T. Lukman argue that "the sociology of knowledge deals with the analysis of the social construction of reality." emphasize [2,P.13].

P. Berger and T. Lukman considered social reality as a social constructor and developed 4 main mechanisms of reality construction: 1. Habitualization, 2. Typization, 3. Institutionalization, 4. Legitimization. According to them, it gives 3 dialectical moments of constructing social reality, i.e. “society is a product of man. Society is an objective reality. Man is a social product. " “The change in scientific rationality gradually brought the constructive role of the subject to the fore” [3, P.266]. Such an approach is called social constructivism in the study of man and society. The knowledge developed by man in the process of cognition is an integral part of the landscape of social reality. With the help of language, signs and symbols, it is a construct of the worldview for people. Using

the method of objectification, the social landscape of the world is reflected in the minds of individuals and becomes its worldview. “The social landscape of the universe is an ideal construct built by human beings that defines their lives and provides patterns of behavior” [4, P.26.].

We can see the construction of the world landscape in the example of the linguistic landscape of the world. The linguistic landscape of the universe is a model of the universe reflected in a concrete language. In particular, the scientific view of the universe as a linguistic view, each science constructs the world using its own language.

For example, history, sociology, psychology, philosophy and all social sciences and humanities will be the construct of the social landscape of the world. History is a construct of the past, sociology is the ideal construct of society, philosophy is manifested through the study of the general laws of society.

At the core of the program of the paradigm of constructivism is the activity of man, who not only reflects the world around him, but is also seen as an active participant in the construction of the world, a constructor of social reality. In particular, in social cognition, our knowledge of social reality is constructed by man through a particular image or model as a specific form of reality. That is why we are talking about the subjective nature of the social landscape of the world. “The social landscape of the world is the product of the creativity of several social entities, each of which contributes to the construction of one or another aspect of society” [5, P.25]. That is, the subjects are formed in the process of constructing with each other.

In the paradigm of social constructivism, the social world is viewed as a product of human subjectivity. Humans define, interpret, and give meaning to the world through their daily actions. A. Schutz expresses this as follows: "All our knowledge of the universe, including everyday and scientific knowledge, is constructions, that is, the sum of idealization, abstraction".

The theoretical foundations of the paradigm of constructivism go back to Kant's philosophy. Accordingly, cognition is related to the activity of the subject and the perception of cognition as a mental construction. In the classical paradigm of cognition, the object was considered a determinant that defines the subject, while in the nonclassical paradigm, on the contrary, they were considered as an interconnected integrated system that defines each other. For example, I. Kant approves of the activity of the subject in the process of learning.

The term constructivism (although its content belongs to I. Kant) began to be actively used in the late 70s of the twentieth century to express theoretical and methodological relations in the humanities, emphasizing the role of social values and cognitive motives in construction.

According to the methodological principle of constructivism in philosophy, psychology, sociology (J. Kelly, J. Piaget, A. Schutz, K. Gergen, P. Berger, T. Lukman, V.S. Stepin, U. Maturana, F. Varela, R. Vatslavik, I. Glaserfeld), knowledge does not exist directly in the object (objective reality) and is not derived from it in the process of acting in relation to absolute reality, but is formed (constructed) by the recognizer.

In this sense, constructivism stands in the position of pluralism or the multiplicity of truth, and contradicts the theory of reflection and the theory of truth associated with it.

One of the features of the paradigm of modern constructivism is that in its approach to knowledge, looking at it in a new perspective, participates in knowledge as a tool that ensures the vital activity of the organism (individual, social group, society). At the same time, it is noteworthy that scientific knowledge transforms and transforms human existence by studying how it affects human life. It means to know something as a synonym for life. For example, U.Maturana, F. The concept of autopoetics developed by Varella is based on the principle of “knowing is life - life is knowing”. In short, knowledge is viewed as a constructive element in the structure of social reality.

In this paradigm, the events of a social event are considered as constructive. For example, in terms of the paradigm of constructivism, globalization as a global project is a political, economic, social, cultural construct.

Primitive society was based on two institutions - the army and religion. The first - scary, the second - comforting. While in an industrial society - industrial society - enrichment through the

multiplication of products and services was the main goal, in a post-industrial society, ie in an informed society - the main wealth is information, which in essence can be recognized as an imaginary construct that turns humanity into a controlled gang. An informed society is a global project.

In the past, it was enough to say, "God has commanded you to fight the enemy." Now this method has no effect. Current in the information age, people need to be shown scenes of blood, suffering, violence. While those images are false and fabricated, the audience still believes, and is moved. This is manipulation. That is, people are becoming a controlled world. Structures, projects, programs are falling into a whirlpool. The reason is that in the information society, where the transformation of values is taking place, for example, the desire for wealth and management, spiritual and aesthetic categories prevail over such qualities as help, humility, honesty, integrity, beauty. In this context, the question arises as to how this imaginary construction-program uses art, which is a form of social consciousness.

The term constructivism is used in various fields of science, culture and art, it can be considered homonymous, behind which there is a completely different use of words. Nevertheless, it can be assumed that there is something in common at the level of metaphorical connections and correspondence in the use of the term in philosophy, psychology, sociology, mathematics, architecture, poetry, and painting.

It is the general construction of the creator of ideal (as in mathematics or philosophy) or material (as in architecture) constructions, which arise from the functionally necessary tasks in the activity. For example, according to Le Corbuze, houses - machines for housing in architecture, or constructive (cognitive standard) - are a functional element of creating a model of the world, itself, other people's personal constructions in the psychological theory.

The goal of social constructivism is to identify ways in which individuals and groups of people can participate in the creation of the social event they perceive. Constructive analysis of social reality Social constructionism studies the processes of formation of social phenomena by people. Traditions are one of the products of the institutionalization of social events. Structured social reality is a constant, dynamic process; they reproduce the truth in the process of people interpreting it for themselves and forming knowledge about it.

Berger and Lukman confirm the idea that the most basic ideas about social reality, including all knowledge, including reason, arise and are preserved as a result of social interactions.

In social communication, people derive ‘common sense’ based on the similarity of perception of truth. Their activities are based on this belief, and their general ideas and understanding of the realities of daily life are repeated and strengthened. Since everyday knowledge is the product of human agreement - a social convention, any human typology and system of values, social formations are perceived by people as an objective reality. One of the tasks of this social constructivism is to study the processes of formation, institutionalization, understanding and integration of human social phenomena into traditions and social values. Since social constructions, as interpretations of events and objects of knowledge, are not predetermined from ‘nature’, they must always be preserved and affirmed in order to exist. According to social constructivism, social constructivism is an idea that is natural and accepted as obvious to those who do it.

From a theoretical point of view, the social constructor and the idea underlying it remain an invention or artificially created cultural artifact that belongs to a particular culture or community. Man is chosen in relation to social constructions, accepting some and rejecting others. The existence of social constructions is not determined by transcendental essence or nature.

Social constructivism, based on constructivist epistemology, focuses on building knowledge, language, and so on. Despite their diversity, both social construction and social constructionism are complementary aspects of that process. Society creates its own cultural world.

In short, the paradigm of social constructivism is a more adequate methodological strategy than the classical paradigm in the study of current complex social reality. It should be noted that this paradigm reflects the characteristics of man, such as activity, creativity, ingenuity, creativity.

However, as long as these features are not based on high humanism, values, it creates constructions in a negative sense. For this reason, any social construct requires passing through the prism of humanism.

Today, in building a new Uzbekistan, that is, in social construction, the following criteria must be taken into account: innovations in all spheres of society, including social, economic, political, legal, spiritual systems, in particular, a new worldview, new emotions, new approaches, new thinking, new requires thinking. Human capital, science, education and innovation, values play an important role in building such a new quality.

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Rezyume: *Hozirgi zamonda ijtimoiy reallikni tushunishning xilma-xil nazariyalari va paradigmalari ijtimoiy reallikni tadqiq etishning metodlari arsenalida adekvat metodologiyani izlash bilan chambarchas bog'liq. Chunki, hozirgi ijtimoiy reallikda murakkablikning, rang-baranglikning, ko'p qirralikning, nochiziqlikning namoyon bo'lishi, uni tadqiq etishda ananaviy paradigmalarning metodologik strategiyasi bir tomonlama ekanligini ko'rsatdi, va yangicha metodologik strategiyani ishlab chiqish zaruriyati kelib chiqdi. Mazkur maqolada ijtimoiy reallikni tadqiq etishning metodologik strategiyasi sifatida ijtimoiy konstruktivizm paradigmasining mazmun-mohiyati o'rganilgan.*

Резюме: *Различные теории и парадигмы понимания социальной реальности сегодня тесно связаны с поиском адекватной методологии в арсенале методов изучения социальной реальности. Поскольку проявление сложности, разнообразия, многогранности, нелинейности в современной социальной реальности, методологическая стратегия традиционных парадигм в своем исследовании показала односторонность и необходимость разработки новой методологической стратегии. В статье исследуется сущность парадигмы социального конструктивизма как методологической стратегии исследования социальной реальности.*

Kalit so'zlar: *Ijtimoiy reallik, konstruktivizm, ijtimoiy konstruktivizm, paradigma, konstrukt, subekt – obekt munosabati, yangi jamiyatni qurish.*

Ключевые слова: *Социальная реальность, конструктивизм, социальный конструктивизм, парадигма, конструкт, субъект-объектные отношения, построение нового общества.*

PRACTICAL-ORIENTED METHOD AS AN INTEGRAL PART OF TEACHING

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Summary: *Engineering education must be regarded as a strategic foundational element, alongside technical research, in building innovation capacity. Engineering is the social practice of conceiving, designing, implementing, producing and sustaining complex technological products, processes or systems. But many of the societal and engineering challenges are so complex and multidimensional that they cannot be unlocked with the old-fashioned key of sciences and technology alone. This high level of complexity is often caused by the emergent behaviour of system development, which changes with time and cannot be predicted from its constitutive parts.This article examines the issues of how to achieve results by teaching engineering students in accordance with the requirements of the new era and the application of a practice-oriented method in the teaching process.*

Keywords: *students, engineering education, CDIO Initiative, new technologies, the learning process, curriculum.*

Engineering education has to be engaging, compelling and motivating, and create a learning community that stimulates all students to discover their talents. The aim is to create a climate in which students are encouraged to develop ideas, both big and small, and bring to the market creative solutions to real world problems. Such a climate can be achieved by focusing on the student as the key player in the learning process (student-centred learning) and by an emphasis on experiential learning: a hands-on approach in teaching and learning of specific knowledge or skills when students feel the need for it. This is a basic premise of the CDIO Initiative , which states that hands-on experience is a vital foundation for engineering students on which to base theory and science. Exploring how one believes a system works, creates a knowledge-building relevance to the lecture or video that is then presented. Exploration, inquiry and problem solving are therefore not just “nice to have” in the classroom but an essential part of a future-proof curriculum.

Curriculum have to focus on coherence, leading to a degree and a connection between courses and (sub)disciplines. They have to connect the subject matter to the context of the students’ lives and the engineering profession, like the pressing issues of environmental awareness, social responsibility and entrepreneurial thinking (“People, Planet, Purpose”), away from the disciplinary monocultures. These issues connect with many young hearts and minds of the Millennial Generation in Western Europe. Students of this generation with birth years ranging from the early 1980s to the early 2000s, have a different set of values[1].

They demand purpose in their lives, want to know who they want to be, not what they can do. Their motivation is self-driven, and they thrive on the ideas of being connected and of co-creation. They do not respect or trust authority or institutions. They want to be involved, make a positive difference, maximise their lives and have fun: “party-cipation”). These students no longer want to be taught, but instead want to be allowed to learn their own way, knowing that somebody at the university cares about their development. Millennial Generation students have a growth mind-set and want to develop their strengths, for which feedback on progress is much more important than feedback on achievement. These characteristics are proven by the great interest, passionate exploration and commitment of the multidisciplinary D:DREAM (“Delft: Dream Realization of Extremely Advanced Machines”; http:// ddream.tudelft.nl/en/ student projects, as well as excellence programmes that offer exactly these opportunities, unfortunately for a limited few.

All engineering students have at least a touch of a maker instinct to build, test and operate things. Experiential opportunities in labs and project and makerspaces foster strengths beyond technical experiences, like leadership, ethical behaviour, deep collaboration, interdisciplinarity, and creativity. Such integrative aspects in a curriculum address real-life concerns, present opportunities

for hands-on experimentation, prototyping, design thinking and problem solving. Hands-on discovery has been and will remain an important part of knowledge development. It sparks the desire to learn, promotes independent learning, and offers a more effective involvement with the engineering environment and society. It is absolutely essential that universities unite and address the engineering practice, and that they do not divide their teaching and research.

Students have to experience the real world of engineering and get a taste of genuine research by learning-by-doing and by being lectured and coached by professors, experts, researchers and engineering practitioners from the industry. Research, experimentation in labs, hands-on design projects on authentic problems, building and testing projects in project, production and makerspaces, and internships in industry and institutes enhance student engagement and teach students how to develop and monitor their own development and learning[2]. It also allows for a better application of learning outcomes in real life and the building of tacit ingenuity in the practice of engineering. Through trouble-shooting and the production of a design, students are brought face to face with the social purposes and consequences of engineering - the technologies it creates, the practice of manufacturing, the management of people, and the personal skills involved.

At a time when the classroom environment is evolving from a room-with-a-blackboard to a laptop-with-a-network connection to the cloud and an online forum, the challenge is to find ways of bringing design-oriented, project-based learning and hands-on experiences to online learning, blended with in-person, hands-on activities in real labs. The rise of new technologies of virtual and augmented reality (overlaying digital information on the real world) will make it easier to simulate in-person experiences remotely and to such a high level of detail that the human brain can no longer distinguish them from reality[3]. This technology, along with an all-pervasive content and multiple instant channels of communication, possibly supported by tactile sensing, will deliver an experience of rich interaction in a lab or a classroom, regardless of location and time.

Remote labs provide an interface through internet to remote equipment in real experimental facilities, using live video streaming of experiments with real hardware under real test conditions. Neither the virtual nor the remote labs can ever be a substitute for an in-person experience and should therefore not be simply cut-and-pasted into a curriculum. They may, however, support the achievement of certain learning outcomes. Part of the hands-on learning experience may be transformed into hands-off learning by serious game simulations of lab environments. We can make them an invaluable tool for supplementing existing laboratory work for large numbers of students. In the near future, remote labs will shift from using a specific piece of equipment to accessing a network of shared facilities between universities. As discussed above, we should avoid situations where students who use hardware simulations lose sight of the real hardware being simulated, and instead get caught up in a “computer game” attitude towards the software. Above all, it should not be forgotten that engineering students bring ideas to life and share their passion for making and testing things by means of real fabrication and experimentation in lab spaces. Hands-on learning in physical labs remains appealing for the sensing, visual, active and sequential learning styles. This generation of students does not only attend university for their engineering degree, but to develop personally as well. It is in classrooms and physical labs, where they learn by practicing and working together.

Much that they learn is not strictly academic. What sets a young engineer apart from his fellows is often not degree-related. Empirical research by the Center for Creative Leadership in North Carolina shows that experiential and social learning contributes to more than 80% of the learning gain, against 20% for formal learning. Students gain the most from one another if their classmates have different interests, experiences, talents and beliefs. This sharing makes physical labs and makerspaces an important place of community, even more so when they provide opportunities to mingle with engineering practitioners from industry and young entrepreneurs. Spaces for hands-on discovery and exploration will therefore remain essential for learning how to engineer and to accept failure, and more importantly, they are places for innovation and experimental play.

To capture student interest and respect, these ethical responsibilities should be more interwoven with subjects that are already taught instead of being condemned to the margins of the curriculum. To develop a good sense of ethical accountability and social responsibility, students need to come in closer contact with engineering professionals with whom they can identify and who they can try to emulate. Long-term strengthened relations between university teachers and the labour market that graduates are expected to enter are therefore essential.

Will we enter paperless classrooms in 2030? A major challenge for academic staff is the rapidly developing digital world. With the proliferation of the use of mobile devices, the growth of social-media connectivity has exploded, and the penetration rate of mobile devices among students has reached a record high. Young people are addicted to social media and students are lightyears ahead of academic staff. They cannot remember a world without these tools. Social media like YouTube, Instagram, LinkedIn, Facebook, and Twitter are increasingly used to bridge the gap between the lecturer and the student, and between the student and the rest of the class (social learning). There are some attractive benefits to interactivity, hyperlinking, searchability and multimedia, but they also promote cursory reading, hurried and distracted thinking, and superficial learning. Frequent interruptions scatter deep thinking and weaken memory[4]. Digital textbooks are increasingly used to share notes or passages in social-media applications. Integrating technology and pedagogy in new teaching and learning facilities allows staff to teach differently, perhaps by abandoning the linear and hierarchical world of the book and by using richer media, but it has to be taken into account that a frequent deciphering of hypertexts or studying multimedia fragments distracts students from reading and deep learning. Online tools and apps have the ability to More than just cool technologies Engineering Education in a Rapidly Changing World, 2nd Rev. Ed., TU Delft, June 2016 53 bring the world into the classroom and they enable the sharing of expertise with others on campus or thousands of kilometres away. These emerging tools make it easier for students to ask and respond to each other's questions and for teachers to provide real-time feedback. State-of-the-art real-time response systems will allow faculty staff to better monitor student learning and to provide immediate advice during live classes (personalised learning)[5]. Although much of the senior staff in today's education is not a digital native but more likely a digital immigrant, they can no longer afford to ignore these tools. With the revolutions taking place in the technological landscape, digital media literacy will only become an increasingly important key skill for our lecturers and professors.

Academic staff may be apprehensive of having to become fluent in these new technologies because many of them are no longer in their formative years. Since the young generation is much more digitally literate and social media savvy, reverse mentoring , whereby students coach their teachers, might be a solution[6]. A major effort is needed in the near future to ensure that staff can support students in developing and using digital literacy skills across the curriculum. The rise of data-driven learning and assessment (learning analytics), whereby data on personalised learning experiences and study results can be mined for new pedagogical insights, also poses new demands on staff abilities regarding learning analytics.

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Rezyume: *Muhandislik ta'limining innovasion salohiyatni oshirishda texnik tadqiqotlar bilan bir qatorda strategik asos sifatida qaralishi kerak. Muhandislik - bu murakkab texnologik mahsulotlar, jarayonlar yoki tizimlarni ixtiro qilish, loyihalash, amalga oshirish, ishlab chiqarish va saqlashning ijtimoiy amaliyotidir. Ammo koʻpgina ijtimoiy va muhandislik muammolari shunchalik murakkab va koʻp qirrali boʻlib, ularni fan va texnikaning eski usullari yordamida hal qilib boʻlmaydi. Ushbu yuqori darajadagi murakkablik koʻpincha vaqt oʻtishi bilan oʻzgarib turadigan va uning tarkibiy qismlaridan oldindan aytib boʻlmaydigan favqulodda tizim dizayni xatti-harakatlari tufayli yuzaga keladi. Ushbu maqolada muhandis-talabalarni yangi zamon talablariga mos ravishda oʻqitish va amaliyotga yoʻnaltirilgan usulni dars jarayonlarida qoʻllash orqali qanday natijalarga erishish masalalari oʻrganilgan.*

Резюме: *инженерное образование следует рассматривать как стратегический фундамент, наряду с техническими исследованиями, в создании инновационного потенциала. Инжиниринг - это социальная практика придумывания, проектирования, внедрения, производства и поддержки сложных технологических продуктов, процессов или систем. Но многие социальные и инженерные проблемы настолько сложны и многогранны, что их невозможно решить с помощью старых методов науки и технологий. Этот высокий уровень сложности часто вызван эмерджентным поведением разработки системы, которое изменяется со временем и не может быть предсказано на основе его составных частей. В статье рассматриваются вопросы достижения результатов путем обучения студентов инженерных специальностей в соответствии с требованиями нового времени и применения практико-ориентированного метода в учебном процессе.*

Kalit soʻzlar: *talabalar, muhandislik ta'limi, CDIO tashabbusi, yangi texnologiyalar, oʻquv jarayoni, oʻquv dasturi.*

Ключевые слова: *студенты, инженерное образование, инициатива CDIO, новые технологии, учебный процесс, учебная программа.*

"SOCIAL AND ECONOMIC INTERNATIONAL RELATIONS OF THE REPUBLIC OF KARAKALPAKSTAN IN THE YEARS OF INDEPENCE"

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Summary. *The article examines that as a result of reforms, carried out in the Republic of Karakalpakstan, clusters of agriculture, fishing, poultry, livestock, and viticulture have been created. It was noted that the production of building materials is well developed. In particular, it is noted that the Republic of Karakalpakstan has become more economically developed as a result of an increase in foreign direct investment and the implementation of promising projects. This, in turn, created scientific opportunities for the Republic of Karakalpakstan to open up new privileges for broad economic cooperation with foreign countries, the inflow of direct investments and access to world markets.*

Keywords: *foreign economic policy, import, export, foreign cooperation, political process, trading house, company, project, contract, reform, investment.*

On December 14, 1990, at the IV session of Joqargi Kenges of the Republic of Karakalpakstan, a declaration was adopted "On the state sovereignty of the Republic of Karakalpakstan"[1.11]. The Regulation on the Foundations of Independence of the Republic of Uzbekistan, adopted on 31 August 1991, recognized the sovereignty of the Republic of Karakalpakstan[2.103].

In accordance with the Constitution of the Republic of Karakalpakstan, adopted on 9 April 1993, economic scientific, social and international economic relations of the Republic of Karakalpakstan are carried out in accordance with the legislation of the Republic of Uzbekistan and Karakalpakstan[3.11].

Pursuant to Decision №125 [4.151] of 7 July 1992 of the Jokargy Kenges of the Republic of Karakalpakstan and Decision №221-/9 of 14 September 1992 of the Council of Ministers of the Republic of Karakalpakstan, the establishment of a special State organization implementing a foreign economic policy, the Ministry of Foreign Economic Relations of the Republic of Karakalpakstan was approved on 2 February 1995. The adoption of this program contributed to the further development of the production of import-substituting products in the region.

It is analyzed that during the years of independence, the Republic of Karakalpakstan became an important factor for reaching a new level of choral cooperation as a result of activities as a separate subject of choral cooperation in political processes and the conclusion of mutually beneficial agreements between different states.

Cabinet of Ministers Decision No. 453 of 7 December 1995 on measures to increase the cultivation of rubella in Uzbekistan [5] Increase the cultivation of roots and agrosanoat "Karakalpaklakritsa" (Karakalpaklakritsa) The Joint Stock Company From Uzbekistan to South Korea, China, Russia, Singapore, Indonesia and other countries exported 1000 tons in 1997, 1704 tons in 2000, and 864.6 million US dollars in 2004.

In accordance with Cabinet of Ministers Decision 220 of 18 June 1996 "On measures to organize the activities of investment funds"[7], primary private investment funds have appeared in the Khojelin, Beruni and Chimboy districts of the Republic of Karakalpakstan [8.76].

An agreement on long-term cooperation on participation in the additional opening of the Shahpakhti field in the period 2004-2012 was signed between the National Holding Company “Uzbneftegaz” and the open joint-stock company Gazprom (Russia). Lukoil JSC has implemented projects for the search and production of hydrocarbons in the Kungirot and Aral halls[9,89]. Along with the exhibition entitled "Russia and Uzbekistan: Strategic Cooperation" it is planned to hold a forum, open trading houses in Nizhny Novgorod and Yekaterinburg in Nukus, signed agreements

with the administration of the Republic of Karakalpakstan and the Penza region, Nizhnegorsk and Broker-Ural[10].

In accordance with the Decisions of the Cabinet of Ministers of the Republic of Uzbekistan of March 2 1995 No 79 “On the construction of the Kungirot soda plant" and of May 14 2002 No 158 "On the completion of the construction of the Kungirot soda plant" in 2005 at the Kungirot soda plant 2006 year, experimental work began and put into operation. In 2010 alone, the export capabilities of the plant increased by 5 times. 30 thousand tons of products were exported to the member countries of the Commonwealth of Interethnic States. In 2010, he received the international Golden Jaguar Award for exemplary service and quality in business [14].

More than 40 enterprises with foreign investments are registered in the Republic of Karakalpakstan. Vietnamese silk spinner «ASIA-SILK», confectionery manufacturer Uzbekistan-China “MANGIT INVEST PLUS”, UK manufacturer “ASTERA TEXTILE”, agricultural producer and processor “Agrosnab” Karakalpakstan-Ukraine OBELIX INTERNATIONAL Karakalpakstan-Switzerland, LANFIBER Uzbek-Chinese joint venture for the production of sintepon, Karakalpak-Russian joint ventures KARAKALPAKENERGOXIM for the construction materials industry and installation are among them. [15.121].

The Asian Development Bank (ADB) has funded the further development of the 1,204-kilometer Guzar-Bukhara-Nukus-Beyneo highway, which connects Uzbekistan with Kazakhstan, Afghanistan and Turkmenistan.

South Korea's Kogaz is one of the most active participants in the Ustyurt gas-chemical complex project[16]. The project won an international award for “Best Contract of 2012” from Trade Finance Magazine and Global Trade Review. On March 13, 2014, the international publication Infrastructure Journal received the 2014 Global Oil and Gas Agreement for the complex construction project. [17.573] Under this project, 4.5 billion cubic meters of natural gas are processed annually, producing 400,000 tons of polyethylene and 100,000 tons of polypropylene. The Asian Development Bank (ADB) has funded the further development of the 1,204-kilometer Guzar-Bukhara-Nukus-Beyneo highway, which connects Uzbekistan with Kazakhstan, Afghanistan and Turkmenistan.

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As a result of the implemented reforms, agricultural, fishing, poultry, livestock and viticulture clusters have been established in the Republic of Karakalpakstan. The construction materials industry is developing. In particular, the increase in attracting foreign direct investment, the implementation of promising projects has given impetus to the further economic development of the Republic of Karakalpakstan. This, in turn, creates ample opportunities for the Republic of Karakalpakstan to open new benefits for broad economic cooperation with foreign countries, the inflow of direct investment and access to world markets.

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Rezyume: *Ushbu maqolada amalga oshirilgan islohotlar natijasida Qoraqalpog‘iston Respublikasida qishloq xo‘jaligi, baliqchilik, parrandachilik, chorvachilik, uzumchilik klasterlari tashkil qilinganligi bayon etilgan. Qurilish materiallarini ishlab chiqarish tarmoqlari rivojlanganligi ta’kidlab o‘tilgan. Ayniqsa, xorijdan to‘g‘ridan-to‘g‘ri investitsiyalar jalb qilishning ko‘payishi, istiqbolli loyihalar amalga oshirilishi natijasida Qoraqalpog‘iston Respublikasi iqtisodiy jihatdan yanada rivojlanganligi yoritilgan. Bu esa o‘z navbatida Qoraqalpog‘iston Respublikasining xorij davlatlari bilan keng iqtisodiy hamkorlik uchun yangi imtiyozlar ochilishi, to‘g‘ridan-to‘g‘ri investitsiyalarni kirib kelishi va dunyo bozoriga chiqishi uchun keng imkoniyatlar yaratilganligi ilimiy yoritilgan.*

Резюме. *В статье исследуется, что в результате реформ, проведенных в Республике Каракалпакстан, созданы кластеры сельского хозяйства, рыболовства, птицеводства, животноводства, виноградарства. Было отмечено, что развито производство строительных материалов. В частности, отмечается, что Республика Каракалпакстан стала более экономически развитой в результате увеличения прямых иностранных инвестиций и реализации перспективных проектов. Это, в свою очередь, создало научные возможности для Республики Каракалпакстан открыть новые привилегии для широкого экономического сотрудничества с зарубежными странами, притока прямых инвестиций и доступа к мировым рынкам.*

Kalit so‘zlar: *tashqi iqtisodiy siyosat, import, eksport, horijiy hamkorlik, siyosiy jarayon, savdo uyi, kompaniya, loyiha, shartnoma, islohat, investitsiya.*

Ключевые слова: *внешнеэкономическая политика, импорт, экспорт, внешнее сотрудничество, политический процесс, торговый дом, компания, проект, контракт, реформа, инвестиции.*

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DIVERSIFICATION AS A BASIC STRATEGY FOR INDUSTRIAL DEVELOPMENT IN A GLOBALIZED ECONOMY

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Summary: *The article reveals the essence of the concept diversification, history of its appearance and formation. The types of diversification strategies and their role in the economy, as well as the concept of diversification.*

Keywords: *Diversification, economy, Uzbekistan, strategy, state, competition, export, agriculture, industry.*

Diversification is a very multifaceted concept, and economic literature contains many interpretations of it proposed by authors in various spheres of economic life. The difficulty of examining the essence of diversification lies in the lack of a common approach to the definition of the concept and often its superficial characteristics, which tend to relate to only one area or reflect one of the parties to a given area process.

The word «diversification» goes back to Latin *diversus* - different and *facere* - do. In a very general sense, the concept can be characterized as a variety of activities of an economic entity

The process of economic diversification around the world began to develop in the mid-1950s. Initially, diversification took place in the United States, Japan, and Western Europe in the fields of industry, transportation, construction, and finance. Therefore, the nature of diversification is determined by the socio-economic factors of these countries, as well as the general factors that belong to other countries (scientific and technological revolution, the struggle for high profits, competition, not to lag behind in technical progress, etc.). In diversification, firms, especially monopolies, become more diversified. They start out in high-income, fast-growing industries. In addition to producing products, companies also begin to produce the raw materials needed for these products. They spend money on low-income sectors that save a lot of money.

Without increasing the competitiveness of economy of Uzbekistan, it is impossible to carry out such a strategic task as bringing the economy of Uzbekistan to the level of developed democracies in the medium term. Comprehensive measures are being taken to ensure the competitiveness of the country's economy.

The Development Strategy Program for the five priority areas of development of the Republic of Uzbekistan for 2017-2021, selected by the head of state, includes an active investment policy aimed at modernization, technical and technological renewal of production, implementation of production projects and high-tech It is planned to accelerate the development of processing industries, primarily the production of high value-added finished products based on deep processing of local raw materials.

The experience of Uzbekistan during the years of independence shows that in any country, the industrial sector, which is the basis of the economy, must develop on the basis of active integration. The positive changes that have taken place in our economy have led to a significant diversification of its structure. Petroleum, chemical, automotive, modern agricultural machinery, building materials industry, railway machinery, consumer electronics, pharmaceuticals, food, textiles, footwear and a number of other completely new industries. the establishment of which laid the groundwork for this. As a result, over the years of independence, industrial production has increased 4.6 times, and in the last 10 years, the average annual growth rate of the industrial sector has exceeded the GDP growth rate. while high, it was 8.9 percent. In the 1990s, agriculture accounted for about 33 percent of the country’s gross domestic product, while industrial output did not exceed 14 percent. Industrial production also included cotton ginning and the production of agricultural machinery.

Today, as a result of reforms, the share of industry in GDP has reached 32.9%, while the share of agriculture in GDP, despite the rapid growth, has reached 17.6%. The share of the broadcasting sector reached 49.5%.

The main task, as noted by the head of state, is to accelerate the development of industry through diversification in the economy and increase its share in GDP to 40% by 2030, reduce energy consumption by about 2 times due to the widespread introduction of modern energy-saving technologies. to achieve.

It should be noted that localization in the production of finished products plays an important role in more sustainable and consistent development of the economy, reducing its dependence on external factors, accelerating the introduction of new efficient technologies in production processes. That is why localization in Uzbekistan is one of the main directions of industrial development. This will ensure the extensive use of local raw materials and production resources, as well as the production of import-substituting, modern and competitive products.

Uzbekistan has a great potential for agriculture. Therefore, in recent years, extensive work has been done to reform agriculture and introduce market mechanisms.

In particular, the Strategy of Agricultural Development of the Republic of Uzbekistan for 2020-2030, the concept of efficient use of land and water resources in agriculture and other organizational and legal measures were adopted. The goal is not only to provide economic benefits, but also to ensure food security and increase the well-being of the people.

It is no exaggeration to say that the Resolution of the President of the Republic of Uzbekistan "On Additional Measures for the Implementation of the" Agricultural Diversification and Modernization "Project with the Participation of the International Fund for Agricultural Development" signed on 15 September this year is an important step in this direction.

At the same time, the establishment of new high-tech production facilities, more active involvement of the regions in the development of competitive and export-oriented modern industrial products, production, engineering communications, road transport, social infrastructure and logistics services In order to expand the attraction of foreign direct investment to ensure rapid development, 14 free economic zones and 96 small industrial zones have been established in the country. It is advisable to increase the above figures, first of all, to use the diversification strategy in order to achieve further development of the economy. In other words, the development of the enterprise requires the use of diversification strategies to expand the scope of activities. Diversification strategy means that the company is expanding its activities. The degree of diversification can vary. The degree of diversification can be in the following forms: limited diversification, linked diversification, unbound diversification.

-bounded diversification- usually occurs when an enterprise leads one business, but other businesses that do not have a large volume also develop;

-related diversification is the development of several activities that are somehow interconnected (production, technology, sales, etc.).

-Unconnected diversification is the development of several different unrelated activities. For example, in the field of consumer services, in addition to manufacturing activities.

The content of the diversification strategy is based on the following objectives:

The essence of a diversification strategy is to distribute the assets and capital of a company between different areas of activity to reduce the risk of losing future income. The main advantages of an unrelated diversification strategy are that the company can find and develop more profitable businesses in the future, as well as reduce the impact of seasonal declines in core business sales. The disadvantages (or risks) of such a diversification strategy are the need to allocate large resources to develop a new line of business and investment.

An international diversification strategy can take one of two forms, described above: linked or unbound. But we talk about it separately because it means a lot to the company. International diversification is one of the main strategic ways to diversify the company's activities. They will

move on to it once national diversification is complete. This process requires high management skills and a properly built management structure.

Selection and analysis of new production lines for the enterprise. Management needs to determine which markets are potentially promising and attractive to enter, what opportunities and resources are available in them, and how this will affect the overall profitability of the company.

Exploration of opportunities for useful combination of value chain blocks of different business units. To increase the operational and strategic efficiency of management, SEBs should look for opportunities to use and redistribute resources. For example, using one company's strong market brand to promote another. Implement measures to increase the value of the company at the expense of existing divisions. Management should seriously assess the existing environmental conditions and opportunities of existing companies, abandon inefficient areas, strengthen the position of promising products by developing internal resources and purchasing ancillary enterprises. Key Methods of Diversification Buying an existing SEB is the most expensive and fastest way to get a business ready and working without additional effort to overcome industry barriers. Creating an SEB based on internal capabilities Identify internal resources to create a business unit from scratch. It is usually applied when the company has sufficient funds and powers to overcome market barriers in the area selected for the activity. This is also common for companies that have valuable resources for their chosen field.

The creation of joint ventures is applied in complex and high-tech industries that require significantly more resources than the enterprise has: They are in poorly studied industries with high levels of risk and uncertainty; diversification applies to operations in another country.

Types of diversification strategies are: Elements of the associated diversification value chain involve entering a new market by forming a business unit that is similar to the elements present in the corporate portfolio.

Unrelated diversification involves entering a new market by acquiring a business unit that is incompatible with the corporation's current trends in the value chain, but has the potential to increase the profitability of the entire company.

Thus, the diversification strategy is related to new products designed for new markets. Of course, this strategy is difficult and risky because it takes the enterprise into new areas. Their success requires the involvement of large human and financial resources.

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Rezyume: *Ushbu maqolada diversifikatsiya strategiyasini turlari va uni iqtisodiyotda tutgan o'rni hamda diversifikatsiya tushunchasi haqida so'z yuritilgan.*

Резюме: *В статье рассматриваются типы стратегий диверсификации и их роль в экономике, а также концепция диверсификации.*

Kalit so'zlar: *Diversifikatsiya, iqtisodiyot, O'zbekiston, strategiya, davlat, raqobat, eksport, qishloq xo'jaligi, sanoat.*

Ключевые слова: *Диверсификация, экономика, Узбекистан, стратегия, государство, конкуренция, экспорт, сельское хозяйство, промышленность.*

SMART-TOURISM IN UZBEKISTAN

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Summary: *"Smart tourism" is simply the ability to receive all the travel services you need via the Internet in any languages, anywhere in the world, and the task of travel organizations is to make these services easily accessible on the Internet and convenient to use. In addition, it creates demand, regulates consumption and offers top-level ancillary knowledge-based services, developing a competitive modern service industry.*

Keywords: *tourism, information technology, "smart tourism", "smart museum".*

Smart tourism is determined depending on the technological capabilities of a particular destination, attraction or the tourist himself. Many destinations are currently being redesigned to incorporate greater use of smart technology in their operations, from payment methods to interactive activities.

In fact, in order for something to be “smart,” it must have complex technological capabilities that allow a range of information to be used, which is then used to inform the development and operation of the product. While the average tourist may not be aware of what is going on behind the scenes, there is likely to be a lot of work to be done to ensure maximum performance and competitiveness.

Although the concept of "smart" is not directly related to technology, in the modern world they are inevitably interconnected. To be smart, destinations, attractions and other members of the tourism industry will use a variety of technological innovations and techniques. Thus, the use of technology is at the heart of the concept of smart tourism.

The rise of information and communication technologies (ICT), resulting from the digital and computer revolution, has transformed entire market systems, propelling them towards greater diversity and activity. The role of ICT is extremely important given the ubiquity of smartphones and the convergence of related technologies in all areas. ICTs are becoming more prevalent because of their accessibility “anytime, anywhere”. Currently, ICTs have reached their zenith with the arrival of the fourth industrial revolution and the spread of the Internet of technologies (IT). ICTs, including IT-enabled devices and sensors, are changing our daily lives as they also play an important role in urban development such as resource use, economics and sustainable development.

However, in practice, “smart” has become a very vague concept, which is often used to implement certain political programs and sell technological solutions. This is especially true in the case of smart tourism, where it is often used in the context of open data initiatives or for fairly trivial projects such as promoting free Wi-Fi or developing mobile applications. While these technologies and new approaches to collecting, managing and sharing data are important stepping stones towards smart tourism, they do not provide a complete picture of what smart tourism entails.

Smart tourism encompasses three levels of these three components: the intelligent information layer, which aims at collecting data; a level of intellectual exchange that supports interconnection; and an intelligent processing layer responsible for analysis, visualization, integration and data mining.

Based on these considerations, smart tourism is defined as tourism supported by integrated efforts at the destination to collect and aggregate / use data from physical infrastructure, social connections, government / organizational sources and human bodies / minds, combined with the use of advanced technologies. to transform this data into field experiences and business propositions with a clear focus on performance, sustainability and enrichment of experience. Its main differences from e-tourism, after the above descriptions and definitions, are described in more detail in Table 1.

Table 1.

The difference between electronic and SMART tourism

	E-tourism	**Smart-tourism**
Sphere	digital	connection of digital and physical
Main technology	Web-site	sensors and smartphones
Travel phase	Before and after trip	During the trip
Blood	information	Huge data
Paradigm	interactivity	technological co-creation
Composition	value chain / intermediaries	Eco-system
Exchange	B2B, B2C, C2C	public-private-consumer cooperation

ICTs are undoubtedly the key to conceptualizing and developing smart tourism. Although the concept of "smart tourism" has only recently become popular among scientists and practitioners, ICTs that can intelligently support tourism have been discussed, developed and envisioned for quite some time. Intelligent ICTs are expected to be able to understand, benefit from experience, acquire and retain knowledge, and respond quickly and successfully to new situations. In the smart tourism landscape, this type of technology is a key component of information systems that promise to provide travel consumers and service providers with more up-to-date information, better decision support, greater mobility and, ultimately, a better travel experience. These intelligent systems include a wide range of technologies for direct tourism support, such as decision support systems and advanced recommendation systems, context-sensitive systems, autonomous agents seeking and mining web sources, surrounding intelligence, and systems that create augmented reality.

Considering that this is one of the areas most affected by the pandemic in the world, 260,000 jobs, 1,400 tourism organizations and 1,360 accommodation facilities have been created in Uzbekistan. 6.5 billion soums have been allocated to support the tourism business in the first nine months of this year.

In addition, 105 new hotels, 1,001 family guest houses, 90 tourist enterprises have opened, the deputy minister added.

According to the department, over 9 months, 1.2 million foreign tourists visited Uzbekistan, and the export of tourism services amounted to $ 273 million. This year there were more tourists from some countries of Western Europe, America and the CIS than expected. However, in general, due to restrictions in Japan, China, India and Southeast Asia, the flow of tourists was low.

Domestic tourism plays an important role in the development of the sector. Thus, the state provides tour operators and travel agents with subsidies of 15% for air and train tickets and 10% for housing for organizing tours throughout Uzbekistan for local tourists. For this, almost 5 billion soums have been allocated from the state budget.

In 2021, almost 3,000 jobs were created in the tourism sector thanks to the launch of 38 projects totaling almost 2 trillion soums.

Tourism education is actively developing. Today, about 6 thousand students study in the direction of tourism in 25 universities, and about 3.5 thousand - in 24 colleges. The educational institutions have opened the specialties "Travel Journalism", "Creative Industry", "Smart Tourism", "Management of Cultural Heritage", "Museum Business".

Focusing on the traveler as a user of intelligent systems, these systems aim to support travelers by:

1) predicting user needs based on various factors, and making recommendations for the choice of context-dependent consumption actions, such as interest points, food and rest;

2) improving the quality of service to travelers on the ground by offering extensive information, location-oriented and personalized interactive services;

3) empowering travelers to share their travel experiences so that they can help other travelers in decision-making, revitalize and reinforce their travel experiences, and shape their self-image and social media status.

In smart tourism, technology is viewed as infrastructure rather than separate information systems, and includes a variety of intelligent computing technologies that combine hardware, software, and network technologies to provide real-time awareness of the real world and advanced analytics to help people accept. making smarter decisions about alternatives, and about actions that optimize business processes and business performance. Today, the widespread use of mobile devices, especially smartphones and their many applications, heralds an era of unprecedented connectivity and ubiquitous Internet access. Thus, many technological developments supporting mobile access, such as cloud computing and Internet end-user service systems, are helping to achieve the goals of smart tourism [1].

Due to the development and improvement of ICT in the tourism sector, the quality of services is improved and awareness of the country's tourism potential is raised.

In order to implement the decree of the President of the Republic of Uzbekistan "On measures for the accelerated development of e-commerce" No. 3724 dated May 14, 2018 in the HoReCa service segment, the State Committee of the Republic of Uzbekistan for Tourism Development, together with the Ministry for the Development of Information Technologies and Communications, developed the international information system Silkroad.uz. It allows guests to quickly make a reservation, speeds up the check-in process, makes payment for services fast and comfortable for both guests and hotel staff. Goskomturizm contributes to the development of entrepreneurial activity by launching a unified reservation system in a pilot mode.

The main advantage of this system is the reliable display of the number of rooms in hotels and information about booking a room in real time. The system allows you to automatically record the payment of state fees, simplifies the submission of reports, and reduces the level of errors due to the human factor. Soon it is planned to connect the system to such aggregators as Booking.com, Expedia.com, etc. An innovative mobile application NAZZAR is being developed together with SmartChain. NAZZAR is an application using AR (Augmentedreality) technology, which allows you to integrate augmented reality elements on any material media. When you hover your smartphone at the NAZZAR icon, an image of a real object appears on the smartphone screen, complemented by various effects. The brand name is placed on any material medium: booklet, magazine, menu, packaging, signboard, advertising banner. Examples include:

• video static image on the carrier, which "comes to life", turning into a video fragment;

• audio accompaniment, which is played using the speaker of the user's smartphone;

• 3D objects. Photos and pictures on the screen become three-dimensional, which allows you to view them from different sides and angles;

• virtual buttons. The advertising offer is complemented by the "buy" and "learn more" buttons that appear on the smartphone screen during viewing [2].

The first Smart Museum in Central Asia was opened in the Amir Temur mausoleum in Samarkand. At the moment, the audio guide is available for ten exhibits in five languages - Russian, Uzbek, English, French and Korean.

For visitors, the opportunity is realized when using a smartphone (headphones are given to each visitor) to use an audio guide to the main exhibits. By aiming the smartphone camera at the exhibit marked with the icon, the visitor is presented with a story about the art object. Moving between the objects of the exposition in the specified order, the visitor receives a full-fledged excursion in a rhythm convenient for him. At the same time, he will be able to repeatedly listen to

the information provided. Also, video fragments from historical chronicles were created to convey the historical atmosphere to the visitor.

Opportunities are not limited to excursion content. For example, on the territory of the mausoleum, an interactive exhibition Uzbekistan was created, consisting of four smart-paintings and eight 3D stands. The visitor receives interactive information about the historical regions of our country. Augmented reality technology on the NazzAR platform is a system of interactive user interaction with objects of the surrounding world through a smartphone. The user receives additional interactive content in the form of audio, video, 3D scenes and objects. To get started, the user needs to install the NazzAR application on his smartphone, which is available for Android and iOS devices. At the same time, for the convenience of visitors, an interactive map of the complex has been created, which, unlike a conventional map, has interactive capabilities. In particular, when you hover your smartphone at certain parts of the map, a 3D model of the attraction appears on the smartphone screen. In this way, the map is integrated into the overall solution and becomes part of an amazing journey through the museum. Following the prepared routes on the map, the visitor approaches the perception of the museum exhibits more holistically.

With the aim of developing tourism in the republic, UzbekistanPass has created an online trading platform UzPass, where companies and firms will be able to offer their travel services to travelers [2].

UzbekistanPass is the first and so far the only national product that provides a wide range of tourism services in Uzbekistan. This application can become a platform for the development of smart tourism in the country. UzbekistanPass is integrated with existing services and applications, which makes the service convenient and efficient for travelers anywhere in the country.

The UzPass application provides a number of services for tourists: booking rooms in hotels, purchasing tour packages, transfer, car rental, choosing a guide and much more. Each company has its own terms and conditions.

The online platform allows for a convenient sale of services and becomes a comfortable search engine for a tourist. Partners need to register on the site, and the traveler will only need to download the application and start using it.

One of the important elements in an innovative product is an electronic discount card, with which you can save on the above travel services. On the site, the cost of each service is presented in two variations: with a discount and without.

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Rezyume: *"Smart turizm" – bu sizga kerakli barcha turistik xizmatlarni sayyoradagi barcha joyida va kerakli tilda olish, turistik tashkilotlar vazifasi bo'lsa Internetdan osonlikcha foydalanishiga va foydalanish uchun qulay bo'lishiga ishonch hosil qilishi kerak. Bundan tashqari, u talabni keltirib chiqaradi, iste'molni tartibga soladi va zamonaviy bilimlarga asoslangan yuqori darajadagi xizmatlarni taklif etadi, zamonaviy xizmat ko'rsatish sohasini rivojlantiradi.*

Резюме: *«Умный туризм» - это просто умение получать все необходимые вам туристические услуги через интернет на любых языках, в любой точке планеты, а задача туристических организаций сделать так, чтобы эти услуги были легко доступны в интернете и удобны в использовании. Кроме того, он создает спрос, регулирует потребление и предлагает вспомогательные основанные на знаниях услуги высшего уровня, развивая конкурентную современную сферу обслуживания.*

Kalit so'zlar: *Turizm, axborot texnologiyalari, "Smart turizm", "Smart muzey".*

Ключевые слова: *туризм, информационные технологии, «умный туризм», «смарт музей».*

ON PROBLEMS OF DOCUMENTARY FILMS ABOUT ARAL: HISTORY AND MODERNITY
Cinema panoramas: from the Aral Sea to the Aralkum

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Summary. *The article analyzes the documentary film panoramas of the Aral Sea and the Aral Sea region in three main aspects characteristic of this sea: historical, sea and sandy. These films presented to the audience the historical and scientific material little-known to the general public. There is shown a remarkable historical exposition, testifying the merits of the Aral Sea for the country.*

Keywords: *film panorama, historical exposition, sea, sandy, historical and scientific material.*

Let us pay attention to the characteristics of the sea we are studying, given by the impartial American encyclopedic dictionary “Britannica”: “The Aral Sea is a large closed salt water body between Kazakhstan and Uzbekistan. In the past, its area was 66,457 sq. km. and it was the fourth largest inland body of water in the world, but using waters of The Syrdarya and The Amudarya Rivers for irrigation led to a decrease in its surface area by more than 3 times compared to 1960. The volume of water decreased by almost 7 times, which led to a significant increase in water salinity. The coast of the Aral Sea is uninhabited, except for the southern shores”[1.52]. Some scientific sources and films say that the sea was the third body of water in the world, but we tend to believe it was the fourth. Let us also clarify that a large part of the Aral Sea coast is uninhabited due to the fact that it is a rocky Ustyurt plateau approaching the sea or wetlands located in Kazakhstan and Uzbekistan. However, the territories near the sea in the region of Muynak and Aralsk (Kazakhstan) were densely populated for a long time. It was a city with a developed fishing industry, and vast lands existed on the territory of the Muynak and Kungrad regions.

Apparently, it will be correct if we analyze the documentary film panoramas of the Aral Sea and the Aral Sea region in three main aspects characteristic of this sea: historical, sea and sandy. Let us stipulate that in the first version (until the middle of the 20th century) there were no documentaries about the Aral Sea filmed.

The film “A trip to the Aral Sea” (2006, the authors and the studio are not indicated, perhaps this is an author’s, amateur tape) tells about the tsar’s expeditions to the Aral Sea and the study of the sea. The film has the subtitle “Following the trail of L.S.Berg’s expedition”. The story of the history of the exploration of the reservoir is accompanied by a live display of its various types during filming, i.e. already in modern conditions.

According to the tape, in 1848 the sailing schooner “Constantine” was sent to the Aral Sea with the first geographical expedition under the command of naval officer Lieutenant A.Butakov. This message is accompanied by a map of the Aral Sea and a sailing schooner of that time plying the sea. Then the announcer says that as a chronicler and artist A.Butakov took with him the exiled Ukrainian poet T.G.Shevchenko. It was there that T.G.Shevchenko created his famous album “Drawings and Sketches of the Aral Sea Shore”. The story is accompanied by views of water expanses and the cries of seagulls.

The first sea map of the Aral Sea was published in 1850, it was compiled by the Hydrographic Department of the Russian Maritime Ministry. The first steamers that entered the Aral Sea were called “Perovskiy” and “Obruchev”. The very first steamer was launched in 1853. In 1862 the ships “Aral” and “Syrdarya” were activated. Under the Aral Sea, a joint-stock company “Khiva” was created, which began industrial fishing.

1900 year. By the decision of the Russian Geographical Society, it was decided to conduct a more detailed survey of the Aral Sea. By decree of Emperor Nicholas II, that year the sailing

schooner "Oreol" (or "Orion", the speaker's pronunciation was indistinct – T.G.Shevchenko) was sent to sea with a research expedition. Leading it was entrusted to the outstanding Russian scientist in geography and biology, President of the Geographical Society L.S.Berg. The purpose of the expedition was to study the sea area, study flora and fauna, draw up maps and sailing directions.

Turning further to the present, the filmmakers show: "This is how the sea looked 40 years ago. And this is how it looks today. The Chebaz Bay, the northern coast of the Aral Sea ... So, we are going to start, our old dream has come true, we are going to the Aral Sea." The jeep quickly rolls along the steppe and more and more new pictures open up to the camera's gaze. Once a cemetery appeared, very similar to a small exotic town, where the tombstones are built of colored silicate bricks and look very beautiful.

From the car window, for long distances, panoramas of hills, steppes, deserts with small bushes are clearly visible and often change. Sometimes a strong sandy wind blows, in such cases nothing is visible around. Moving from the sands to the takyrs, travelers say that driving along the takyr is a complete pleasure. They also share professional advice for filmmakers: "With such a strong light (the sun in the desert creates bright lighting – T.G.Shevchenko) it is impossible to shoot without protective filters, there is a complete exposure." When the group went out to sea, the waves of the surf hitting the shore became clearly visible and audible. Thus, this film, more than other tapes, presented to its audience the historical and scientific material little-known to the general public for more than a century and a half.

The film "The Aral Sea" (1963, A.Ananiev, G.Novozhilov, K.Ernazarov, V.Vasilchenko, U.Davletgaliev) shot by Kazakh documentary filmmakers was made during the still relatively full-flowing Aral Sea and is filled with optimism. It begins with a wide view and geographical panorama: "The Aral Sea is one of the greatest lakes in the world. It is twice the size of Lake Baykal. The area occupied by this huge lake could accommodate such European states as Holland and Belgium taken together." Then an overview of the port city of Aralsk is given, its work rhythm, the trumpet signals of ships departing from the pier.

The historical exposition is presented: "The first steamer on the Aral Sea appeared more than a hundred years ago, it was brought in disassembled form on camels. Now the waters of the ancient sea are plowed by hundreds of large and small ships. In ancient times, the Aral was called Khorezm Lake. Then it was called Blue Lake, then Aral-Tengiz, the sea of islands."

Then the operator captures the views of the vast sands on camera: "The desert steppe surrounds the sea from all sides. Gloomy expanses scorched by the Asian sun stretch for hundreds of kilometers from its shores. An island of cool water among the endless ocean of a sultry desert." We paid attention to such a recurring publicistic naming of the Aral Sea in the first paragraph of the first chapter. But here the image is drawn by the authors a little differently - an island of water in the middle of the desert.

"There are many salt lakes in the east of the sea. High quality table salt is mined here." The film shows the drawings of the exiled T.G.Shevchenko: "The great son of the Ukrainian people left us the first sketches of the Barsa-Kelmes ... Now there is a reserve of rare animals. Saigas can be seen not in every zoo, and there are more than three thousand of them on the island. Kulans are absolutely protected animals." The belt is continuously accompanied by wide panoramas of the sea and islands, herds of saigas and kulans, which are looked after by the huntsmen.

From animals, the authors consistently move on to characterize the world of birds: "River deltas, reed thickets of the Aral shores are a real kingdom of birds. Many different birds fly here to the nesting site: seagulls, swans, ducks ..." The text is accompanied by a large-scale video review of bird colonies.

The authors call fish the object of pride of the Aral people: "Fish is the main wealth of the Aral Sea. There are more than forty species here, mainly commercial. Aral fishermen annually catch up to half a million centners of fish, the main place in the catch is carp. The Aral Sea is in second place in the production of carp in the Soviet Union, in the production of bream - in the third. A lot of roach, barbel, asp and other fish are caught."

Then a remarkable historical exposition is shown, testifying to the merits of the Aral Sea to a huge country: "In difficult years of devastation, V.I.Lenin turned to the fishermen of the Aral Sea for help. He asked to increase fish production in order to help the starving Volga region. The Aral people honorably fulfilled V.I.Lenin's order and since then they have been getting bigger and bigger catches." From the address of V.I. Lenin, it is clear that interest in the water resources of the Aral Sea and their use in the interests of a large country arose already at the very beginning of Soviet power. The fishing scenes are given by the authors in different plans and versions.

"A lot of work is being done in the basin to preserve and replenish fish stocks. For this purpose, special fish breeding stations have been created. Millions of valuable commercial fish fry are released into the sea every year. Now, not only the traditional Aral fish species inhabit the Aral Sea, more than ten species of new commercial species have been adapted here recently. The grass carp will soon become a permanent inhabitant of the Aral Sea." At this time, fishing and releasing fry into the sea on the screen is replaced by the ship "Lev Berg".

"Our meat, fish, water and other natural resources are a great national treasure," the authors continue. "We must carefully protect nature, use its resources wisely and economically, restore and increase the wealth of our forests and rivers." The film ends with a generalizing cinematic image: "The Aral Sea is a wonderful blue oasis of Kazakhstan. His wealth belongs to the people." Throughout a tape is followed by soft and pleasant symphonic music. In general, the film marks the very initial period of the transition from the Aral Sea to the Aralkum.

Dramatic scenes, and at the end a tragic motive, are present in the film "What's happening to the Aral Sea now?". The year of filming, the authors and the studio are not given, although from the text it can be assumed that it was either filmed by authors from Kazakhstan or, at least, on the territory of Kazakhstan. It was put on YouTube on June 18, 2020. Presenting the material of this tape, we will keep closer to the voiceover.

The film tells that in the early 1960s the Aral Sea was one of the largest lakes in the world; its large size was provided by the two largest Central Asian Rivers Amu Darya and Syrdarya. But during these years, the Soviet Union realized that it had serious problems with cotton, so the country's leadership launched widespread development of virgin lands in Central Asia (especially in Uzbekistan - T.G.Shevchenko) to dramatically increase the number of cotton fields. All this was accompanied by an intensive withdrawal of water from both rivers, as a result of which it began to flow into the sea noticeably less and it began to degrade. From 1960 to 1990, the sown area in Central Asia increased from 4.5 million hectares to 7 million hectares. The water level in the sea decreased annually, depending on the specifics of the year, from 20 to 90 cm. We must not forget that filtration, i.e. the absorption of water by the land was more than 60 percent, which was previously replenished by river flows.

Fishing has reached a scale that threatened its timely reproduction. There were one fish cannery, five fish factories, more than twenty fish receiving points in Uzbekistan. One fish cannery, five fish factories, forty-five fish receiving points worked in Kazakhstan.

The Soviet authorities officially recognized the problem of the Aral Sea only in 1985, but they did not intend to stop or at least reduce the intake of water from the rivers, because a huge country needed a lot of cotton.

In the film, there is a very beautiful panorama of the sea from the beginning of the 60s, when a large flock of white birds flies over the boundless waters. Due to the range of the shooting plan, it is difficult to see what kind of birds they are; presumably they were swans.

Before the viewer, the photographs of the Aral Sea, taken from space in different decades, are successively replaced, as a result of which the stages of the drying up of such a large reservoir become clear for him. From space it is clearly visible that a huge salt desert has now appeared in the place where there was a sea.

The authors clearly showed large shoals of fish that died due to the high concentration of salts in the remaining water. Two port cities (Aralsk and Muynak) have completely lost their trade

turnover. It is simply impossible to engage in any industrial activity in this region, and the climate has become much more arid.

At the end of the tape, the authors take a close-up shot of an elderly Kazakh who says: "Everything is dead. Nothing left." In Kazakh films, such harsh assessments are sometimes encountered, while the First President of Uzbekistan, Islam Karimov, did not support such reviews, therefore, there are no such assessments in films shot by Uzbek or Karakalpak filmmakers.

One of the few films that we really liked is called "Going to Sea" (2010). Its authors are Victoria Grudinskaya and Alexander Kuzakov, the characters are the Aral sailors Sergey Lisovskiy and Igor Drozdovskiy, as well as a resident of the city Aralsk Alexander Danchenko. The studio is not listed. Perhaps this is also a private, amateur tape, but it was made quite professionally.

The film begins with a show of the Neva River and ships on it. Against their background, St.Petersburg resident S.Lisovskiy tells how he was called to serve in the Aral flotilla. The film contains inserts from previously filmed documentaries. According to these inserts, as follows from the narrator's text, a bulky irrigation construction was developed in the area of two large Central Asian rivers during the Stalin's five-year plans. The desert was submitted to the people of the new era - the Bolsheviks. The announcer reads poetry:

With the name of Stalin, joy came

The steppe blossomed with Stalin's name.

In the third paragraph of the first chapter, we cited the words of the first secretary of the Central Committee of the Communist Party of Uzbekistan Usman Yusupov (1939) about the need to take water for irrigation from the Syrdarya and Amudarya Rivers. It is known that he was in good standing with I.V.Stalin and could not take such a step without his consent. From this it is clear that the top leadership of the CPSU (the Communist Party of the Soviet Union) was at the head of the water intake policy that was destructive for the Aral region.

In the film "Going to the Sea" this motive is repeated once again in connection with the shooting of Leonid Ilyich Brezhnev against the background of a cotton field and in the conference room of the Kremlin Palace of Congresses: "Leonid Ilyich raises the question of accelerating the increase in cotton production." The voiceover commented on the position of the Secretary General as follows: "An imminent catastrophe will come. The construction of these canals should have been banned."

S.Lisovskiy continues, against the background of small children walking along the Aral sands: "The life of one generation has not yet ended, and these children no longer remember the Aral Sea." Then the ships "Admiral Nakhimov" and "Kyrgyziya" appear in the frame. A desert wind whistles in the microphone.

"The first campaign left a vivid impression, - says S.Lisovskiy against the background of A.Rosenbaum's song about St.Petersburg, referring to his first trip to the Aral Sea as a sailor. - The sea swayed, the ship swayed. The wave was short, but strong, like a key beating." Seagulls fly over the sea, the wind blows around the clothes. Then he talks to two little girls who know Russian. Children say that their parents told that there was fish, fishing, there was a beach and everyone was sunbathing.

Further in the frame, the author is shown in close-up, who says very touching and sincere words: "Here, in the heart, the Aral Sea lives, with its surfs, waves, storms" ... "We were in the city Aralsk, first 15 km away, then in 150 km from the sea. The sea goes further and further." A tear runs down S.Lisovskiy's face: "Something is missing, there is not enough sunrises, seagulls that fly." Then he shares his impressions: "When you go on a train and look back, there is a huge, huge space. You go, you go and there is nothing, just a little half-stop."

At the end of the film, a resident of St.Petersburg says: "I hear a cry, a cry for help: "I am dying." Only no one came to help him. The sea gives SOS: "I feel bad, I am dying." So what? "I am dying ..." These words reflect the noticeable indifference of people and authorities in the 60s - 70s to the fate of the sea. The film ends with alarms of Morse code, which fly into the air against the backdrop of the desert and rusting ships.

The film “Why did the Aral Sea really dry up?”[2]. deserves special attention. The film was uploaded on YouTube on November 20, 2018. The film was filmed by “Global Error”. There is no other information about the authors of the film. Judging by the text, most likely, it was filmed by Russian documentary filmmakers. It is interesting in that it lists other reasons for the drying up of the Aral Sea, and water intake, according to the creators, is not the main factor. The film is accompanied by dynamic voiceover text, which does not allow the viewer to relax for a minute.

“Why did the Aral Sea dry up? The Aral Sea is a lake located on the border of Kazakhstan and Uzbekistan. According to the calculations of scientists and researchers, the Aral Sea emerged 25 thousand years ago (previously another source cited the figure 20 thousand years ago, see Chapter 1, Paragraph 3 - T.G.Shevchenko), which is confirmed by radiocarbon studies of bottom remains. Now little is left of it, it is divided into two parts. Most of it belongs to Uzbekistan and is intensively used for irrigation of cotton fields, which leads to its destruction. This phenomenon, for all its harmfulness, does not really bother Uzbekistan.”

The film also contains other accusations against our country. We believe that the filmmakers would have acted more wisely if they had named specific culprits of this environmental crisis, without naming Uzbekistan as a whole. Because the people of Uzbekistan also suffered from this.

“The fact is that oil exploration has begun on the dry bottom. They practically found oil in large volumes. Uzbekistan hopes for the benefits of oil development and does not invest in the fight against the drying up of the Aral Sea.

Kazakhstan behaves differently and invests large resources in preserving the remains of the Aral Sea. This state has carried out the construction of a dam and the waters of the Syrdarya fill the remainder of the large reservoir and make the water less salty. Kazakhstan is investing in commercial fish farming, including valuable breeds. The fruits of these efforts are already making it possible to start rebuilding the fishing fleet in the Aral Sea.”

There are two brief comments to make here. First, the residents of Karakalpakstan do not know anything about the fact that the development of oil fields has begun on the dry bottom of the Aral Sea. If this were true, then from any one of the following three sources it would become known to the local population: 1) from official reports; 2) from the materials of bloggers; 3) as a result of popular rumor. Secondly, Kazakhstan created a partition because it was able to take advantage of the convenient geographical confluence of the Syrdarya into the Aral.

The authors say the following about the process of drying up of the Aral Sea: “Several million years ago there was a stable connection between the reservoirs of the Caspian Sea and the Aral Sea, they were one whole. The Aral Sea, after its separation from the Caspian Sea, is shallowing not for the first time. Serious shallowing was observed in the 4th century AD, it was man-made. The medieval state of Khorezm turned into a powerful state and created a unique irrigation system, which was supplied with the waters of the Amudarya. The Aral Sea has become very shallow. Now, on the dried up bottom, they find mausoleums that were built in those days. But the hordes of conquerors destroyed the state of Khorezm, practically wiped it off the face of the earth and the uncontrollable Amudarya returned to its former channel and re-filled the Aral Sea.”

We are forced to comment on these statements again. Firstly, in the 4th century there was no powerful state on the territory of Khorezm. In the 3rd century, Khorezm had its ambassadors in other countries, but experts do not call the state of that time powerful. Secondly, in the 8th century the Arabs conquered Khorezm, but their main goal was not the destruction of the country, but the establishment of the religion of Islam here. Thirdly, Khorezm was destroyed by Chinghis-khan, but this happened in the 13th century, not in the 4th. Of course, there is no need to talk about the erasure of Khorezm from the face of the earth, at least for some time.

Further, the authors continue: “The Aral Sea reached its maximum volume in the 16th century, when all the tributaries of the lake turned in its direction. This volume of the Aral Sea survived until the middle of the 20th century. The Aral Sea is constantly fluctuating in its size. Scientists have calculated that in three thousand years this lake has shrunk five times and receded from its shores.” We believe that this could have happened in dry years.

According to the authors, one of the reasons for the drying up of the Aral Sea is intensive water intake. They say: "Until now, on many pages of the Internet, the developed irrigation system of Uzbekistan is called a crime of the Soviet regime," which gave rise to Kazakhstan, according to the authors, to blame Uzbekistan for the ecological catastrophe.

However, later in the film, the authors put forward another reason for the drying up of the sea. They believe that "since 2010, an increasing number of scientists are inclined to believe that the main reason for the decrease in the water table of the Aral Sea is the escape of water underground through the bottom layers." They cite this as a worldwide tendency: "The point is that not only the Aral Sea is disappearing. In Africa, the mirror of the large Lake Chad is rapidly decreasing; in America, Lake Salton City is disappearing before our eyes. There are more and more supporters of the theory that in this case water is leaving into the underground horizons." In order to confirm or refute this hypothesis, specialists need to study this issue.

The authors develop this idea further: "Some climatologists suggest that we are observing the primary phenomena of future changes in large lakes, in which deep lakes, such as our Baikal, will increase in size, and shallow, up to 200 meters deep, will decrease or dry out completely."

The hypothesis that they put forward further deserves serious attention: "The theory that emerged in this century that an ancient bridge between the Caspian and Aral seas was discovered in the underground horizons is gaining a number of supporters. Scientists developing this theory draw attention to the strange coincidence in time between the decrease in the Aral Sea and the increase in the Caspian Sea. Unfortunately, there is no other evidence for this theory yet. However, it was recently proved by satellite photographs that one of the serious branches of the Amudarya river-bed has made its way through the sands to the Caspian Sea. Thus, the river naturally reduced the flow of water into the drying up lake." We can note that this fact is also unknown to us. If it were so, there would probably be some publications on this topic.

And finally, the main reason why we give special consideration to this film. Its authors say: "There are a growing number of supporters of the theory that the process of fluctuations in the volume of the Aral Sea does not depend on human activity and has climatic natural causes. They all believe that the waters of the Aral Sea are going along the bottom paths to the Caspian Sea. Hydrologists attach more and more importance to the hypothesis of water withdrawal into the bowels of the earth."

They confirm their thought with the following arguments: "Last year, articles appeared in foreign scientific sources proving that 63% of water losses on the planet should be attributed to this ever-increasing phenomenon. The natural filtration of the soil and the escape of water to the lands of the Aral Sea are currently estimated as 60% of the total impact on the disappearing lake. The reason is of a planetary scale. Today, foreign hydrologists believe that the reason for the rapid drying up of the reservoir is a significant decrease in the amount of atmospheric precipitation in this region. The fact is that a decrease in the water surface of the Aral Sea is associated with a decrease in the amount of precipitation in winter and summer, and a small amount of rain is associated with a progressive decrease in the Pamir glaciers, which are the main climate regulator in this region. The decrease in precipitation is due to a serious reduction in ice and snow deposits in all the mountains of Central Asia, which is an inevitable consequence of climate warming. The total influence of the climate is 15% of the negative factors that give rise to the shallowing of the lake."

Finally, seeking to further strengthen their position, the authors refer to photographs from space: "In 2014, according to NSA images, the eastern half of the Aral Sea dried up, which is explained by low precipitation. However, underground water sources do not allow this part of the reservoir to dry out completely. The Kazakh part of the Aral Sea, thanks to the costly efforts of the state, has ceased to dry up."

Concluding the analysis of this film, we want to say that its authors told the viewer a lot of interesting information and outlined the existing hypotheses about the reasons for the drying up of the Aral Sea. At the same time, it is clear that these assumptions require appropriate scientific research.

The film “Aralkum” was filmed jointly by Uzbek and Russian documentary filmmakers (1989, director - Bakhodir Muzaffarov, scriptwriter - famous Russian publicist Yuri Chernichenko). Y.Chernichenko says with regret that there were Kyzylkum and Karakum here, and now there are Aralkum. The film contains his publicistic appeal to the audience: “If you have a map of the Soviet Union, then the whole sea has disappeared on it, mark this. 300 thousand Karakalpaks live here.” As a result of the wrong policy, the dried-up sea led to the formation of the salt-bitter sands of Aralkum of a very special kind here, because this place has been a bottom of the sea for many centuries.

As a conclusion to the paragraph, it can be noted that, in principle, as the study of documentaries about the Aral Sea shows, it is not particularly difficult to create panoramic cinema lighting of the problems posed, because the object itself allows shooting wide and large-scale spaces, covering the required landscape: the size of the sea, large massifs of sand, a wide view of the steppes, ships stuck on the dried bottom of the sea, vast thickets of saxaul, endless bushes, river floodplains, etc. An important element of the panorama is the camera’s view of the area being filmed, scenes of the sea, water, deserts, steppes, hills and long roads. Of course, the correct shooting of the Aral panoramas is possible when it is done taking into account the laws and rules of cinema, proceeding from the audience’s interest.

The stories of cinematographers are often accompanied by a screening of pictures of the Aral Sea from space, from cars, from the tops of hills and rocks. In general, if we compare the panorama of the Aral Sea and its coast in the middle of 60s of the 20th century and in the early 20s of the 21st century, we can get two opposite pictures.

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1.(“Britannica”. The Big Encyclopedic Dictionary. - M .: ”Astrel Publishing House”: “AST Publishing House”, 2009, p. 52).

2. (http://xitfilms.ru/online/ZWlVMm9yZFoxdEk=)

Rezyume: *Maqolada Orol dengizi va Orolbo‘yining hujjatli film panoramalari ushbu dengizga xos bo‘lgan uchta asosiy jihat: tarixiy, dengiz va qumlilik bo‘yicha tahlil qilinadi. Ushbu filmlar tomoshabinga keng jamoatchilikka kam ma'lum bo'lgan tarixiy va ilmiy materiallarni taqdim etdi. Orol dengizining mamlakat oldidagi xizmatlaridan dalolat beruvchi ajoyib tarixiy ekspozitsiya namoyish etiladi.*

Резюме: *В статье проанализированы документальные кинопанорамы Арала и Приаралья в характерных для данного моря трех основных аспектах: историческом, морском и песчаном. Данные фильмы представили зрителю малоизвестный широкой публике историко-научный материал. Демонстрируется примечательная историческая экспозиция, свидетельствующая о заслугах Арала перед страной.*

Kalit so’zlar: *film panorama, tarixiy ekspozitsiya, dengiz, qumlilik, tarixiy- ilmiy materiallar.*

Ключевые слова: *кинопанорама, историческая экспозиция, морской, песчаный, историко-научный материал.*

THE ROLE OF PARENTS IN EDUCATION

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Summary: *This article provides advice on child-rearing. In particular, the responsibilities of parents in the upbringing of children were disclosed. Aspects of parenting in parenting were outlined. Existing problems in child-rearing were highlighted. The solutions to these problems are based on Islamic sources. Data were obtained from reliable sources.*

Keywords: *Child, upbringing, reward, punishment, family, father, mother, responsibility, Islam, woman, man, manners, son, daughter, age, puberty, adolescent.*

Every parent thinks about the future of their child. They want my child to be a good person in the future, to be smart, honest, conscientious, and to benefit society in general.

Although the noble traditions of our people originated with Islam, the issue of child-rearing has been reflected in the Avesta. For example, the Avesta pays great attention to the upbringing of children as pure, moral, well-thought-out, knowledgeable in all trades of his time, strong in faith, both morally and physically fit.

For example, Zoroaster appeals to his children to "be zealous and courageous in the way of living honestly." This is a lesson that will never become obsolete.

Luqman Hakim advises his sons:

My son! Seek knowledge in your youth! Of course, it will be difficult to demand knowledge in old age. Oh, my son! Just as Pandu's advice is insane, so it is difficult for an old man to cross the pass.

This means that the responsibility for attracting young people to science lies primarily with parents. At the same time, the child should be taught a profession. Because, as he spends his knowledge for the development of the nation, he will benefit people from the profession he has learned, and he will find honest and pure sustenance for himself. You don't need anyone.

The Prophet (peace and blessings of Allah be upon him) said: The best food a person can eat is what he earns through his profession. Of course, the Prophet David (peace and blessings of Allah be upon him) used to eat from his own hands. [2;113]

The Messenger of Allah (peace and blessings of Allah be upon him) also said: Among the sins are those for which only the concern for the sake of halal sustenance is expiation. [2;120]

It is obvious that in the education of young people, it is important to pay attention to their professionalism. It is the responsibility of every parent to introduce our youth and children from infancy, first of all, to the One who created them, and to make them perfect believers, believers, serving their religion and homeland.

Good behavior is the highest and most superior of all human qualities. Because goodness is always expected from the owner of good behavior: he only benefits himself, his family, society, and the whole environment. What great words the Prophet s.a.v uttered for the youth who are the future owners of our society. The Prophet (peace and blessings of Allaah be upon him) said:

"That is, one of the most difficult things to do on the scales on the Day of Resurrection is to fear Allah and to be virtuous." [2;117]

In another hadith, they say: O my Ummah? You can never fully thank each other with wealth and donations. Therefore, try to find your consent with openness and kindness. (Narrated by Imam Bazzar and Bayhaqi.) [2;128] Teaching children good manners and Islam is better and more rewarding than supererogatory worship. For with the righteousness of children, one finds pleasure in the grave.

The charity of a good child and his good deeds make the grave of his parents full of light and the pure in spirit happy. There are ten types of good manners:

- Avoiding conflicts with people in good deeds.
- Not giving in to emotions and passions.
- Not looking for the shortcomings of others.
- Compassion for someone's unhappiness and understanding it correctly.
- If the offender confesses his guilt, forgive him.
- Assistance to the needy.
- Taking care of people.
- Be able to see their shortcomings.
- Etiquette is being moral.
- Be polite.

We need to cleanse our children of bad behavior and corrupt ideas.

The child is a deposit in the presence of his parents, and his heart is a pure pearl. He can accept any pattern. If taught to do good, he will grow up to be a good person. His reward will be shared by his parents and coaches. If taught to do evil, he will grow up to be a bad person. His fault lies with his parents or guardians. The guardian must protect him and educate him. Teach him good manners. Let him protect her from bad children. Don't get used to be interested in worldly pleasures. Let him not be tempted to put rugs on adornment. So that when he grows up, he will not waste his life following zebu ornaments.

Parents should carefully monitor the child from an early age, from the previous days of his life. Let him breastfeed only to a woman who is pious and honest. There is no blessing in milk made from haram. The first of the lusts that arise in a child is the hunger for food. Therefore, let the parents teach him the etiquette of eating. Sometimes he just gets used to eating bread. So that he does not think that he should add something else to the bread.

A parent instills in their child the evil of eating too much. He explains that eating a lot of food is the work of animals.

It is explained to boys that it is good to wear white clothes, while colorful and silk clothes are specific to women. The child should not be added to children who are accustomed to living an extravagant life. There are many responsibilities of a parent in raising children in a family.

First - if a child is born in the family, he should give it a well-intentioned, decent, beautiful name. For when he grows up, he should not be ashamed of his name, he should not be upset, he should not be ashamed of his name when others say it;

Second - to educate the child, that is, to create conditions for education and upbringing, to educate and train him according to his abilities;

Thirdly, if the child is a boy, he must be married when he grows up, and if he is a girl, he must be married;

Fourth - if the child is a boy, it should be made a home;

Fifth, if there are several children, there must be a fair distribution of the inheritance between them. The family plays an important role in a person's spiritual development. Because the family has two important functions - to give birth to children and to bring them up properly.

From the first days of a child's life, parents will need to nurture positive habits that will help him or her develop healthy growth, development, and behavior. Forming a culture of morality in them will have to explain to them the general rules. In particular, it is necessary to tell about how to behave at home, in kindergarten, at school, on the street, in public places. It is useful to teach a culture of dealing with one's elders and peers, respecting adults, and speaking to them with respect.

After a son grows up in a family, every father should explain to his child what a man's role is to support the family morally and economically, to share the concerns of his wife and children, to be a shield in case of danger, and to take care of family members in general.

If a girl grows up in a family, her mother should tell her what a woman has to raise children in the family, to wash them white, to shave them white, not to waste the food brought by a man, to

wait for guests and, most importantly, to watch and meet her husband and children. there will be light upon light as he tells us with vivid examples.

The presence of strict discipline and agenda in the family harms the upbringing of children. Children's educational achievement, morals, and level of health depend in many respects on the decision-making regime in the family. Parents themselves should follow this pattern and set an example.

Relationships between parents in the family, such as mutual sincerity, solidarity, kindness, mutual respect, sweetness, caring for each other, have a positive impact on the upbringing of children.

It is clear that if a parent makes fights out of everything, insult, and curse each other in front of their children, it will harm the upbringing of their children. That is why the saying "a bird does what it sees in its nest" should not be forgotten. It is not in vain that our sages have said, "Forty days of blessings and goodness go from a house where there is a quarrel one day."

Another important task of parents as the main educators is to passionately tell their children about the history of our generations, their heroism, their prestige in society, and on this basis to instill in young people a sense of homeland. As our wise people say, "Man must know his seven generations."

Indeed, the sense of patriotism nurtured in childhood never leaves a person. Therefore, parents will have to work on the principles of cultivating a sense of patriotism in their children based on national values. The sacred land we live in, its sun, water, air, gardens, hospitality, and humanity of our people must occupy the heart of a child. To do this, parents need to use fairy tales and stories that are interpreted in the genres of folk pedagogy for their children.

It is also a good idea for parents to take a walk in nature with their children. In addition to the enjoyment of nature by their children, they should appreciate the love of the motherland, the beauty of the native land, the blessings of nature, and instill in the minds of their children their care.

So, if every parent pays attention to the upbringing of their child, if he fulfills his parental duty, he will have contributed to the development of society.

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Rezyume: *Ushbu maqolada bola tarbiyasi bo'yicha maslahatlar berilgan. Xususan, ota-onalarning farzand tarbiyasidagi mas'uliyati ochib berildi. Tarbiyaning muhim jihatlari ko'rsatildi. Farzand tarbiyasidagi mavjud muammolarga alohida to'xtalib o'tildi. Bu muammolarning yechimlari islomiy manbalarga asoslangan holda keltirildi. Ma'lumotlar ishonchli manbalardan olingan.*

Резюме: *В этой статье даются советы по воспитанию детей. В частности, раскрыты обязанности родителей по воспитанию детей. Обозначены аспекты воспитания детей. Выявлены существующие проблемы в воспитании детей. Решения этих проблем основаны на исламских источниках. Данные получены из надежных источников.*

Kalit so'zlar: *Farzand, tarbiya, ajr, jazo, oila, ota, ona, mas'uliyat, Islom, ayol, erkak, odob, o'g'il, qiz, yosh, balog'at, o'smir.*

Ключевые слова: *ребенок, воспитание, награда, наказание, семья, отец, мать, ответственность, ислам, женщина, мужчина, манеры, сын, дочь, возраст, половое созревание, юность.*

SPIRITUAL CULTURE OF KARAKALPAKSTAN IN THE MIDDLE OF THE XIX CENTURY

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Summary. *The article tells about the preservation of the Karakalpak people's cultural specimens, the role of religion in the cultural process of the Karakalpak community, the role of religion in enlightenment, and the places of religious beliefs in the territory of Karakalpakstan. Beliefs, Mullahs, Sufis play an important role in the public life of the Karakalpak people.*

Keywords: *people, culture, public affairs, religious beliefs, enlightenment, confidence, importance, place, life.*

The Karakalpak people are one of the most ancient peoples of Central Asia. Together with other peoples of Central Asia, it is the heir to all the riches created by the peoples of the Aral Sea region.

In the 9th-12th centuries on the land of ancient Khorezm and the Aral Sea region, numerous scientists, poets, singers, masters lived and worked, who created wonderful works of art, numerous architectural monuments, beautiful dwellings, wonderful dutars and other values preserved in numerous museums. In foreign and Arab countries Central Asian dancers and musicians amazed with their skills [1, P.45].

A special period in the development of the culture of the peoples of the Aral Sea region falls on the period of the VII-XII centuries, when the peoples of this region created numerous cities, especially Tokkala, Khaivan Kala, Kerder and other cities, which are centers of science and culture. Numerous scientists who lived in the city of Kerder, like Al Gapuri, Al Kerderi and others, became famous in many cities of the then civilizational world: in Basra, Iraq, Cairo, as well as among the peoples of Russia. They were mainly engaged in scientific and pedagogical activities.

During the period of the Timur and Timurid state, as well as in subsequent periods, Muslim culture spread among the peoples of the Aral Sea region, especially this culture developed under the influence of such prominent personalities as Khoja Akhmed Yassawi, Sulayman Bakyrgany and other leaders of the entire Muslim world, whose homeland is the Aral Sea region, the lower reaches of the Syrdarya and Amudarya Rivers.

Despite the international situation in the middle of the 19th century, the interfeudal wars in the khanates, especially between the Khiva Khanate and Bukhara, as well as with other states in the khanates, cultural life was not as backward as some foreign historians portray. It should be said that the people of Khiva were famous for their scientists, masters, poets and other cultural figures.

Many rulers of Khiva were scientists and poets. This can be seen in the example of the outstanding historian Abulgazy, who lived in the 17th century, who left wonderful books on the history of the peoples of Central Asia, especially on the history of Turkmenistan and Khorezm. This tradition continued in the middle of the 19th century, when poetic and historical literature was developed among the peoples of the Khiva Khanate, especially during the reign of Mukhammad Rakhim Khan, known under the pseudonym Feruz, who ruled in Khiva for more than 40 years, he paid great attention to the development of the culture of his people.

At the beginning of the 19th century, the Karakalpak people, despite continuous wars and heavy taxes, created and preserved wonderful cultural monuments in the form of epic works, such as "Alpamys", "Kyrk-kyz", "Sharyar" and other folklore works, works of art and literature. The poets Ajiniyaz, Berdakh lived and worked during the period under review.

Thus, the peoples of Central Asia, before the Russian conquest, including Karakalpaks, had a peculiar, rich, material and spiritual culture, which during the Soviet system were denied or belittled, considering that Karakalpaks did not have their own written language, their national statehood. Spiritual culture, especially the religion of the people, was denied.

One of the first historians who collected the cultural heritage of Karakalpaks, Uzbeks and Turkmens were Russian researchers. At the beginning of the 20th century, on the territory of Karakalpakstan there was a researcher I.A.Belyaev who wrote down folk dastans such as "Edige", "Alpamys", the works of Berdakh Kargabay uly, the works of the Turkmen poet Maktumkuly, whose works were widely distributed among the peoples of the Khorezm oasis. Many of the collected materials of the researchers were published as a separate book in Tashkent and other cities. Many researchers and travelers, having visited the peoples of the Khorezm oasis, recorded various folklore materials, works of folk poets. Among them, it should be especially noted the role of the cultural historian A.N.Samoylovich, who first visited the territory of the Khorezm oasis at the beginning of the 20th century, recorded numerous works of the Turkmen poet Maktumkuli among Karakalpaks, many of which were published at the beginning of the 20th century. A.N.Samaylovich, having found many manuscripts of Maktumkuli, notes the wide popularity of the Turkmen poet among Karakalpaks and he managed to find some of his works in the village of Kyrsadak on the shores of the Aral Sea [2, P.67].

Riza Kuli Mirza, A.Kaulbars, Stoletov, Sobolev and others visited the cities of Chimbay, Kungrad, Nukus and other settlements. Their works have become valuable by historical and cultural sources for modern researchers to study the cultural life of the peoples of the Aral Sea region.

Culture covers many aspects of human activity. It includes the history of cities, the history of art, literature, language, customs and rituals created by the people over many centuries. Considering the culture of the Karakalpak people in this work, special attention is paid to the role of religion in the cultural process of the Karakalpak society in the middle and in the second half of the 19th century, as well as other components of the cultural activities of Karakalpaks of the period under review. Considering the situation, of all cultural processes, the most humiliating position was the role of religion in the Karakalpak society.

The Karakalpak people, like all the peoples of Central Asia, have created a rich spiritual culture in their centuries-old history. The people cannot live without culture. By their action, people created material production, as well as spiritual values in the form of a human language, writing, religious beliefs, oral traditions, literature, customs, etc. Since ancient times, human societies have appeared on the territory of Karakalpakstan, leaving material remains in the form of settlements, cemeteries, irrigation facilities and other cultural objects that have survived to this day. Our ancestors were the creators of the early religion in the form of Zoroastrianism, the main book of which was the book "Avesta", created 2700 years ago on our territory. Many traditions of the Zoroastrian religion passed from one generation to the next, enriching the spiritual life of our ancestors. Karakalpaks and other peoples of Central Asia professed the religion of Sunni Islam. In our previous historical works devoted to the history of the religion of Islam, it was directly written that "the Muslim religion, Sunni Islam, played a reactionary role in the fate of the Karakalpak people" [3, P.132].

However, historical facts testify: religion, including the Islamic religion, helped the people to live better and happily, to work for the good of the people, taught justice and honesty, friendship between people and nations. In difficult days, representatives of the clergy lived and fought together with the people. Many Ishans and Ulemas were true patriots and enlighteners, they studied all their lives, put knowledge and science in the first place from childhood to old age. There is a popular proverb that a person must study all his life, "besikten tabytka shekem" which means that every Muslim must improve his knowledge throughout his life.

Religion was a national and universal value. The religion of Islam served not only for the interest of the rich people of the Karakalpak society, it defended the interests of the poor, disadvantaged people, called upon rich people to provide material assistance to the poor and toilers.

From an early age, Karakalpaks studied at primary schools (mektebs), where education was based on the Arabic script and alphabet. At these primary schools, along with religious subjects, they studied secular sciences, history and literature, mathematics and geography, and other necessary sciences. At the mektebs, children got acquainted with the works of oriental poets. They

studied the works of al-Bukhari, Imam al-Termizi, Khoja Akhmed Yassawi, Suleyman Bahyrgany and others. Especially the book of Sufi Allayar was studied at the mektebs of Karakalpakstan, the sacred book of Muslims Kuran, Hadith and other books of religious content served as the ideological main culture of the people and were taught at the mosques and madrasahs, they were especially fond of the works of great thinkers like Navoiy, Fizuli and others.

At the beginning and in the middle of the 19th century, the role of Ishans among Karakalpaks increased, each person should have been a Sufi for certain Ishans. Ishans were decisive in solving many social and public problems among the people. They obeyed the laws of the Islamic religion, opposed foreign invaders, and were also disseminators of religion among the population. They had a huge amount of land. The land was the source of their income and prosperity. They were also large livestock owners, they had Sufi people who were loyal to them and worked in their farms. On the territory of Karakalpakstan during the period under review, there were also large cemeteries, where great Ishans were buried, around which Sufis and close relatives and fellow villagers were buried. The population had great respect for the memory of their ancestors, they constantly came to the burial place of fathers and mothers. People treated the burial sites with care and read a prayer in honor of the dead, followed religious beliefs and traditions.

Such sacred cemeteries were “Kabakly Ata”, “Karakum Ishan”, “Ishan Kala”, “Nazlumkhan Sulu”, “Azler Baba” and others, many of which still exist.

The Islamic religion called on people for peace between peoples, opposed the war, called on all Muslims to unite, especially against the invasion of the Russian Empire into the territory of the Khiva Khanate, against the construction of fortresses on the shores of the Aral Sea and on the Amudarya River, in the 40s of the XIX century they called to fight against the Russian army for the preservation of the integrity of the Khiva Khan.

In the middle of the 19th century, many children from the Karakalpak regions began to study in the city of Khiva in madrasahs, after which they promoted the poetic heritage of their great ancestors. Ajiniyaz Akhun, who graduated from the Shergazy Khan madrasah in the city of Khiva, became such a famous poet in the middle of the 19th century.

The most respected people among Karakalpaks were Ishans who graduated from madrasahs in Khiva and Bukhara. During this period, Ishans lived in many settlements of Karakalpakstan, the main function of which was to spread the religion of Islam.

The most popular higher educational institutions on the territory of Karakalpakstan were the madrasahs “Karakum Ishan”, “Kumozek” (Ishan Kala).

These centers of religion and culture of the peoples of the lower reaches of the Amudarya River served as a hotbed of enlightenment of spirituality and culture. Many visitors came here from various regions of Karakalpakstan, the Khiva Khanate, Karakalpaks, Uzbeks, Turkmens and representatives of neighboring regions. In “Karakum Ishan” there was a cemetery where people from different regions, Biys, Ishans, Ulemas, poets and storytellers and others were buried. This place is the most revered cemetery, where numerous pilgrims from different territories of our Republic, as well as neighboring countries, come to this day.

The Islamic religion had a positive impact on the spiritual and material development of the Karakalpak society in the middle of the 19th century. Together with Uzbeks and other neighboring peoples had a huge impact on the development and spread of the religion of Islam among neighboring peoples. Karakalpaks played a positive role as disseminators of Islam among the Kazakh population inside Karakalpakstan, where Kazakhs made up a significant part of the population in the north-east and north-western regions, as well as in Kazakhstan, where they opened mektebs, in which they taught Kazakh children mainly the religion of Islam. This function was performed by the famous Karakalpak poet Ajiniyaz Kosybay uly, who repeatedly visited Kazakhs, had poetry competitions with the Kazakh poetess Kyz Menesh. So, Karakalpaks, having graduated from the Khiva and Karakum madrasahs, performed a noble function, fought to raise the spiritual enrichment of other peoples, especially Kazakhs and Turkmens, where they played the role of modern teachers.

The Islamic religion called for the establishment of warm human relations between people, for brotherhood, tolerance for representatives of another religion, of another nationality.

Ishans, Mullahs, Sufis were enlightened people. Many of them studied at madrasahs in Khiva and Bukhara. Their number increased among the peoples of the lower reaches of the Amudarya River in the first half of the 19th century. They played a huge role in the social and family life of people. The most common form of family among Karakalpaks was monogamous. The Muslim religion attached great importance to the role of men in the family, increased the role of father and mother.

Community traditions played a special role in the Karakalpak society: aul, koshe. Each aul had its own leaders – "Biys", "Aksakals". A special role was assigned to the Ishans, Akhuns and Mullahs. Their opinions in solving many social, economic and family issues were decisive.

"Community" – "jamaat" existed in all auls and cities of Karakalpakstan under the name "maslahat", i.e. "advice". The Council of Elders jointly resolved community issues, where members of the community specially gathered, where there were specially designated places called "maslakhat tobe", where representatives of the clergy took honorable places.

These councils were mainly attended by men. However, they took into account the opinions of women. It is necessary to reconsider the opinion "Women were not considered full members of society, beating them was not prosecuted by law" [4, P.134].

Many informants report that Karakalpaks, like other peoples, treated women, things and girls with respect. They were given places of honor in the house, they were treated with respect especially by Ishans, Mullahs and other clergy, considering them to be the basic of family life. Among women there were experts in Sharia, they studied at mektebs and madrassas, among them there were poets, performers of poetry, representatives of art [5, P.13].

All the above facts testify that, as in other countries, among Karakalpaks, the Islamic religion widely penetrated into the social and family life of the people in the middle of the 19th century, it played a large role in the development of the spiritual life of society, therefore the role of Islam was enormous and it had a positive influence on the development of the Karakalpak society.

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Rezyume: *Maqolada qoraqalpoq xalqi o'zining ajoyib madaniyat namunalarin saqlab qolgani, qoraqalpoq jamoatchiligining madaniy jarayoninda dinning roli, ma'rifat ishlari bilan shug'illangan din vakillarining xizmatini aytib, Qoraqalpog'iston hududidagi diniy ishonchlar bilan bog'lik o'rinlar haqida ma'lumot beriladi. Ishonlar, mullalar, sufilarning qoraqalpoq xalqining jamoatchilik hayotidagi ahamiyatli roli ko'rsatilgan.*

Резюме: *В статье рассказывается о сохранении прекрасных образцов культуры каракалпакского народа, роли религии в культурном процессе каракалпакской общины, роли деятельности представителей религии в просвещении, местах религиозных верований на территории Каракалпакстана. Раскрывается, какую важную роль играли верования, муллы и суфи в общественной жизни каракалпакского народа.*

Kalit so'zlar: *Xaliq, madaniyat, jamoatchilik ishlar, diniy ishonch, ma'rifat, ishonch, ahamiyatli, o'rin, hayot.*

Ключевые слова: *люди, культура, общественные дела, религиозные верования, просвещение, уверенность, важность, место, жизнь.*

HUMANITIES SCIENCES

REPRESENTATION OF SEMANTIC EQUIVALENCE IN DIFFERENT DICTIONARIES, SYNONYMY IN THE SYSTEM OF LANGUAGE

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Summary*: This thesis compares similarity of meaning and diversity of form, and contemplates that any language has various words or "synonyms" which are similar in meaning, but distinct in morphemic structure, form and implementation. Synonymy is frequently understood as semantic equivalence, semantic equivalence can appear between words and word groups, word-groups and sentences, sentences and sentences. In the following thesis, the author intended to reveal the certain peculiarities of synonyms, their representation in dictionaries and in the system of language. The author's assumptions are based on experience of researching synonymy and semantic equivalence.*

Keywords: *semantic equivalence, synonymy, dictionary, system, language.*

Introduction.

The vocabulary system of any language is characterized by the existence of the synonyms, which is related to the problem of word meaning. Synonymy is one of the lexical semantic relations which are the relations between meanings of words. By definitions, synonyms are one of two or more words or expressions of the same language that have the same or nearly the same in some or all senses' (Mish, 2003). In its narrow sense, a synonym is a word or phrase that is perfectly substitutable in a context for another word or phrase. Professional linguists agree that there is no such term as an ideal synonym, for it is impossible to find two words or phrases that are identical in denotation (meaning), connotation, frequency, familiarity and appropriateness. Indeed, linguists have long noted the economy of the language, which suggests that no language permits a perfect fit, in all respects, between any two words or phrases. In some linguistic works synonymy is defined as semantic equivalence. This paper examines the semantic equivalence, the definitions of synonymy and its representation in dictionaries, synonymy in the system of language. Synonymy could be a connection between person faculties of words, so that a single word regularly has diverse sets of equivalent words for each of its faculties. This paper synthesizes the data of the articles and works on this field of study and endeavors to discover the key focuses and create this proposal.

Materials and methods.

Numerous books on semantics pay awesome consideration to lexical-semantic relations, in any case they contain small data around synonymy. R.Ginzberg and et al. claim that semantic proportionality in any case can be found between words and word groups, word-groups and sentences, sentences and sentences. The sentences may be summarized and indicate the same occasion. Semantic proportionality may be watched on the level of word-groups. Thus we may say that "to win a victory" is synonymous with "to gain a victory"(R. Ginzburg et al. 1979).The usual test for synonymy is the substitution: if one expression can be replaced by another in a sentence without change to the meaning of the sentence, then the two expressions are said to be synonymous. Absolute synonyms are substitutable in all possible contexts in all possible ways.

Arnold. I. V. defines the synonyms as two or more words of the same language belonging to the same part of speech and possessing one or more identical or nearly identical denotational meanings, interchangeable, at least in some context without any considerable alteration in denotational meaning, but different in morphemic composition, phonemic shape, shades of meaning, connotations, style, valency and idiomatic use (Arnold.I., 1986). Synonymy is a relation between individual senses of the words so that a single word typically has different sets of synonyms for each of its senses. The semantic structures of two words sometimes coincide in more than one meaning, but never completely. L. Bloomfield and E. Nida suppose even that there are not actual synonyms, i.e. forms which have identical means. Murphy states that "like its converse, polysemy, lexical synonymy undermines linguistic economy—having more than one form to express a single meaning is inefficient. It would be economical for languages to avoid absolute synonymy, and indeed they seem to. But languages tolerate a large amount of semantic overlap and replication of meanings in different registers" (Murphy, 2018).

Results and conclusions.

The terms synonymy and synonyms should be confined to semantic relation between words only, semantic relations between word-groups and sentences are described as semantic equivalence. Thus, more acceptable definition of synonyms seems to be the following: synonyms are words different in their sound form, but similar in their denotative meaning or meanings and interchangeable at least in some contexts (R. Ginzberg et al. 1979). Synonyms (in ancient Greek syn 'guv' plus and onoma 'ovo^a' name) are different words with similar or identical meanings and are interchangeable. The way synonyms function may be seen from the following example: Already in this half-hour of bombardment hundreds upon hundreds of men would have been violently slain, smashed, torn, gouged, crushed, mutilated (Ruziyeva, 2018). All the definitions of synonymy rely on the substitution test (the possibility replacing one word with another). In her work, E. Jezek gives classification of synonyms, semantics and lexicon and types of meaning (Jezek, 2016)

Furthermore, Irina Kononenko attempted to investigate the problems of semantic equivalence in different types of Polish and Ukrainian dictionaries. As she pointed out, a large number of words and idioms of the same origin have gradually developed their own systems of meaning in both languages, making it difficult to take analogs that fully reflect the semantic structure of linguistic units.

To sum up, this paper synthesizes the information of the articles and works on this field of study and attempts to find the key points and develop this thesis. We have already discussed on the causes of the appearance of the synonymy. The language development as a means of human intercourse, the development of abstract thinking, of a finer differentiation between various sides of one and the same concept as the logical cause should be considered predominant. Synonymy may be created by any extra touch of emotional coloring. The change of words changes the style and the effect is quite different.

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Rezyume: *Bu tezisda ma’no o‘xshashligi va shakl xilma-xilligi taqqoslanadi va har qanday tilda ma’no jihatdan o‘xshash, lekin morfemik tuzilishi, shakli va amalga oshirilishi jihatidan farq qiluvchi turli so‘zlar yoki “sinonimlar” mavjudligini nazarda tutadi. Sinonimiya deganda ko'pincha semantik ekvivalentlik tushuniladi, so'z va iboralar, iboralar va gaplar, gaplar va gaplar o'rtasida semantik ekvivalentlik paydo bo'lishi mumkin. Muallif keyingi bitiruv malakaviy ishida sinonimlarning ayrim xususiyatlarini, ularning lug‘atlar va til tizimidagi ifodasini ochib berishni maqsad qilgan. Muallifning taxminlari sinonimiya va semantik ekvivalentlikni o'rganish tajribasiga asoslanadi.*

Резюме: *Этот тезис сравнивает сходство значения и разнообразие формы и предполагает, что в любом языке есть различные слова или «синонимы», которые похожи по значению, но отличаются по морфемной структуре, форме и реализации. Под синонимией часто понимают смысловую эквивалентность, смысловая эквивалентность может возникать между словами и словосочетаниями, словосочетаниями и предложениями, предложениями и предложениями. В следующей диссертации автор намеревался раскрыть некоторые особенности синонимов, их репрезентации в словарях и в системе языка. Предположения автора основаны на опыте исследования синонимии и семантической эквивалентности.*

Kalit so'zlar: *semantik ekvivalentlik, sinonimiya, lug'at, tizim, til.*

Ключевые слова: *семантическая эквивалентность, синонимия, словарь, система, язык.*

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SOMATIC PHRASEOLOGY AS AN OBJECT OF LINGUISTIC RESEARCH

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Summary: *The article deal with somatic phraseology as one of the components of the linguistic picture of the world. And somatic components in phraseological units of the English and Karakalpak language.*

Keywords: *phraseological units, somatism, somatic components, somatic phraseology.*

The linguistic status of a component of a phraseological unit is one of the main controversial issues of phraseology. When considering this problem in modern linguistics, there are different directions based on different theoretical concepts, and the differences in the interpretation of the component composition of PU are determined mainly by two opposing points of view on the nature of the constituent PU elements. According to the adherents of the first point of view, the PU component is a out-of-word, semantically devastated combat element. According to supporters of opposite views, the phraseological component is a special word formation.

Theoretical research in the field of English phraseology convincingly demonstrates that a phraseological unit is a more complex formation than a word or a variable phrase. I.R. Galperin calls phraseological units "combinations of words in which the meaning of the whole dominates over the meaning of the constituent parts, or, in other words, the meaning of the whole combination is not entirely accurate and sometimes not at all deducible from the sum of the parts that make up this combination" [2., 169]. To the category of phraseological units A.V. Kunin refers to "separately formed units of the language with fully or partially rethought meanings" [3., 6].The semantic change affects phraseological units either completely to do smth. with flying colors - to successfully cope with the task, or one of its components to die with one's boots on - to die while performing a combat mission.The meaning of a phraseological unit, known to the speakers of a given language, cannot always be determined from the meanings of its components, which causes difficulties in adequate perception, understanding and translation. In the phraseological meaning itself, there are two sides: the content plan (designatum), in which one should distinguish between the significative (constituting the content of the concept), denotative (reflecting in a generalized form objects and phenomena of extra-linguistic reality) and connotative (emotionally expressive) aspects, and the expression plan, that is, the material shell of PU. This two-sided nature of the meaning of the phraseological unit represents the unity of content and form.

The English-language scientific linguistic literature is represented by a relatively small number of works devoted to the theory of phraseology. The existing works (L.P.Smith, R. Moon, etc.) do not raise such fundamental questions as scientifically substantiated criteria for identifying phraseological units, the ratio of phraseological units and words, the systematic nature of phraseology, etc. English and American scientists also do not raise the question of phraseology as an independent linguistic discipline. Problems of phraseology are interpreted mainly in works on semantics and grammar, as well as in prefaces to phraseological dictionaries.

The process of realizing oneself among the surrounding reality and defining oneself as a person began with sensations that arise directly through the senses and parts of their own body. The human body turned out to be one of the most accessible objects for observation and study, and the words denoting parts of the human body are as ancient as the human consciousness itself. With the help of these "tools" of cognition, a person began to orient himself in space and in time, expressing his attitude to the world.

The term "somatism" has various meanings. According to a wide interpretation, somatisms, [from the Greek soma (somatos) - "body"] are a means of designating phenomena related to the

sphere of corporeality. In a narrower sense, somatism is any significant sign, position or movement of the face and the whole body of a person.

Somatisms, due to the clarity of the functions of the parts and organs of the body, called these units, the ease of their allegorical comprehension, have increased productivity in the field of phraseology. There are various approaches to the study of somatic phraseological units in terms of diachronic and in terms of synchrony.

At present, the problem of interpreting the image of a phraseological unit in the space of cultural knowledge is becoming increasingly important, in the light of which various somatisms participating in the creation of the image are investigated to identify cultural meanings.

For the last ten years, somatic phraseology has become the subject of constant research based on the material of different languages: Russian, Adygei and English languages (Z. Bogus), Russian and Polish languages (M. Gordi), Russian and German languages (R. Mugu), the Kazakh language (E. Nikolina), the Russian language (D. Sknarev), Russian and Spanish languages (V. Yakovleva) etc. Nevertheless, despite the fact that in modern linguistics the problem of somatic phraseological units is widely investigated, English somatic phraseological units are still an insufficiently investigated linguistic phenomenon. [1., 7]

According to the data, many somatisms appear according to the composition of somatic phraseological units: arm, back, cerebral back, abdomen, bone, brain, cheekbones, elbow, eye, eyebrows, eyelids, face, fingers, toes, hair, hands, head, heart, heels, hips, joints, knees, feet, lips, mouth, muscles, bones, neck, palms, ribs, shoulder, skeleton, skin, skull, spleen, nerves, throat, tongue teeth (teeth).

When talking about the productivity of somatisms in the construction of somatic phraseological units, the somatic phraseological units that make up the words hand, eye, head, heart, foot (foot) need to be evaluated most productively. There are infertile parts of a somatic phraseological unit that includes the face, ears, back, blood, nose, fingers, bones, heels, hair, feet, lips, skin, tongue, teeth (teeth), hands, neck, and so on. (SPU). [5., 83].

The Estonian Scholar F. Vak was the first to introduce the term "somatic" into linguistics. The term “phraseological somatism” was first coined by E.M. Mordkovich used it and applied it to the Russian language in his article “Semantic-Thematic Examination of Somatic Phraseologisms”. [4., 241]

So, the following units were used as somatic components in phraseological units of the English language: head, shoulder, brain, hair, eye, nose, mouth, tooth, ear, tongue, heart, hand, foot, thumb, heel, neck, knee, arm , back, finger, leg, flesh, blood, skin, bone, lip, face, lung, cheek. For example: one’s hair stood on end, not to see beyond the end of one’s nose, the world is on the tip of my tongue, from the bottom of one’s heart, to have one’s head screwed on one’s shoulders on the right way, etc.

It should be noted that somatic components are used in phraseological units and in the plural form, in the body of the research material we have identified the following plural somatisms: shoulders, brains, hairs, eyes, teeth, ears, hands, feet, heels, knees, arms , legs, bones, lungs, for example: to bring somebody to his knees, to welcome someone or something with open arms, to stand on one's own two feet, to wash one's hands off, etc ..

The presence of derivatives of somatisms in the structure of a phraseological unit is also recognized as a criterion for material selection: eye-opener, finger-tips, eye-teeth, for example: an eye-opener, to have something at one’s finger-tips, to have one’s eye-teeth cut.

In the Karakalpak language, the following lexical units were recognized as somatism components that make it possible to include a phraseological unit in the corpus of research material: head, hair, shoulder, neck, eye, nose, mouth, tooth, eye, ear, tongue, heart, blood, heel, hand, leg, heel, knee, tongue, back, finger, flesh, skin, bone, lip, pharynx, throat, brain, face, back of the head, forehead, abdomen, forehead. For example: to poke your nose into your own business-birewdin’ isine murnin sug’iw(aralasiw), an eye for an eye – ko’zge ko’z, a tooth for a tooth-tis ke tis, a

tongue to swallow-tili tan'layina qatiw, a bad head does not give rest to the legs, etc-bas islemese ayaq sorlig'a qiyin.

English-speaking writers use somatic phraseological units with a "heart" somatism to express emotions, passion, and strong emotions, while karakalpak writers use emotions as "soul" (jan), "mood" (kewil). expressed in words. For example: light - hearted – aq kewil , to take to heart – Janina tiyiw, etc

There are a number of similarities between the karakalpak and English languages in the definition of certain events. For example, to widen one's eyes – ko'zi uyasinan shiqti, smb's hair stands up on end – to'be shashi tikturdi, an apple of an eye – ko'zdin' qarashig'i, to put smb's heads together – bas qosiw, etc

Karakalpak is richer in somatic phraseological units than English is. To one English idiom we found several different karakalpak equivalents:To hold one's tongue/ to open one's lips – jumg'an awzin ashpaw, tilqatpaw,awzinaqumquyiliw,awzinataqansalipaliw; To keep an eye on smb –ko'ztigiw, ala ko'zimenenqaraw,ko'zinalaytiw,ko'zinbaqiraytiw;

For example: …-Awzin'aqum*! Ju'rekti jarmag'an endi sen qalip edin',*- dep ha'mmeg'awirlasadi.(**Awzina qum quyiw-so'yletpew, u'ndetpew**, Ju'regi jariliw-qatti quwaniw yamasa qorqiw) [6., 27]

…-Bizge salsan'iz qizdin' jazasi-dar, ata-enesinin' gu'nasi zindan!...dep Muxammed na'zir qabag'in u'ydi. (**Qabaqu'yiw**-ashiwlaniw,qapa boliw) [7., 143]

In conclusion, the human factor plays an important role in the emergence of somatic phraseological units, which occupy a special place as a linguistic phenomenon in the English language. Somatisms are widely used in phraseological units. This is because the names of body parts represent the most archaic and at the same time the most persistent lexical layer, which is closely related to the functional and emotional aspects of a person, the individual characteristics of different language groups.

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Rezyume: *Maqola somatik frazeologiya bilan dunyoning lingvistik rasmining tarkibiy qismlaridan biri hisoblanadi. Ingliz va Qoraqalpoq tili frazeologik birliklarida va somatik komponentlar.*

Резюме: *В статье рассматривается соматическая фразеология как одна из составляющих языковой картины мира. И соматические компоненты во фразеологических единицах английского и каракалпакского языков.*

Kalit so'zlar: *frazeologik birliklar, somatika, somatik komponentlar, somatik frazeologiya.*

Ключевые слова: *фразеологические единицы, соматизм, соматические компоненты, соматическая фразеология.*

THE CONCEPT OF PUBLIC SAFETY AND ITS LEGAL BASIS

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Summary: *In this article the concept of public security, the legal framework for its existence, public security agencies are scrutinized by author. It also analyzes the existing problems in public safety and makes specific proposals to address them.*

Keywords: *public, public safety, civil safety, providing public safety, National Guard.*

Ensuring the peace and security of the country is one of the top priorities of every state. Along with other state bodies, the functions of the National Guard of the Republic of Uzbekistan have a significant role in ensuring peace and security. The President of the Republic of Uzbekistan Shavkat Mirziyoyev maintained that according to the recent measures taken on the organizational structure of the Armed Forces, the National Guard has been established. It is known that duties of this special military unit are ensuring the security of society and the state, the realization of human rights and freedoms, protection the safety of nation from various terrorist threats and law enforcement activity[1].

Today, units of the National Guard of the Republic of Uzbekistan stands in indispensable position in ensuring public order and safety of citizens. National Guard units provide public order, patrolling, summoning prone offenders, conducting one-on-one interviews, community meetings, and prosecuting offenders and offenders.

It is essential to maintain and focus on the concepts of public safety and civil security.

Public security is the function of governments which ensures the protection of citizens, persons in their territory, organizations, and institutions against threats to their well-being and to the prosperity of their communities

Ensuring the safety of citizens means the elimination of any illegal encroachment on citizens and their property, the prevention of unlawful violation of the inviolability of the person and his property, the prevention of various encroachments that threaten the peace. The National Guard units consider to protect individuals and their property from criminal encroachment, to stop the illegal movement of persons who are preparing to commit an offense or a crime, or to prevent them from committing an offense or crime; identification and elimination of sources of threats to peace and security, monitoring the implementation of security measures by individuals, arrest and prosecution of offenders as their main function[2].

In a short time, the National Guard became an important link in the country's security system. Along with the ongoing reforms in all spheres of public life in the Republic of Uzbekistan, a number of reforms have been implemented in terms of improving the activities of the National Guard. It is known that any change is initially reflected in the legal framework, including the following legal framework for the activities of the National Guard over a short period of time:

First, according to the “Defense Doctrine of the Republic of Uzbekistan[3]” approved by the Law of the Republic of Uzbekistan the relevant governing bodies, troops, military structures and institutions of the National Guard of the Republic of Uzbekistan are included in the Armed Forces. According to Article 18 of the Doctrine, the main tasks of the Armed Forces of the Republic of Uzbekistan in times of "peace", "threat" and "war" are defined;

Second, in accordance with the Law of the Republic of Uzbekistan "On amendments and additions to some legislative acts of the Republic of Uzbekistan in connection with the improvement of certain state bodies in the field of security and defense[4]", 16 laws, including Criminal Procedure Code of Administrative Offenses, Tax Code, Customs Code, Air Code and the Law "On Combating Terrorism", "On Fire Safety", "On Sanitary and Epidemiological Surveillance", "On Tuberculosis" , Amendments and additions were made to the laws “On the State

Flag of the Republic of Uzbekistan" and "On the State Emblem of the Republic of Uzbekistan" concerning the activities of the National Guard of the Republic of Uzbekistan;

Thirdly, the President of the Republic of Uzbekistan in April 2019 adopted laws regulating the activities of the National Guard in the field of law enforcement in connection with the establishment of units of the National Guard of the Republic of Uzbekistan to conduct investigations and inquiries.

In accordance with the Law of the Republic of Uzbekistan "On Amendments and Addenda to the Criminal, Criminal Procedure and Administrative Code of the Republic of Uzbekistan", the powers of the National Guard in the field of pre-trial investigation and inquiry:

According to the appendix to Article 381^2, part 1 of the Code of Criminal Procedure: the National Guard and its local branches are charged under Article 250^1 (illegal handling of pyrotechnic articles) of the Criminal Code (except for crimes related to violation of customs legislation) and Article 259^1 ((Non-fulfillment of obligations to ensure the protection of critical and classified objects) conducts pre-investigation and inquiries into cases of alleged crimes.

As a result of the addition of Article 248^1 of the Code of Administrative Responsibility[5] of the Republic of Uzbekistan, 61, 185^1 (except for violations of customs legislation), 194^1, 195^1, 196 (except for offenses related to violation of customs legislation) of the Code of Administrative Liability of the Republic of Uzbekistan In case of detection of administrative offenses provided for in Articles 1 and 2 of this Code, officials of the National Guard of the Republic of Uzbekistan shall draw up a report on the administrative offense.

In accordance with the relevant Decree of the President of the Republic of Uzbekistan, the National Guard of the Republic of Uzbekistan is responsible for maintaining public order, including during public events, rallies, meetings, demonstrations and public places, prevention of offenses, including their detection and commission. and new tasks were assigned, such as determining the conditions.

In addition, the President of the Republic of Uzbekistan Sh. based on the tasks set at the extended video conference held under Mirziyoyev on March 18, 2020, prophylactic (senior) inspectors, servicemen and employees of the National Guard of the Republic of Uzbekistan, chairmen of mahallas, as well as assistants of prophylactic (senior) inspectors and "Fidokor Youth "patrols have been set up to curb crime. Measures were also taken to conduct independent patrols of alleys, squares, parks, shopping malls and centers, hypermarkets, supermarkets, commercial markets.

Implementation of the tasks set out in the above-mentioned legal framework, in turn, requires increasing the knowledge of servicemen and staff of the National Guard of the Republic of Uzbekistan in the field of public order and crime prevention.

As society is constantly evolving, criminal rate of the society is increasing as well. Therefore, it is time to improve the work of the National Guard and law enforcement agencies, as well as all law enforcement agencies, which are working to prevent and detect crimes. It should be noted that crime prevention is better than punishment for offenders, which means that citizens, the state and society suffer both economic and moral damage as a result of the offenses. Especially in emergencies, it requires a responsible approach to maintaining public order and ensuring the safety of citizens. The relevant articles of the Criminal Code and the Code of Administrative Offenses of the Republic of Uzbekistan define the responsibility for violations of public order.

The activities of the National Guard to maintain public order and ensure the safety of civilians have their own legal basis. These normative legal acts can be divided into laws and by-laws according to their legal force.

Public safety differs from private security. The first difference is a service that the state must provide to ensure peace and tranquility while protecting the rights and property of citizens, and the second is to ensure the protection and safety of goods, infrastructure and people.

Over the past two years, a number of documents, articles are whipped up in the sphere of law. In particular, the structure and powers of all branches of the police have been reconsidered, and

65% of the staff will work in the neighborhoods to be closer to the population. The focus was on crime and delinquency. To this end, the number of prevention inspectors has been increased by an additional 1,000 people, and appropriate social and living conditions have been created for them to serve effectively in the field. It is safe to say that as a result of the initiatives of the President, the introduction of "Safe City", "Safe Tourism", "Safe House" systems, the establishment of a 24-hour patrol service, people have gained confidence in "justice and the rule of law." ladi. According to the Supreme Commander-in-Chief of the Armed Forces, each law enforcement agency should have in-depth information on the location and type of crime, and government agencies and public organizations should work together on a regular basis. The Ministry of Interior, the Ministry of Defense, the State Security Service, the National Guard, the Prosecutor's Office - all must serve the people. At the same time, there must be a strong anti-ignorance awareness in society. The environment should be such that no one is allowed to commit a crime, which is an effort to ensure that citizens live in peace and tranquility[6].

Drawing conclusions from the above considerations, the following is suggested:

• A broader and more detailed coverage of the concept of public places requires that it be reflected in the law;

• In the selection of candidates for the positions of sergeants and officers of public security units in the educational institutions of the National Guard of the Republic of Uzbekistan. and development of criteria for granting benefits to candidates who have won the Republican Science Olympiads and candidates who have received state awards;

• At the district (city) level, by the decision of the district (city) governor, it is necessary to organize the activities of patrol units engaged in maintaining public order and security in public places and in special circumstances on a contractual basis and to create a legal framework for their activities;

• To provide the National Guard personnel involved in the prevention of public safety with electric weapons and electric motorcycles that meet international standards and create favorable conditions for the performance of their duties.

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Rezyume: *maqolada muallif tomonidan jamoat xavfsizligi tushunchasi, uning mavjud bo‘lishini ta’minlovchi huquqiy asoslar, jamoat xavfsizligini ta’minlovchi organlar muhokama qilinadi. Shuningdek, jamoat xavfsizligi faoliyatida mavjud muammolar tahlil qilinib, ularni bartaraf qilish bo‘yicha o‘ziga xos takliflar ilgari surilgan.*

Резюме: *В статье автор подробно исследует понятие общественной безопасности, правовые основы ее существования, органы общественной безопасности. Он также анализирует существующие проблемы общественной безопасности и вносит конкретные предложения по их решению.*

Kalit so‘zlar: *jamoat, jamoat xavfsizligi, fuqarolar xavfsizligi, jamoat xavfsizligini ta’minlash, milliy gvardiya.*

Ключевые слова: *общественность, общественная безопасность, гражданская безопасность, обеспечение общественной безопасности, Национальная гвардия.*

PHOTOJOURNALISM - AS THE MOST IMPORTANT AND IMPRESSIVE TYPE OF VISUAL INFORMATION

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Summary: *The article examines the role and significance of photographic materials in modern journalism. The author distinguishes between two types of photojournalism, mainly artistic photojournalism and documentary photojournalism. The article describes four main aspects of photojournalism: content, technique, genres and theoretical foundations of photojournalism.*

Keywords: *photojournalism, journalism, photography, photographic material, genre, racus, newspaper, magazine, illustration, information, photojournalism, photography, photojournalist, photo report, mass media.*

The importance of visualization has significantly increased during the period of globalization. One of the main reason for this is due to the excessive expansion of the amount of information. Reference sources are growing on a considerable scale. They can be divided into four groups: Local Mass Media, World Mass Media, official news on the internet, bloggers on the Internet. Of course, in this case, it is impossible to involve all the information. Anyway, the necessity to involve all the information, modify and analyze the data is growing up. Consequently, journalists have been utilizing two methods:

Firstly, transmitting the information on a short and understandable way.

Secondly, enhancing the visuality of the information.

Visual perception of the environment has always played a vital role. Because, all the day 90 percent of the information is perceived in a visual way. That's why the materials that are presented on a pictorial way are always crucial.

Photojournalism is one of the most important and impressive fields of journalism. Photo materials have been used as a tool for the illustrating decorations of the newspapers and magazines, internet materials as well as affecting to the auditory.

In fact, Photojournalism is divided into two groups:

1. Fine-art photojournalism
2. Documentary photojournalism

We consider that learning the photojournalism in the following four perspectives would be proper. They are content, techniques, genres and journalism.

1. In the content of pictures its appearance and opportunities is studied. As it's known for all of us, the illustrations on the mass media are taken by photographs, or drawn by artists. The field photojournalism studies the pictures that are taken only by cameras.

The quality of the photo content is evaluated just by exquisite appearance character of the photo. That's why it is necessary to present the complete appearance chances of the photo and use it productively. If the either the newspaper or journal is published without pictures, or the internet materials are came out without photos, then it is considered to be unseen and less attractive.

Photo is the thing that illustrates the life of human being, or all the beings of the nature. It makes live forms stand out from beings and makes them particularly impressive. In addition to this, the appearance in the photo may look better than it does in real life. Because in the picture a part of

life taken objectively is separated from the world and reflected in an impressive way. Most celebrities first gained fame through photography.

D. Joyce described the photo as a "automatic writing". The age of Photo was the age of movement, mimic and dance, says M. Mc. Luhen [1. 218]. Such kind of appearance is believed to be the tool that connects the human relationships because everybody perceives in the same way. The features that presents the quality of the photo is the following things: 1) Photo is an obvious look for everyone that is easily received which does not require any data. 2) Documentary value of the photo is high, because, its reliability effect at the high level (Namely, photo accusation). 3) Time dynamics, human being, nationality, the history of the country and world, unrepeatable events of the nature or history are represented in the photo. For instance, the photo can display the people of the previous century, their appearance and culture of clothing, their life, disappeared streets and buildings of the town without any kind of changes. This is the reason why the photo is called as eternal document. 4) Actions will be strong in the photo and can quickly attract. 5) Photo the photo reveals a vividly documentary image of time, society, the individual 6) photo saves the appearance of the person, event, and society on a special gradient. 7) The date is stopped in the photo 8) well taken photo affects the mood as well as shows its character 9) Photo is the most wide spread technique of transmitting the information 10) Photo shows the method of photograph, his attention to the event and others.

2. Technique donates the standard of newspaper and journals. Before the photo is prepared for publication, there are several requirements to do: 1) Directly take the object to the photo, only the necessary information should be on the frame. 2) Demonstrate more precisely the people, things, buildings, trees that are taken on the photo. 3) The must not be the excessive details on the photo: peoples, things, trees, empty spaces (there will be cut while being prepared to come out and it is called frame). 4) Photo should be complied with the type of the newspaper and journals. 5) The equivalent of the far and close plans of the photo plays a vital role.

3. Defining the genre features of the photo is considered to be crucial. The experts show the different classifications of its genres. For example, N.I.Voron divides them in the following way: photojournalism, photo reportage, photography, photojournalism, photo essay, and photomontage [2. 145]. E.L.Mjelskaya distinguishes like stile life, landscape, portrait and (жанровая фотография) genre photography [3. 34]. G. Chudakov divides the genres of the photojournalism into two large groups that includes several genres: publicist information (photo message, photomontage and photo illustration) and fine publicist (photo essay, photo series and photo poster) [4, 14-15]. As for V. M. Berezin, he offers these classification of genres:

1. Epic and liro-dramatic.

2. Publicist information (photojournalism, photo reportage, photography, photojournalism, photo essay, and photomontage).

3. Fine-publicist (photography, photo portrait, photo essay, photo poster, photo series, photo edition, photo collage).

4. Practical decorative.

Quiet an extensive diversity of examples can be given by the classification mentioned above. If the given data by special sciences is generalized we can create the classification on the below: photojournalism, photo reportage, photography, photojournalism, photo essay, and photomontage, photography, photo portrait, photo essay, photo poster, photo series, photo montage, photo collage e.t.c

4. Photojournalism is the most complicated and productive method of this field. In the history of the Mass media and photo only the publicist photos are saved. Photos that are responsible just for a day will be vanished. Photo publicist is created by the

The word Photography translated from Greek "Fotos" (Light) "Grafos" (write) and from our point of view it gives the meaning "I will write with the help of light" or "write the light". The evolution of the Photojournalism is closely connected with the first come out of the photo and its steps on the development. Photo publicist improved after the appearance of the social photography.

If we come back the history of the photography, we can see that Jozef Nisefor N'eps, Lui-Jak Manje Dager and William Fox Henri Talbots are the first founders of the photography. There various options among the scientists about the invention of photography. Some of them claim that photography is created by Lui-Jak Manje Dager, some of them prove that it was first appeared by Jozef Nisepor N'eps 19 years before Dager's work. Some of them say that 4 year before the Dager's work there was invented a negative effect of the photo and in 1839 Boyar organized an exhibiton with his photos with positive effect. There is an option that in 1865 Yogan by producing the pinhole camera invented the first photography. "Because-they say, in this camera he used the zann lens is also used. This Camera reminds the one which was invented 150 years ago by N'eps"-they try to prove their ideas in this way.

We should not forget that by connecting a number of ideas there was the evolution and development of science technology. So, we can see that Jozef Nisefor N'eps, Lui-Jak Manje Dager and William Fox Henri Talbots, Boyar, Yoganni and Zanns contributed the invention and development of the photography.

B.Karrin is considered to be the inventor of the photos in the social field. He tried to demonstrate the life of the population with simple photographic language. Russian Photograph illustrated so impressively the life of the farmers.

Photography passes the "social photography" period and attracts the attention of the audience. Photo report first came out in1870s during the war between Russian and Turkey. But, at that times the opportunities of the photo report was limited. The cause for its transmission to photo publication was the development of the technology and Russian Japan war at the beginning of the XX century. The Manchjou and the problems in the Far East were effectively illustrated. Among the soldiers there were professional photographers. The poor actions of the war and the hard life of the soldiers were so impressively represented by A. Otsup and V. Vnpla. Besides them, G. Goldshteyn, A. Lionidov, A. Savalev, M. Napelbawm, N. Svincov, M. Saxarov, A. Tarapani were also popular with their photo reports.

We can see the role of the photographic materials in the life of the newspaper and journals in the examples mentioned above. This might be because, if the articles are published just by words, then the importance of the event would be less. If the photo materials are also added to the given work, then it would be interesting, impressive and clear to the readers. This on one hand provides to decorate the newspaper with photo illustrations; on the other hand the level of estimation rises up. As the consequence, it attracts the attention of the readers.

The meaning of the photo was explained above. Publicist work essay is believed to be the actual work, that interests everyone. At this moment, it is necessary to underline the distinctions of the photojournalism and photo publicist. The conception of photojournalism is more wide that photo publicist. Photojournalism might include the information that is not directly related to photo publicist. For example, photo landscape and photo life still. The main feature of the photo publicist is the visual photo publicist.

So, we can show the unique aspects of the photo materials. Firstly, the documentary photojournalism. The view or the event that is illustrated on the photo no one can disprove. Secondly, its actuality. The materials displayed on the photo are crucial because of its presence. Thirdly, photo shows the dynamic, that is the action. Action always attracts the people. Moreover, photo demonstrates the events in the form of view. It is the special feature of the photo material. These aspects initiate the photojournalism as a unique incident.

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Rezyume: *Maqolada zamonaviy jurnalistikada fotografik materiallarning tutgan o‘rni va ahamiyati o’rganilgan. Muallif fotojurnalistikani asosan badiy fotojurnalistika va hujjatli fotojurnalistika sifatida ikki turga ajratib ko‘rsatadi. Maqolada fotojurnalistikaning to‘rt asosiy rakursi, ya’niy mazmun, texnika, janrlar va fotopublitsistikaning nazariy asoslari* isfotlab berilgan.

Резюме: *В статье исследуются роль и значение фотоматериалов в современной журналистике. Автор различает два вида фотожурналистики, в основном художественную фотожурналистику и документальную фотожурналистику. В статье описаны четыре основных аспекта фотожурналистики: содержание, техника, жанры и теоретические основы фотожурналистики.*

Kalit so‘zlar: *Fotojurnalistika, jurnalistika, fotografiya, fotomaterial, janr, rakus, gazeta, jurnal, illyustratsiya, informatsiya, fotopublitsistika, fotorasm, fotomuxbir, fotoreportaj, ommaviy axborot vositalari.*

Ключевые слова: *фотожурналистика, журналистика, фотография, фотоматериал, жанр, ракус, газета, журнал, иллюстрация, информация, фотожурналистика, фотография, фотожурналист, фотоотчет, СМИ.*

THE IMAGE OF JOSEPH (YUSUF) IN RABGUZI'S WORKS

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Summary: The article analyses Rabguzi's attitude to the "Story of Yusuf", the creation of the image of Yusuf in the "Story of Rabguzi". Besides, the aesthetic principles of Uzbek literature in the Golden Urda will also be analyzed.

Keywords: "Uzbek literature in the Golden Urda", "Qisasi Rabguziy", "Yusuf" story, "Qissai Yusuf Siddiq alayhissalam", story.

The emergence of new perspectives in literary criticism has undoubtedly led to the need to look at the history of Uzbek literature as a science free from the search for ideas. Therefore, from the earliest days of literature, it was concluded that aesthetic principles and aesthetic values, rather than ideological views, were formed as objects formed as a result of the "mental development of humanity**"** [1, 48]. In the literature of each period, a unique relationship of attitudes reflected new, different states of aesthetic values.

Paying special attention to the Uzbek literature of the Golden Urda, we would like to emphasize that it is a unique aesthetic object. In general, no matter what period literature we are talking about, written literature was not devoid of aesthetic principles. Only aesthetic principles have different characteristics in the literature of different periods.

Such an idea can be put forward about Kul Ali's "Qissai Yusuf", which is interpreted as a prominent representative of Bulgarian-Tatar literature. As early as the 19th century, famous European Turkologists A.Krimsky, K.Brokkelman, A.Borovkov, Tatar scholars G.Gaziz and G.Rahim commented on the spread of the plot of Yusuf's story. Almost all of these scholars suggested that the homeland of the story of "Yusuf" was Central Asia, more precisely, Bukhara or Movarounnahr. In particular, the Turkish scholar M.F.Koprulizoda says that the homeland of this story is "pious and ascetic Khorezm" [2, 277], and it is impossible not to agree. In fact, the remarkable aspect of the most beautiful "Story of Yusuf" and its stories in the "Story of Rabguzi" created in the Khorezm region, and the fact that this series of stories gained attention in the East, is emphasized in this work. At the beginning of Rabguzi's "Qissai Yusuf Siddiq" (alayhissalom), when he began to narrate this story, what was the wisdom in saying "ahsan"? He asks himself a question and answers: "Javob ul tururkim, Qur'on ichindagi qamug'qissalardin telimrak, foydasi ukushrak Yusuf qissasi turur. Ul yo'ldin "Ahsan-ul-qasas" (qissalarning eng go'zali – M.K) tedilar"[3, 100]. (Meaning: Yusuf's story "Ahsan-ul-Qasas" in the Qur'an is the most beautiful story). This single commentary by Rabguzi clarifies the source and origin of the series "Yusuf" and "Yusuf and Zulayha". We will not dwell on "Surah Yusuf" in the Qur'an, as it is known to scholars. And so on, it's out of the question. Probably, the European scholars who spoke about Yusuf's plot were unaware of this information in "Qisasi Rabguzi". Koprulizada's opinion of Yusuf's story is quite logical, it corresponds to the geographical area of Rabguzi's story, and at the same time it is in line with Rabguzi's information. Khorezm, one of the important cultural centers and lands of the Golden Urda, undoubtedly served as a "bridge" to convey the literary process of Central Asia to other lands inhabited by Turkic peoples.

We decided to begin with a brief commentary on the stories of "Yusuf" and the epics of "Yusuf and Zulayha". Indeed, when it comes to the impact of this series of stories on fourteenth-century storytelling, it can be said that the plot of Joseph (Yusuf) originated as a genre of storytelling. In addition, the story is superior to the genres of narration, news, and anecdote. The adventures of "Yusuf and Zulayha", as well as certain aspects of these heroes and their activities as artistic images, are often described in the narrative genre.

The Golden Urda we are talking about is remarkable for the fact that the aesthetic principles of Uzbek literature are based on moral and educational concepts. At the same time, in this state of

the Golden Urda, which is spiritually, culturally and morally advanced, there is a growing interest in Turkish literature and the Turkish literary language. Although the literature of this period is called Turkic literature, the language is called Turkic language, the works created in the literary environment of the Golden Urda, which has a special place among the Turkic-speaking peoples, are very close to every Uzbek reader in all respect [4, 74]. Indeed, we can only imagine that the Golden Urda had a wide geographical coverage of Uzbek literature as a separate period. First of all, the Uzbek literature of this period was connected with the oral and written literature of the Bulgarian people created along the Itil River. For example, on the eve of the formation of the Golden Urda, along with the Mongol invasion of Central Asia, written literature and folklore moved to the Bulgarian state. Of course, this is a legitimate phenomenon, and it should be noted that the literary process has moved not only through ethnicity, but also through linguistic proximity. The story of Yusuf Siddiq (alayhissalom) in which a woman fell in love with Muhammad Shaybani and behaved inappropriately is noteworthy in this regard. The stories in this category are close to the stories in the first category. After all, the ideas and beliefs of the Sufis required that they, as individuals, purify themselves both spiritually and externally. Rabguzi devises all sorts of tricks to make Zulayha fall in love with Yusuf in order to catch up with him. Zulayha enters the house in a beautiful dress and takes Yusuf to her. Yusuf refuses to accept Zulayha's offer to have an affair, saying that he loves Alloh, that the beloved Egyptian bought me, and that he will not betray him. Yusuf tries to convince her that Zulayha's offer of a romantic relationship is unacceptable. After all, Zulayho was the most beautiful woman on earth after Eve. Zulayha's beauty did not move Yusuf's heart. Rabguzi narrates the following story to show that the integrity of Joseph's faith did not undermine his moral perfection.

One man fell in love with Imam Muhammad ibn Hasan Shaibani. He was lying in wait. Imam Muhammad came and said, "O Imam of the believers, I have a question for you. Please come into this house. " Imam Muhammad entered the house, and the man closed the door and clung to Imam Muhammad. He gave him some advice, but he didn't accept it. He said, "I have work to do outside. He agreed. Imam Muhammad went out and rubbed feces on his body, face and neck. When he returned to the house, the smell of feces spread to the house and the man ordered Imam Hasan to leave the house. Because he was not in love with the Imam's heart, but with his appearance. [3, 125]

Through this short story, Rabguzi Muhammad through the image of Shaybani, along with the criteria of morality, showed that the rejection of lust is a beautiful manifestation of faith and morality. The integrity and moral purity of Yusuf's faith is shown through the image of Muhammad Shaybani, and Zulayha's lust and enslavement to greed are shown through the woman's misdeeds and actions in the story. When Rabguzi uses narrative stories to convey his main purpose, he places the main burden on the stories. As mentioned earlier, in addition to the story, there are several other genres in the story - narration, news, anecdote, narration, which, of course, serve the story. Let us return to the story of "Yusuf Siddiq". While Zulayha was in love with Yusuf in the story and was trying to fulfill her intention, Rabguzi told Imam Muhammad ibn Hasan Shaybani that a woman had fallen in love with him and that the imam had committed adultery with her tells the story of how he survived [3, 125].

Rabguzi's purpose in quoting this story is to exemplify the "weakness" between Zulayha and the woman who tried to seduce Imam Muhammad, and the "kindness" between Yusuf and Imam Muhammad. Rabguzi attributes the "kindness" and "weakness" he is trying to convey to the story, not to other genres in the story. The two successive stories in Yusuf Qissai Yusuf Siddiq (as) are about the miracle of eye contact that has survived among the people and the consequences of this belief. In the story, Jacob exhorts his sons to go to Egypt: "I tell you, when you come to Egypt, do not go in by the same door. Enter through the door one by one so that the eyes of the people do not touch ..."Then the hadith of the Prophet (Muhammad sollolohu alayhu vassallam) is narrated: "Eye leads to men to tomb, it takes camel to cook. ". The following narration from Qissai Yusuf Siddiq (as) is in line with the above hadith.

In the story, there was an Arab tribe. “His eyes were wide open and he was famous. When they want to eat meat, they put a pot on their wives and say to those who cross the road, “What a beautiful horse you have, or a cow, or a goat!” then they would die and they would bring meat”. [3,144].

The rest of this story is based on the author's main goal - the importance of faith among the people, the fact that beliefs are one of the most important aspects of human faith, not heresy. The consequence of eye contact is that people with bad intentions return to themselves, and the essence of the story lies in the fact that a person's intention should only be good, the evil intention returns to the head of the perverted person, so the person the belief that he should be worthy of what he sees as worthy of others is exaggerated.

Story. The disbelievers of Quraysh captured one of the tribes to harm Muhammad Mustafa صلى الله عليه وسلم and told him to harm Muhammad. Then Gabriel came and brought a verse. Whoever wants to harm the Messenger of Allah, May Allah bless him and grant him peace, recited this verse and rested himself. The victim was eventually blinded. [3, 144]

This story is also told in the story of Joseph. Another story in this series is about the miraculous nature of Moses, not about the sight of the eye, but about the divine power of Alloh in Moses (Muso). The light of the revelation appeared in Moses. Anyone who saw Moses would not be able to see. It is said that the Day of Judgment will be over. That is why Moses was wearing a mask, and no one could see his face. In the story, Moses came across a mountain when he came across a mountain. Musa said, "Open your face and I will see”. Moses opened his face. Uragut stared, but lost both eyes. Moses pleaded, saying, “Pray for the executioner and let him sees me”. Moses prayed, and his eyes were opened. He said, "Open your face and I will see you again”. Moses was hungry, but he could not see again. He said, “Pray” It did, but it opened. I'll see you later. Moses said, “You will not see”. He said, “O Moses, it is better for me to be blind than to see the light”. Moses opened his face. Uragut stared, lost his sight, and was shot [3, 171].

In our opinion, Rabguzi did not fabricate this story himself or did not take it from the people's oral tradition, but from another written source. Therefore, Rabguzi uses the phrase “coming in the story” and convinces the reader that Moses has a radiant light.

So, one of the works that united Central Asia and Bulgaria in the early days of the Golden Urda and ensured the integrity of the literary environment is the plot of Yusuf. Many didactic stories in this story testify to the uniqueness of this story, created in the Uzbek language in the literary environment of the Golden Urda, and the important role of the literary environment of the Golden Urda in the development of genres in Uzbek literature.

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Rezyume: *Maqolada Rabg‘uziyning «Yusuf qissasi»ga munosabati, «Qisasi Rabg‘uziy» asarida Yusuf obrazining yaratilishi masalalari tadqiq qilingan. Shuningdek, Oltin O‘rda o‘zbek adabiyotining estetik tamoyillari tahlilga tortiladi.*

Резуме: *В статье исследуется отношение Рабгузи к «Рассказу о Юсуфе» и создание образа Юсуфа в «Рассказе о Рабгузи». Также будут проанализированы эстетические принципы узбекской литературы в Золотой Орде.*

Kalit so‘zlar: *«Oltin O‘rda o‘zbek adabiyoti», «Qisasi Rabg‘uziy», «Yusuf» qissasi, «Qissai Yusuf Siddiq alayhissalom», hikoyat.*

Ключевые слова: *«Узбекская литература в Золотой Орде», «Рассказ о Рабгузи», «Рассказ о Юсуфе», «Киссаи Юсуф Сиддик алайхиссалам».*

THE NAMING FATURES OF ETHNOGRAPHERS IN FOLK EPICS

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Summary: *In this article the national ethnographic materials that are found in the language of folk epics, which is one of the folk oral traditions, are studied. The reasons for naming ethnographies are analyzed on the example of epics. In addition, the author draws on the analysis of several types of nominations in the context of factual analysis. In this case, the nomination (naming) is studied in the main directions, that is, in terms of morphology, function, nomination depending on the material. In other words, the origin, meaning and function of the nominative words are compared in the context of content analysis.*

Keywords: *term, nomination, ethnographism, organ, clothing units.*

There are two ways to study the semantics of a language. On the one hand, it is possible to analyze ready-made language forms and ask what their semantics are. The second way is to first select any meaning that interests us, and then convey it in clear language units. The first case is called semasiological analysis, and the second is called onomasiological analysis. In linguistics, the comparison of semiotics and onomasiology is common. However, these are interrelated sections of semantics. The way of analysis is often determined by the goals and objectives of the study.

In linguistics, the choice of a term is not required by law, and the choice of a term is independent. This type of choice proves that different peoples have different names for the same thing. In many cases, the term may be similar according to the properties of a substance in the peoples whose genetics is different. This leads to the similarity of practices in society in the nomination, that is, the fact that many people choose one of the various properties of the thing.

The factual analysis of Karakalpak folk epics shows that many ethnographisms can be traced back to several groups.

In this article, we will learn the following types of nominations:

1. Nomination by morphology. In these terms, the components that make up the word are the words that describe the organs of humans and animals.

In the lexicon of epics, which is considered to be the richest treasure of the Karakalpak people, there are many names of human and animal organs. These words form the backbone of the Turkic word layer. After all, it is known that each nation call the names of organs by the words of the native language. It is almost impossible to name the organs with words from other languages. If so, it is rare. Scholars say: "... the terms of the human organs in the vocabulary of each language are considered to be the original words of that language, that is, the terms of the human organs are less derived from other languages [3: 193].

In the lexicon of Karakalpak folk epics there are words that mean several human organs. These include bas (head), awiz (mouth), ayaq (leg), qol (arm), qulaq (ear), murin (nose), jurek (heart), qoltiq (armpit), bawir (liver), bel (waist), qabirg'a (rib), ju'z-jamal-bet (face), ko'z (eye), ko'kirek (breast), qa'ddi-boy (stature), barmaq (finger), to'be (top), shash (hair), jan-ju'rek (heart), dize (knee), pa'nje (hand), tobiq (ankle), bilek (wrist). For example, Joqarisi *ko'z*, asti *awiz*, ortasinda *murni* tawdin sengirindey sinin'di buzip tur eken, -dedi. (The upper is eye, the bottom is the mouth, and the nose in the middle are like a mountain and it spoils your face, -he said).

"ay, inim, bizin' elde ushiq ta ko'p, pushiq ta ko'p, jalg'iz *janim* qalsa boldi, kesip ala ber, inim, -dedi. (Oh, my brother, in our country there are a lot of little, a lot of small nose, only leave my heart, cut others, my brother-he said). *(*The Epic of Bozuglan, p. 220).

Oqiranip tikireytse *qulag'in*, If he looks and raises his *ears*,
Qara tasqa qayrap bassa *tuyag'in*. Marshes *hoof* sharpening a black stone. (The Epic of the Forty Girls, p. 9)

On' *qolinan* bir su'ydi, shep *qolinan* bir su'ydi, He kissed her right *hand* and then left *hand*.

Man'layinan jup su'ydi. He kissed twice on the *forehead*. (Epic of Edige, p. 33)

In these rows the qulaq (ear) is the human's listening organ, qol (hand) is the part of the human body that adapts to things from the shoulders to the fingers, the man'lay (forehead) is the organ above the human eye, and the tuyaq (hooves) are the underside of the feet of animals, horses, and other domestic animals.

The foot is used in the epics in both literal and figurative senses: in the sense of the end of something, in the sense of the foot, and in the sense of the body that serves to support and move the body. The heart is a circulatory system. The word means "moved" in Old Turkic. For example, At basinday som *ju'regi*, Qanag'a siymay turadi. Ya qoltiqtan, ya *ju'rekten* ata qoyg'anda masaqsiz qamis oq tiymey o'tip ketpeydi (the heart is as big as a horse's head, it doesn't fit in its place. When shot from the armpits or from the heart, a reed without a stalk does not pass without a bullet) (Epic "Edige", p. 33). As we have already mentioned, this is one of the few words that is derived from the other languages among human organs. This is approached by the sound structure in the Mongolian language "zyurhe" in the Kalmyk language "zerke", in the Manchurian language "zhurege", in the Uzbek language "yurak" [1: 220]. The word is also found in Japanese as "kokoro". The word kokoro, which means heart in Japanese, is semantically and structurally similar to the word "ko'kirek (chest)" in Karakalpak. This word is used in the form of "jurek (heart)" in Mahmud Kashkari's "Devonu lugat-it turk".

Bawir (Liver) – is used in epics in the form of "bawir" and "bag'ir". For example, Qoltig'ina qisip, *bawirina* basip, balasin izine ertip, Sarg'ayadi, soladi. *Bag'iri* ottay kuyedi. (She tightened him in her armpit, *hugged* him, followed him, missed and was upset. His *liver* burns like fire). (Epic of Edige, p. 150). It is worth noting that in the above examples, the human organs themselves are used in several variants in the language of Karakalpak folk epics. For example, bash-bas (head), bawir-bag'ir(liver), juz-jamal (face), qaddi-boy (body), jan-jurek (heart), and so on. The names of these human organs were also used in ancient writings. In particular, in the language of the Orkhon-Yenesei monument (VI-VII centuries) in the form of bas-bash, kewil –ko'n'il (soul), suyek-su'n'u'k (bone), shash-sach (hair), dize-tiz (knee), in the "Devanu-lugat - at-turk" these words are: awiz-ag'iz (mouth), moyin-boyin (neck), shash-sach(hair), ju'z-juz (face), ayaq-azaq (leg), dize-tize(knee), jurek-yurak (heart), emshek-emik (breast), bilek-bilak (wrist), su'yek-son'uk (bone). From this it is clear that these words are also found in the language of ancient written memoirs, and that they have undergone various changes.

The use of words in several variants in this form in the folk epics, which are the national heritage of the Karakalpak people, certainly proves its unique artistic and rich linguistic features. For example: A'ne, qarday eti, nurday *beti*, onnan artiq hesh bolmas Biypatmanin' u'mmeti, juzin ko'rgen jigitke jawar qudanin' ra'hmeti. (That, body like snow, *face* like light, there's no ummah than Biypatma, the grace of the goddess to the young man who saw his face)(The Epic of Bozuglan, p. 220).

2. Nomination for service. In the historical and heroic epics of our people many names of military uniforms and weapons can be found. This is because the epics military uniforms in the episodes of the participation of the heroes in battles, swordsmanship, and competition for the beloved shore, weapons, their use are reflected and play an important role in resolving the situation.

Batirlar ishedi ma's bop sharabin, The heroes drink wine,
Qilishlar sag'inar jawda *qinabin*. *Swords* miss its *scabbard* in enemy.
Or:
Mergen bolsan' go'zegen jerden atarsan, If you are a *sniper*, you can shoot from anywhere
Nesiyben' bolmasa balam qaytarsan, If you don't have luck, you'll return, my child,
G'arrimizdan qalg'an bir bayshinar bar, There is a baishynar left from our grandpa,
Mergen bolsan' *sarijayin'* tartarsan'. If you're a sniper, you'll take your *arrow*. (Epic Koblan, p.414)

The basic meaning of the word "qilish (sword)" in the above examples is "a long, bent, dagger-like sword made of steel." Its second meaning also means that the tool is used for weaving

cobwebs [2: 202]. However, the word used in the rows above serves as a weapon. The word “qinap (scabbard) means "a bag made of leather for swords and sabers." This bag protected the sword from frost and rain, and the prohibition of the sword in military campaigns was important in order not to cut the human body, that is, to ensure its safety.

The word mergen (sniper) is mainly used for a person who is engaged in hunting and hunter. However, the troops are needed on the battlefield who do not miss a single shot. Therefore, the art of sniping is one of the martial arts. This art has survived to the present day. Most of us don't pay much attention to the fact that the word snaiper (sniper) came from mergen. The word sarjay in the epic "Koblan", cited in the example, can be found in almost all the epics of the Karakalpak people.

Sarijay (arrow) is an old shotgun. This is an archaic word. In particular, we can see that in historical works, instead of this word, the words "oqjay (arrow)" and "sadaq (bow)" are often used. Although the word sarijay is less used in our country, we can see that the word sarijay is still actively used in related nations. For example, in the Kazakh people:

Qinapqa salsa jilt etken, when you put in scabbard, it shone,
Suwirip alsa jarq etken, When you pull it out, it flashes,
Almas *qanjar* qolg’a alip, Holding a sharp *dagger*,
Sultayshaday qalmaqtin’, Like Sultaysha of Kalmykia,
Basin kesip aladi. He cut off his head.
Or:
G’amg’a kewlin toltirip, Filling the soul with grief,
Zalimnin’ gu’lin soldirip, By withering the flower of the wicked,
Aq *nayzanin’* ushina, To the tip of a white *spear*,
Zalimnin’ basin ildirip. Hanged the head of the wicked. (The Epic of the Forty Girls, p. 58)

The qanjar (dagger) in the above-mentioned rows is “a short-handled weapon with a sharp point on both sides, strapped to a belt”, and nayza (a spear) - an old war weapon with a long wooden handle with an iron tip." If the dagger was used in close combat, the spear was a weapon used to stab the enemy and make wounds.

Kiyip *sawit* a’rman menen shaylayiq, Let's be ready wearing the *armor*,
Ha’mirin’izge shegip beller baylayiq. Let's obey to your order. (Epic of Maspatsha, p. 88)

The word sawit (armor) in these rows means "military uniform." That is, clothes made of iron or steel wire to prevent bullets from passing through the bodies of heroes.

3. Nomination according to the material. In the lexicon of folk epics there are cases of naming the products and materials used. Thus, they can be divided as follows:

1) Names related to construction. In Karakalpak folk epics there are also construction terms. Among them you can see more words related to construction, such as saray (palaces), otaw (clans), orda (hordes). For example, a palace is a place where khans sit:

Aq *saraygʻa* men qoymadim za’n’gini, I did not put the ladder in the White *palace*,
Men buzip almadim qala ba’ntini. I did not break and take the city lock. (Epic Maspatsha, p.124)

Orda (Horde) means "place to live, people gathered place, dwelling, occasion". For example:

Tawdin’ qirra boyinda, Along the edge of the mountain,
Sol shinardin’ aldinda, In front of that maple,
Toqsan *otaw* ku’ndiki, Ninety *hordes* a day,
Maldi baqqa quldiki. The animals are slave’s. (Epic of Edige, p. 102)

In the example above, the main meaning of the word otaw is "black house (yurt)." That is, the yurt, built by our people in ancient times, is made of flexible wood, which grows in the forest.

Atasinin’ ustasinan, From his father's carpenter,
On eki usta aldirip, took the twelve carpenters,
Aynalasina otawdin’, on the surrounding of the horde,

Qoladan *qorg'an* saldirdi. He built a bronze *fortress*. (The Epic of the Forty Girls, p. 123)

Qorg'an (fortress) in this row is a wall, a fortress, built to protect against landslides.

2) The names of clothes and hats. In the Karakalpak epics the names of clothes are not very common. You can also come across a shapan (robe), zer ko'ylek (a dress), sa'lle (a turban) and other words. For example:

Jirtilg'an son' *shapanimdi* jamadim, I patched my *robe* after it was torn,
O'z isime hesh te salaq bolmadim. I was never careless with my work. (The Epic Kirik kiz, p. 108)

Zerko'ylektin' etegin iler me eken, yar-yar, Will he sew the hem of my *dress*, yar-yar?
Qa'dirimdi tekis qul bilermeken yar-yar, will the slave know my value, yar-yar,
Qor qilma bunday qulg'a sultan basim, don't despise my sultan head over such a slave,
Janimdi alsan' qayilman, pa'rwardigarim, yar-yar. If you take my soul, I'm ready, my caretaker. (Epic of the Giant, p. 154)

Or:

Basinda bar *sa'llesi*, there is a *turban* on his head,
Iyninde bar mellesi. Mellesi on the shoulder. (Epic Alpamis, p. 65)

Shapan - "an outer garment made of cotton, made of various spider webs." In ancient times, the robe was worn by men. Zerko'ylek (dress), that is, is sewed with silk thread, embroidered, a dress with patterns. And the turban is a kind of hat made of various materials.

In conclusion, the formation of the Karakalpak written literary language has a long history. It is worth noting that the role of folklore in the formation of our literary language is significant. The study of the reasons of naming the ethnographisms, which are common in folklore, especially in folk epics, helps a lot in studying the traditions of our people, which are intertwined with nationalism.

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Rezyume: *Ushbu maqolada xalq og'zaki ijodi an'analaridan biri bo'lgan xalq dostonlari tilida uchraydigan milliy etnografik materiallar o'rganiladi. Dostonlar misolida etnografiyalarning nomlanishi sabablari tahlil qilinadi. Bundan tashqari, muallif faktik tahlil kontekstida bir necha turdagi nominatsiyalar tahliliga asoslanadi. Bunda nominatsiya (nomlash) asosiy yo'nalishlar bo'yicha, ya'ni materialga qarab morfologiyasi, vazifasi, nominatsiyasi jihatidan o'rganiladi. Boshqacha aytganda, mazmun tahlili doirasida nominativ so'zlarning kelib chiqishi, ma'nosi va vazifasi solishtiriladi.*

Резюме: *В данной статье исследуются национально-этнографические материалы, которые встречаются в языке народных былин, являющихся одной из народных устных традиций. На примере былин анализируются причины именования этнографий. Кроме того, автор обращается к анализу нескольких типов номинаций в контексте фактологического анализа. При этом номинация (наименование) изучается по основным направлениям, то есть с точки зрения морфологии, функции, номинации в зависимости от материала. Другими словами, происхождение, значение и функция номинативных слов сравниваются в контексте контент-анализа.*

Kalit so'zlar: *atama, nominatsiya, etnografizm, organ, kiyim-kechak buyumlari.*

Ключевые слова: *термин, номинация, этнографизм, орган, единицы одежды.*

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POLITICS IN CENTRAL ASIAN CITIES DURING THE MONGOL PERIOD

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Summary: *The article describes the introduction of tax policy in the 13th and 14th centuries with the Mongol invasion of Central Asia. In order to accumulate a lot of wealth from the local population, cities, counties, and rural areas should be replenished by taxing craftsmen who lived there and produced their own products, people who used the land for planting crops, and those who were engaged in animal husbandry. It has been revealed that Information is given on the creation of new types of taxes.*

Keywords: *Central Asian cities, tax system, Mongols, written sources, feudal relations.*

Major political events occurred in Central Asia in the 13th and 14th centuries. It was the Mongol conquest of Central Asian territories and the establishment of feudal kingdoms in the region. Colonial wars, following tax systems, and other kinds of oppression remained in the memory of the people of Central Asia for centuries. The tragic events of this period have come down to us in many myths and legends.

After the Mongol invasion of Central Asian cities, they established a tax system in order to make a great profit from them. One of the most important tasks in the history of the people of Central Asia is to solve the social problems of the Mongol period one of the main issues of the social history is the tax system of the Mongols.

Academician V.V. Bartold was one of the first in Soviet history to create the tax terminology of the Mongol people, based on written sources, Persian writers of the Ani nation.

In addition, we give brief information about the types of basic taxes introduced during the Mongol period. One type of tax was called “ko’pchur”. This sort of tax was levied on residents of all social classes.

“Kopchur” is a type of tax which was paid for one's life. The historian Kartmer described the term "Kopchur" as a Mongolian word that originally meant "Jaylau." According to the Menchu-Kaan label, the “kopchur” should be paid between one and ten dinars, depending on wealth. The idea of payment based on the state of the bridge, on the other hand, was completely disregarded. During the Mongol khanate, 10 dinars were taxed at 70 dinars, according to historian Juwayni. Rashid al-Addin claimed to have collected 15 dinars from wealthy families and one dinar from destitute ones in China and Mawarounahr.

According to the information above, after Ghazkhankhan's order, one “kopchur” (life tax) was separated into two groups:

1. The tax Kopchur which was levied on settled residents. In this category, the tax was levied twice a year.

2. The tax Kopchur collected from nomads. Taxes were levied on this category of people once a year.

The deadline mentioned above is strictly adhered to. If the taxpayer does not pay on time, an additional hundred dinars will be deducted. [2, 259].

From the information given by Rashidaddin, we can see that the “kopchur tax” was collected by the Mongol khans from the settlements and nomads in the lands of Central Asia. The ruler of Movarannahr, Rashiduddin, made an appeal to Kaydu, saying that the ruler of Mawaruonnahr also made “kopchur” using grain or domestic animals. In this instance, “kopchur” will be found in one out of every hundred cattle and one out of every ten animals. [5, 253].

Elsewhere, the author also mentioned that Kaidu ordered 500 carts of food to be sent to the Mongol capital, Karakorum. Of course, these foods were collected at the expense of kopchur and other taxes collected by the Mongol khans from the people of Central Asia.

The Mongol khans' tax policy was prevalent in Iran, Khorezm, and other parts of Central Asia, as seen by the examples above.

The amount of the Tagore tax and the methods for collecting it from the citizen were mentioned in Armenian history. According to Armenian historians, the amount of tagora produced per capita in the state was as follows: 100 liters of grain, 50 liters of wine, 2 liters of rice, 3 bags, 2 strings, coins, bullets, horse per person working everywhere [3,88].

In his work called “Jilnamalar jiynag’inda”, Rashidaddin gives the following information about the fact that the amount of tax is still related to the income of taxpayers. The khan orders: Let a special secretary to be sent to each province to visit the village and take it into account. There, taking into account the previous life tax, whether or not the size of the kopchur decreases or increases, as a result, the districts will be comfortable and satisfied. [5,253].

As a result, we can conclude that the “kopchuk” tax is actually imposed on immigrants and settlers that is free of other taxes.

The kopchur was received in kind or in cash, according to Rashididdin, depending on the situation in each region. This principle was strictly observed. However, the collection of monetary taxes affected the development of commodity-money relations. In turn, high taxes in Central Asia have limited commodity-money relations. Birds before the Mongols - their art was almost undeveloped during the time of the nomadic Mongols.

A stamp tax was levied in Central Asia during the Mongol khans' reign in the 13th and 14th centuries. A tax known as the "tamga" was imposed on artists and merchants from all areas of urban life. The "tamga" tax was different in each province, according to the Kazan khan's decree. The amount of tax is printed on this label and put on a specific board near the city's doors or on the city's highest point. It shows the amount of taxes paid by the local population. Taxpayers or middle-class producers had the right to increase or decrease the amount of tax.

Some historians understand the term (tamga) from transit tax or "tomogina". The scholar VV Bartold states that the concept of "tamga" is similar to the Persian word "badan" ("bagiy"). This term has been used by the authors of the center as a tax since the first century of Islam. V. V. Bartold, who studied written sources, believes that all taxes on "tamga" have been announced [2, 44]. This applies to all retail stores from trade and industrial enterprises.

Rashiduddin calls the stamp collectors "stamp ilaxr," meaning city stamps.

The financial gain collected from “tamga” could be a massive amount. That is why it became a reliable supply of wealth for the Mongol khans. The ways of collecting taxes were terribly cumbersome. Taxpayers couldn't pay taxes forever. Rashidaddin says, “The Mongols… insisted, caused the folks to become poor, tortured them with clamps, and captured and killed the refugees. Whoever can't pay taxes has taken their children."

From this information, written during the Mongol period, we can see the suffering and humiliation of the masses during the period of the invading khans.

One of the pre-Mongol taxes was the Kharaj tax. In the XII-XIV centuries Kharaj was considered a form of taxation. In post editors, this message comes in a variety of terms. In one author it is "Kharaj", in others - "mal", in the third - "Mutawajihad".

Rashiduddin stated in his Sanctuary that the tax was collected in cash. However, in some areas, "Haraj" is also produced in kind. Written records in Iran show that the term “Bahra” appeared in the last periods of Mongol rule, which was also a form of land tax.

The Bahra tax may be levied on landowners. Academician I. P. Petrushevsky quoted Hamdallah Kazvini as saying that the author "received a part of the harvest from the owners of the state treasury-private property" [4,36].

A Chinese tourist in Samarkand, Chan-Chuń, described the situation in Samarkand after the Mongol conquest as follows: The beys and fields of the city often belong to the Hoy Hesskis (i.e., the local people), but cannot be used on the Hoy Hels lands.

Chan Chun went on to say that he cannot rule over the local people. The local people had to work their lands together with the Chinese, the Khitans (agreed with the Mongols). Of course, the Mongols also contributed here. Chan-Chun said that both the governors and the elders of these lands came from different places, from different tribes [1, 63].

Thus, one of the most significant policies adopted in the towns of Central Asia during the Mongol period was not only an oppressive tax policy, but also terrible production practices. In medieval society, relentless tax collecting resulted in the impoverishment and division of the working people.

During the nomadic Mongol period, there were no substantial changes in Central Asian cities' socioeconomic life. That is the only reason to the Khorezmshahs belonged to a group of dictators who previously reigned over the Mongols and the towns of Central Asia. Nomadic Mongol nobility took over as feudal lords from Turkic lords. The old nomadic tradition was resurrected and transported to Central Asia and Iran by the Mongol feudal lords.

During the nomadic Mongol period, there was no significant change in the socio-economic life of Central Asian cities. The reason is that among the Mongols, the representatives of Khorezmshah, who ruled in the cities of Central Asia before him, were also one of the oppressors. The former Turkish feudal lords were replaced by the nomadic Mongol aristocracy. The Mongol feudal lords re-adopted the old nomadic tradition and brought it to Central Asia and Iran.

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Rezyume: *Maqolada XIII-XIV asrlarda O'rta Osiyo hududlariga mog'ullar bostirib kelishi bilan soliq siyosatining joriy etilishi keltiriladi. Mahalliy aholidan ko'plab boylik yig'ib olish maqsadida shaharlarga, okruglarga, qishloq-joylarga o'sha yerda yashab o'z mahsulotlarini ishlab chiqargan ustalarga, yerlardan ekin ekishda foydalangan odamlarga, chorvachılıg bilan shug'ullanganlarga soliq solib g'aznanı to'ldirish uchun harakat etilganligi ochib berilgan. Yangidan soliq turlarining vujudga keltirganligi haqida ma'lumot keltiriladi.*

Резюме: *В статье описывается введение налоговой политики в XIII-XIV веках с нашествием монголов в Среднюю Азию. Чтобы накопить большое богатство у местного населения, города, уезды и сельские районы должны пополняться за счет налогообложения ремесленников, которые жили там и производили свои собственные продукты, людей, которые использовали землю для посадки сельскохозяйственных культур, и тех, кто занимался животноводство. Выявлено, что дается информация о создании новых видов налогов.*

Kalit so'zlar: *O'rta Osiyo shaharlari, soliq tizimi, mog'ullar, yozma manbalar, feudal aloqalar*

Ключевые слова: *города Центральной Азии, налоговая система, монголы, письменные источники, феодальные отношения.*

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ACTUALITY OF FORMING LINGUOCULTURAL COMPETENCE OF STUDENTS OF PEDAGOGICAL INSTITUTIONS

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Summary: *The article deals with the importance of developing the linguocultural competence of students of a pedagogical institution. In the article, the factors that affect to the development of linguocultural competence have been analyzed. Also, the article determines the problems and some reasons in forming and improving students' linguocultural competence at a pedagogical institution. In addition, the actuality of this study has been clearly defined. The author suggests several ways to enhance learners' linguocultural competence and pedagogical skills of future professional educators.*

Keywords: *actuality, approach, educational process, future professional teachers, linguoculturological competence, pedagogical skills, pedagogical institution.*

Modern linguoculturology should be considered as an interdisciplinary, independent branch of scientific knowledge, which has its own goals, objectives, object and subject of research. With all the variety of directions that cultural linguistics considers and studies, one of the main components of this science is the study of the cultural segment of the semantic meaning of linguistic signs - keywords that are formed during the interaction and interaction of two important subject areas: language and culture [2, 12]. In the following, we will analyze the statement given by Khalupo, which is the transfer of the linguistic culture of society with the help of knowledge and skills has three stages of development (three levels): 1. Low (Limited use of language units and facilities. Poor understanding of cultural property); 2. Medium (There is some experience of using linguocultural material); 3. High (Fluency in the language, extensive knowledge in the field language and culture) [3, 129].

However, to date, despite the significant interest of scientists and the significance of the research results obtained, the problem of the formation of linguocultural competence of pedagogical institution students has not received due date and scientific attention and has not been sufficiently addressed. We assume that one of the main reasons for this might be in the following: 1. lack of a generally recognized understanding of linguocultural competence as a complex cultural and pedagogical phenomenon that requires specially organized measures for its formation and has significant potential in solving the problem of improving the quality of professional training of students of a pedagogical institution; 2. insufficient elaboration of the theoretical and pedagogical foundations of the process of formation of linguocultural competence of future specialists, reflecting its essential and functional characteristics and opportunities for improvement; 3. dominance of a formal approach to the process of formation of linguocultural competence that consists in replacing systemic influences on the professional development of future specialists by the implementation of methodologically and technologically unjustified procedures, the result of which is only a general idea of the formation of linguocultural competence; 4. undeveloped content and methodological and technological aspects of the formation of linguocultural competence of students of a pedagogical institution in the conditions of their professional training; 5. inconsistency of the level of development of the technology for measuring and evaluating the results of the formation of linguocultural competence of pedagogical institution students with modern requirements for assessing quality in the educational sphere.

Thus, the actuality of this study can be determined by the followings:

- at the socio-political level, the development of globalization processes, the emergence of a need for new forms of intercultural interaction and the need to improve the efficiency of a modern teacher;

- at the socio-pedagogical level - the increasing requirements for the quality of professional education of future specialists in the field of foreign languages and cultures who are able to effectively teach intercultural communication;

-at the theoretician - methodological level - the need to develop theoretical foundations for the formation of linguocultural competence of students in the process of their professional pedagogical training at the institution;

- at the methodological and technological level - the need to develop an appropriate technological apparatus for the effective development of linguocultural competence among students of a pedagogical institution.

Based on the analysis of the pedagogical, methodological, cultural literature, the latest scientific research, the study of the activities of higher education, the problem of research has been formulated, the essence of which is the need to resolve the contradiction between the increased need of society in training a specialist with a high level linguocultural competence and insufficient theoretical, methodological and methodological-technological development of ways and means of its formation, adapted to effective implementation in the conditions of a dynamically developing educational process of higher educational institution.

Therefore, the process of forming linguocultural competence of pedagogical institution students will become more effective if the followings can be obtained:

- on the basis of the system-activity, competence-based and process-culturological approaches, a model for the formation of linguocultural competence will be developed and implemented, which contains structural blocks (motivational-target, content-process and evaluative and productive), performing all relevant functions (goal-setting, diagnostic and prognostic, motivating, personality-forming, communicative-cognitive, axiological, diagnostic-corrective, stabilization and reflexive-stimulating);

- if characterized by integrativeness, predictive adequacy and pedagogical validity;

- if implemented taking into account principles of positive corporatism, culturally related co-learning of foreign and native languages, ensuring an international standard level of training and prolonged competence. A complex of pedagogical conditions will be identified and implemented, including: 1) the implementation of pedagogical support of the process of formation of linguocultural competence of students of a pedagogical institution; 2) creation of an innovative linguocultural environment based on electronic educational resources; 3) orientation of linguocultural training of students to professional types. The need to develop linguocultural competence of pedagogical institution students is due to the increased requirements for the level of their professional training, the sociocultural and intercultural orientation of the language policy in the field of teaching non-native people, languages, as well as insufficient development of the problem under study in pedagogical theory and practice. Linguocultural competence of pedagogical institution students - future specialists is a type of professional competence, pedagogical skills including knowledge about a different linguoculture and the norms of interaction with its representatives, the ability of effective speech communication within the framework of linguoculture, intercultural communicative and individual professional qualities necessary for the implementation of professional pedagogical activities. The process of development of linguocultural competence of pedagogical institution students requires the implementation of such theoretical and methodological approaches that would ensure its organizational complexity, linguodidactic and linguocommunicative orientation and allow explore the linguocultural aspects of competence characteristics. An effective solution to such a problem is provided by a combination of systemic activity, competence-based and process-culturological approaches.

The model of the formation of linguocultural competence of pedagogical university students contains structural blocks (motivational-target, content-process and evaluative-productive) that

perform the corresponding functions (goal-setting, diagnostic and prognostic, motivating, personality-forming, communicative-cognitive, axiological, diagnostic-corrective, stabilization and reflexive-stimulating); characterized by integrativeness, predictive adequacy and pedagogical validity; is implemented taking into account the principles of positive corporatism, culturally related co-study of foreign and native languages, ensuring an international standard level of training and prolonged competence. Some conditions for the effective functioning of the model for the formation of linguocultural competence of students of a pedagogical institution are in the following: implementation of pedagogical support of the process of formation of linguocultural competence of pedagogical university students; creation of an innovative linguocultural environment based on electronic educational resources; orientation of linguocultural training of students to professional types.

In this research, we assume that the implementation of the communicative function in the context of a different linguoculture is capable of providing linguocultural competence, by which we mean the integrative quality of a person, including knowledge and skills associated with the selection, assimilation, processing, transformation and use of information about linguoculture in practice, the experience of intercultural communication and personal qualities necessary for its successful implementation in a different linguistic culture, and the linguocultural competence of pedagogical institution students - future specialists is interpreted by us as a type of professional competence, pedagogical skills, including knowledge about a different linguoculture, the ability to effectively communicate in intercultural communication, and individual and professional qualities necessary for the implementation of professional pedagogical activities. At the same time, by the formation of linguocultural competence of students of a pedagogical institution, we mean a systematic accumulation of positive quantitative and qualitative changes in the content of linguocultural competence and the achievement of the unity of its components in a purposeful, specially organized educational process of a pedagogical institution. The didactic process of forming a linguocultural competence as a complex multistage activity, starting with the development of a general idea and leading to precisely programmed actions and a predictable final result can be methodically modeled, in this regard, we take into consideration the task of building an appropriate model that ensures the targeted formation of linguocultural competence, taking into account the specifics of the teacher’s professional activity. The factor in its development was the choice of theoretical and methodological approaches that reflect the direction of scientific research and its outcome.

Thus, the purpose of this research: the need to systematize the process under study, such as building an appropriate model (systematic approach); the achievability of the result only in the conditions of specially organized activities (activity approach); necessity to achieve a specific result - linguocultural competence (competence-based approach); the specifics of the process being implemented in the aspect of its cultural and linguistic orientation (culturological approach). The system-activity approach presupposes the orientation of the research towards studying the structure and composition of the pedagogical system in conjunction with the consideration of the patterns of its development in activity. After analyzing the point of view of this approach (I.V. Blauberg, P.Ya. Galperin, V.N. Sadovsky, E.G. Yudin) [1], we consider the formation of linguocultural competence of students of a pedagogical university as a subsystem of professional training in the context of higher education; as a pedagogical system, including structural and functional components and characterized by intrasystem dialogicality; as a pedagogical activity with the following characteristics: status position as a form of the subject's relationship to a multicultural society, to the interaction of different cultures and subcultures; the presence of subject-subject and subject-object relations in the process of teaching intercultural communication in the conditions of the educational process at the university; artificiality and circular structure of the investigated type of activity, the content of which is determined by free goal-setting; the relevance and situationality of the pedagogical tasks being solved and the conjugation with the educational activities of students.

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Rezyume: *Maqolada pedagogik ta'lim muassasasi talabalarining lingvomadaniy kompetensiyasini rivojlantirish muhimligi muhokama qilinadi. Maqolada lingvomadaniy kompetensiyani rivojlantirishga ta'sir qiluvchi omillar tahlil qilinadi. Shuningdek, maqolada, pedagogika institutida talabalarning lingvomadaniy kompetensiyasini shakllantirish va takomillashtirishning muammolari va ba'zi sabablari aniqlangan. Bundan tashqari, ushbu tadqiqotning dolzarbligi aniq belgilangan. Muallif talabalarning lingvomadaniy kompetensiyasini va bo'lajak professional o'qituvchilarning pedagogik mahoratini oshirishning bir qancha usullarini taklif qiladi.*

Резюме: *В статье рассматривается важность развития лингвокультурной компетенции студентов педагогического вуза. В статье проанализированы факторы, влияющие на развитие лингвокультурной компетенции. Также в статье определены проблемы и некоторые причины формирования и повышения лингвокультурной компетенции студентов в педагогическом вузе. Кроме того, четко определена актуальность данного исследования. Автор предлагает несколько способов повышения лингвокультурной компетентности учащихся и педагогических навыков будущих профессиональных педагогов.*

Kalit so'zlar: *dolzarbligi, yondashuv, ta'lim jarayoni, bo'lajak bo'lajak professional o'qituvchilari, lingvomadaniy kompetentsiya, pedagogik mahorat, pedagogik muassasa.*

Ключевые слова: *актуальность, подход, образовательный процесс, будущие профессиональные преподавателя, лингвокультурная компетентность, педагогическое мастерство, педагогическое заведение.*

PROBLEMS OF RESTORATION OF THE RIGHTS OF THE REHABILITATED PERSON.

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Summary: *The article explores some matters in the field of the citizen protection from illegal criminal prosecution and accusation, restriction of their rights and freedoms.*

Also examined a mechanism of compensation for harm caused by unlawful or unjustified criminal charges. Proposals for improving legislation are justified.

Keywords: *illegal actions, rehabilitation, reparation, restoration of rights, criminal proceeding.*

Paragraph 6 of Part 1 of Article 304 of the Criminal Procedure Code provides for reimbursement of other expenses incurred as a result of illegal actions committed against the rehabilitated person.

Other costs are the costs incurred by the rehabilitated person as a result of criminal prosecution, as well as to cover the consequences of unlawful criminal prosecution, including medical rehabilitation, rehabilitation, travel to the place of investigation and trial, and rent.

That is, the rehabilitated person must be reimbursed for all costs directly related to the criminal prosecution and the elimination of its consequences, as evidenced by the relevant documents. For example, the Tashkent City Criminal Court ruled on October 6, 2020, that Z.'s application to recover the amount of parcels and parcels sent to him by his family members during his detention was rejected due to a lack of relevant documents.

According to Part 2 of Article 14 of the Civil Code, income (lost profits) that a person can receive in the ordinary course of civil proceedings, but not receive, in the event of violation of his rights, is an integral part of the damage. Article 985 of the Code also stipulates that damage caused to a citizen's person or property as a result of an illegal act (omission), as well as damage to a legal entity, including lost profits, must be fully compensated by the person who caused the damage.

In our opinion, there is no impediment to the consideration of the application of the rehabilitated person for recovery of lost profits in criminal proceedings, as this issue is covered by the concept of "other costs" referred to in Article 304, Part 2, Clause 6 of the CPC. However, in any case, the lost profit is unlikely to be real, it must be proved by the necessary documents.

According to Article 52 of the Criminal Code, a person holding a military or special rank may be deprived of that rank by a court verdict when convicted of a serious or very serious crime. The restoration of a person's rights requires the restoration of military and other ranks.

According to the regulation "On the procedure for restoration of service, pension, housing and other personal and property rights of rehabilitated servicemen and compensation of property damage, elimination of the consequences of moral damage" after the entry into force of the decision of the competent authority on rehabilitation, a serviceman may apply to the court for the restoration of military and other ranks, the return of state awards. That is, after the decision to rehabilitate, the issue of restoration of military and other ranks of servicemen, the return of state awards will be considered separately in court.

However, throughout this paragraph it is noted that an illegal sentence provides for the reinstatement of a serviceman deprived of his military rank or the restoration of his rank on the day of his deprivation of his military rank after the court's decision to annul the illegal decision, which means that rehabilitation itself is the basis for reinstatement.

In our opinion, it is unreasonable to hold another court hearing on the issue of restoration of the title and it will prevent the restoration of the person's rights. The Plenum of the Supreme Court of the USSR in 1967 also provided that in case of revocation of the verdict on the grounds of

rehabilitation, a copy of the decision (ruling) should be sent to the bodies requesting deprivation of military or special rank.

Restoration of the title shall be entrusted to the authority which granted the title and subsequently deprived the title on the basis of a court judgment.

In connection with the unlawful conviction, unlawful placement in a medical institution, unlawful detention or house arrest as a precautionary measure, dismissal from office (position) due to unlawful detention, or involvement in the case as an accused, defendant person illegally removed from office must be reinstated in his previous job (position), if the enterprise, institution, organization is liquidated or other grounds provided by law do not allow him to be reinstated in his previous job (position), he must be given another job (position). (Article 310 of the Criminal Procedure Code).

However, as a result of the lack of a clear definition of the recovery mechanism and the consequences of non-compliance with this requirement, rehabilitated citizens face problems with recovery over the years. Of course, it is difficult to regulate this mechanism in the CPC itself, but the fact that this issue is not regulated by a special law means that the rights of the individual are not restored in practice.

This is confirmed by the fact that respondents to the survey answered the question "What do you think is the biggest problem in rehabilitation" as the restoration of other rights (reinstatement to work or study, retirement).

Due to the lack of a special law, this issue is addressed in various bylaws, such as the Resolution of the Prosecutor General's Office, the Ministry of Defense, the Ministry of Internal Affairs and the National Security Service of March 4, 2014 No. 4-q / q, 5, 5, 21 “Regulations on the procedure for restoration of service, pension, housing and other personal and property rights of servicemen and compensation for property damage caused to them, the elimination of the consequences of moral damage”.

Article 6 of the Statute of May 18, 1981 clearly regulates this issue, and when an application is made within three months after the acquittal or decision to terminate the criminal case, the citizen is given a job (position) no later than one month from the date of application it was clearly stipulated that the time spent in custody and the time served would be included in the total length of service. One of the problems associated with the reinstatement of a rehabilitated person's right to work is to determine whether the person's dismissal is related to criminal prosecution or is related to labor discipline. While it may seem easy to separate it from the outside, it is actually complex and interconnected. That is, in most cases, an employee can be dismissed on the basis of the fact that there were grounds for dismissal, even if there were no grounds for dismissal before the criminal case was initiated, and Article 100 of the Labor Code can be specified.

In this case, the dismissal should be considered by a civil court, as in practice the initiation of criminal prosecution was the basis, but the dismissal did not provide a verdict or criminal procedure decision, ie there is no official causal link.

Compensation for moral damage in criminal proceedings allows the restoration of a person's personal non-property rights. A person who has been unlawfully prosecuted or convicted will suffer immeasurable material damage over a long period of time in order to prove his innocence.

The CPC provides for only one form of compensation for moral damage, namely, if a person has been detained, imprisoned or placed under house arrest, dismissed, placed in a medical institution or convicted, disseminated through the press, radio, television or other media. If he dies, at the request of his relatives, the court, the prosecutor, the investigator, and the inquirer, the relevant media must notify him of his rehabilitation within one month.

However, according to Article 1022 of the Civil Code, moral damage is covered by money.

In addition, many foreign countries provide other forms of compensation for moral damage. For example, Article 136 of the Criminal Procedure Code of the Russian Federation stipulates that, in addition to the above, the prosecutor must formally apologize and notify the rehabilitated person of the place of work, study or residence.

In addition, the CPC did not specify in the claim procedure for compensation for moral damage to the rehabilitated, which was explained only by the decision of the Plenum of the Supreme Court of the Republic of Uzbekistan "On some issues of application of laws on compensation for moral damage."

The prosecutor must formally apologize to the rehabilitated person as a state representative who oversees the implementation of the law during the pre-trial phase and supports the public prosecution during the trial. However, the apology serves to eliminate the consequences of the moral harm inflicted on the person and to restore justice, with the participation of the inquiry officer, the investigator, who is directly responsible for bringing the case to trial at the discretion of the rehabilitated person. It will also have prophylactic value for officials responsible for prosecuting criminal cases.

Some scholars are of the opinion that the prosecutor should make an official apology on behalf of the state in the courtroom, in the rehabilitation procedure, because, firstly, the different interpretations of the form of apology are limited, and secondly, the formal form of apology is more in the interests of the individual.

Compensation for moral damage serves as a way to protect civil rights. Compensation for moral damage is the protection of intangible interests (personal non-property rights) of citizens.

Injustice negatively affects a person’s mental state, can lead to a sense of disrespect for the law and the state, so there is a need to compensate for the spiritual suffering inflicted on the person.

In fact, the unlawful conviction of a person, the application of coercive measures against him, causes moral suffering not only to him but also to his close relatives, directly affecting their honor and dignity in the neighborhood, work or study.

Pursuant to Article 1021 of the Civil Code, it is unlawful for a citizen, regardless of the guilt of the perpetrator, to unlawfully convict him, to prosecute him unlawfully, to detain him as a precautionary measure, or to obtain a receipt for decent conduct shall be reimbursed if the result of the imposition of an administrative penalty and unlawful detention.

In accordance with the Resolution of the Plenum of the Supreme Court of the Republic of Uzbekistan "On some issues of application of the law on compensation for moral damage", it should be noted that the right of the rehabilitated to compensation for moral damage arises after acquittal or termination of the criminal case). A claim for moral damage to a rehabilitated person shall be considered in civil proceedings.

In describing the moral damage in criminal proceedings, N.V. Kuznetsova meant that moral damage in criminal proceedings means the physical, mental or spiritual suffering of citizens in connection with the commission of acts punishable by criminal law.

The impossibility of a clear assessment of mental suffering means that the free and fair opinion of the judge is crucial in determining the amount of moral damage. That is, the court must be based on objective and subjective criteria, taking into account the personality and characteristics of the victim, as well as the actual circumstances of the moral damage.

However, the lack of certain objective criteria in judicial practice prevents the correct assessment of moral damage. For example, by the decision of the Uchtepa district civil court of 22 June 2020, E.'s claim for moral damage against the Tashkent city finance department was partially satisfied and 50 mln. The sum is charged with moral damages. However, E. sentenced by the court on May 16, 2013 to 11 years in prison and rehabilitated on December 4, 2018 for $ 500 million. sum claimed for moral damages. Two conclusions can be drawn from this decision of the court. First, E. Although rehabilitated on December 4, 2018, 2 years elapsed before a decision was made to recover moral damages and the damages have not yet been recovered in practice. Second, the court did not reduce the amount of unjustified moral damage, for what reason in the substantiating part of the decision E., the amount of non-pecuniary damage for imprisonment, serving a sentence and suffering for 5 years was 50 mln. soums.

If we look at the judicial practice in determining the amount of moral damage, we can see that the courts have satisfied the claim filed by the plaintiffs to a much lesser extent than the amount

requested for moral damage. This indicates that there are no clear criteria for determining the amount of moral damage for victims and judges who file a claim. In the case of moral damage, the courts sometimes do not pay much attention to the amount required for compensation, and there are cases of unjustified reduction of the amount of non-pecuniary damage.

The lack of clear criteria for compensation for moral damage leads to a different approach to judicial practice, resulting in public distrust of the court. Of course, it is impossible to measure subjective criteria, such as moral damage to the honor and dignity of an individual, but it is possible to develop objective criteria based on the type and amount of punishment imposed by the court.

For example, in practice, the amount of moral damage is calculated differently by the person being rehabilitated, although the duration of the imprisonment actually served is the same. In our opinion, it is possible to develop certain objective criteria based on the duration of criminal penalties, the length of conviction. That is, it will be a basic criterion, but it does not limit the judge, the judge may increase the amount of moral damage based on the circumstances of the case, the individual, health status, marital status, but not reduce it from the basic criterion. For example: the amount of non-pecuniary damage for the period of serving a sentence in a penal colony for 1 year in the amount of 100 times b.h.m. for imprisonment, 20 times it would be expedient to set it at 10 times the b.h.m. for each year of unemployment. The definition of these criteria, firstly, facilitates the calculation of the amount of moral damage, and secondly, ensures the formation of a single case law.

Scientists have developed coefficients for determining the severity of moral damage based on the criminal qualification of the actions of the convicted person..

The prosecutor must formally apologize to the rehabilitated person as a state representative who oversees the implementation of the law during the pre-trial phase and supports the public prosecution during the trial. However, the participation of the inquiry officer, the investigator, who is directly responsible for the pre-trial proceedings at the discretion of the rehabilitated person in the apology, serves to remedy the consequences of the moral harm inflicted on the person and to restore justice. It will also have prophylactic value for officials responsible for prosecuting criminal cases.

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Rezyume: *Ushbu maqolada shaxsni noqonuniy jinoiy ta'qib va ayblovdan, huquq va erkinliklarini cheklashdan himoya qilishning muammoli masalalari tahlil etilgan. Shuningdek, noqonuniy yoki asossiz jinoiy ayblov natijasida yetkazilgan ziyonni qoplash tartibi muhokama etilgan. Qonunchilikni takomillashtirish yuzasidan takliflar asoslantirilgan.*

Резюме: *В статье проанализированы некоторые проблемные вопросы в области защиты личности от незаконного уголовного преследования и обвинения, ограничения их прав и свобод. Также рассматривается порядок возмещения вреда, причиненного незаконными или необоснованными уголовными обвинениями. Обосновываются предложения по совершенствованию законодательства.*

Kalit so'zlar: *noqonuniy harakatlar, reabilitatsiya, ziyonni qoplash, huquqlarni tiklash, jinoyat protsessi.*

Ключевые слова: *незаконные действия, реабилитация, возмещение вреда, восстановление прав, уголовный процесс*.

STUDYING METODOLOGY OF KARAKALPAK LEGENDS

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Summary: *The article is devoted to the study of the genre of narration in the Karakalpak folk prose. The article analyzes the problems of the origin of legends in the Karakalpak folk oral art, their sources, issues of study and their thematic division. The creation of the Karakalpak oral art, passing over the centuries from generation to generation and being renewed by the invaluable heritage of the people, who absorbed and reflected the spiritual culture of the people.*

In the Karakalpak folklore studies, a number of works were carried out to collect publications and study samples of oral folk art. Such genres as fairy tales, proverbs, sayings, riddles, aytis (singing competitions), dastan (poem) were independently researched.

At the same time, they have not yet been investigated; they are awaiting clarification and decision. One of these problems requiring research in the Karakalpak folklore studies are the genre of legend. Until now, the genre of the legend has not been the object of special scientific research.

Keywords: *folklore, genre, legends, theme, fairy tale, religion.*

In modern world folklore, the creation of a classification of works of folk prose, a comprehensive study of the historical and genetic foundations of oral prose, problems of genre composition and artistry have become priority scientific directions. New catalogs of epic plots and motifs, which appeared thanks to the improvement of the historical and geographical method developed by the Finnish school of folklore by English, German, Hungarian, Turkish and Russian scientists, made it possible to carry out comprehensive research on the study of oral prose works of the peoples of the world, including genre originality legends, national characteristics and typology.

Karakalpak folk legends differ from other genres of folklore, because they most closely reflect folk traditions, historical, social life in past eras, with history, and this is its difference from other genres of folklore.

Indeed, legends tell about the whole path that the people went through. Studying this, we observe various historical events that happened to our ancestors, reflected in artistic form.

The genre, artistic and poetic properties of the legends are diverse. Their study is the basis for determining the sources of the formation of oral folk art (CNT), the stages of its development. Since the Karakalpak folk legends were not the object of special research. In the specialized literature we meet them in different terminological names, some of them are used as legends, myths, fairy tales. It is necessary to distinguish which of them are legend and which legends are in the stories, and to assign each genre its proper place. For this, it is necessary to clarify the genre differences of legends, their classification, sources of formation, direction of development and their typological differences, in scientific research.

Folk legends in Karakalpak folklore were not the object of special scientific research and are one of the genres that have not been mastered until now. The aim of this study is to comprehensively examine these issues, taking into account the above problems. The conclusions of the scientific research, being a scientific and theoretical source in considering the history of Karakalpak folklore from a new point of view, helps in the upbringing of the growing generation as morally and spiritually developed people, can serve as a scientific and methodological guide for teachers, cultural specialists and the general public.

In the Karakalpak folklore studies, legends still do not have a definite, main research direction in the historical-aesthetic, genre aspect. At the same time, it should be noted, although legends are recognized as a separate genre of folklore. In the scientific environment, there is no single name for this term.

The founder of the Karakalpak literary science and folklore, N. Davkarev, was the first of the Karakalpak scholars to try, taking into account the thematic and artistic differences and the content of the legend, to designate their originality, to give them a special name (term). In his works devoted to the UNT, and in "Essays on the History of Karakalpak Literature", he designates legends with the term "legend". The scientist believes that people widely spread among the Karakalpaks, such as Asan kaygy, Erezhep tentek, Aldar kose, Zhiyrenshe sheshen, Khoja Nasratdin, Umirbek lakky, Daulet Karaman and many others.

characteristic anthroponymic heritage of legends and comes to the conclusion that "... these people actually lived, although these legends describe facts very close to the truth, passed from mouth to mouth, they are gradually changing, adding, decreasing in the text, they cannot be called history. This is only material necessary for history.

And so N. Davkaraev, taking into account that historical sources are the basis for legends, he assessed this difference as the leading criterion of the genre.

K. Ayimbetov, one of the first major Karakalpak scientists who began to collect, publish and consecrate Karakalpak folklore, also uses the term "legend", epic sources referring to legends, arguing "One kind of folk tales will be called a legend. And the legends associated with history, the scientist expresses his opinion, can be attributed to fairy tales and legends. " In the course of studying the semantic content of the legends, he claims that "The Karakalpak people have quite a lot of interesting, vivid oral fairy tales related to their history, the land on which they live, as well as about some people, to one degree or another, associated with historical events. So, for example, there are legends among the people about "Guldursin", "Sultan Sanzhar", "Aidos biy", "Yernazar biy", "Erezhep useless", about the mountain "Tok Tau" and once again emphasizes that these are just "oral fabulous narratives "associated with a certain historical milestone of the people. And further, developing his point of view, K. Ayimbetov says "Although the legends that sound in the mouths of the people we call fairy tales, they nevertheless tell about facts related to specific historical events that once took place on the land of our ancestors ... legends provide great auxiliary information for the study of historical events of past years in the life of our people "[Ayimbetov K, 1988: 33], comes to this conclusion. In his book "Folk wisdom", the scientist, paying great attention to the rich and colorful musical skills of the Karakalpak people, the zhyrau melodies belong to the legends "Nogayets", "Jump to the Moon", "Tradition of the Desert", the melodies of Bakhsy - "Bozatau", "Blind girl "," Seven Barriers "," Koshym Fighter "," Overcome the Mountain "including other legends [Ayimbetov K, 1988: 214-219]. Of course, these works and scientific practical instructions of prof. K. Ayimbetova provide great assistance to literary scholars in determining the genre features of the Karakalpak folk legends.

N.Zhapakov, who carried out scientific work on the issues of realism in the Karakalpak literature, in his famous work in relation to the concept of "Karakalpak folk legends", using the term "Fairy tale", adds in brackets: (legend). He, saying that the content of all fairy tales (legends) consists not only of fantasy, fiction, and most of them are closely intertwined with real life, reflecting certain historical events, cites the Legend of Guldursin as an example. Along with the assessment of this legend as a "highly ideological tale," the researcher poses the following rhetorical question: "Can such a legend be outside of historical events, outside the struggle of the people?" [Zhapakov N, 1972: 9-10],

The scientist K. Zharimbetov, who worked in the field of literary science, designating the legend with the term "legend", writes in his work: "… the initial basis of the legend was stories and essays about a historical event or a specific historical person. Despite the fact that there is a lot of fantasy and hyperbolism in the legends, they do not go far beyond the boundaries of the historical truth "[Zharimbetov K, 1994: 111].

Scientist K. Makhsetov in his latest classification of oral folk prose gives the following genre designations - apsana is a myth, rivoyat-legends, agyz-legend [Makhsetov K, 1996: 212]. The genre designations given here "legends", "historical myths", "oral stories", "rivoyat" are basically folk art set out and transmitted from mouth to mouth, statements woven from fiction, fictional

images, historical events that existed in history people, provided with popular ideas of the concept of land, water, nature and outer space.

Since the beginning of the 90s of the last century, one of the most significant genres of the Karakalpak folk prose-tradition began to be designated by its former term. And in recent years, the term "legend" has become extremely rare in Karakalpak folklore studies. For example, in the book "Karakalpak folk legends and anecdotes" published in 1995 (Nukus, "Karakalpakstan", 1995), the word "legend" is very rare. And in the book "Karakalpak Myths, Legends and Wits" published in 1992, the word "legend" as a genre term is not used at all. Instead, the term "traditions" is used. In the aforementioned books, although briefly, attention is still drawn to the current state of publication and research of tradition as a genre in Karakalpak folklore studies. Literary critics, giving a scientifically substantiated assessment of the legends, noted: "In folk legends, it is widely covered from the emergence of man to the name of the earth, water, city, as well as all living beings and inanimate objects living on earth, people discussing their appearance each of them with a specific name" [Bakhadyrova S., Mambetnazarov K, 1992: 4]. At the same time, dwelling on the genre features of folk prose, they emphasize that "the Karakalpak folklorists consider the terms" legend "and" legend "to be close to each other in meaning and the genre differences between them have not yet been scientifically studied" [Bakhadyrova S., Mambetnazarov K , 1992: 4], noting that the process of studying this issue, which is important for the Karakalpak folklore studies, is moving very slowly. However, in the above book, each of the texts of legends and traditions are presented separately. It is felt that the researchers, carrying out work on the division and assessment of the genres of folk prose, are trying to put an end to the further genre shift of thematic, textological and substantive nature.

Thus, we see that the term "tradition" went through several stages before finally establishing itself in the Karakalpak folklore studies. This situation is observed not only in the Karakalpak folk legends, it is one of the main problems of folklore studies of many peoples. Russian researchers note that "Legends have not yet been sufficiently defined on a scientific basis. Although legends and traditions are essentially different genres, in scientific literature we find their mixed use everywhere" [Kravtsov NI, Lazutin, 1977: 122].

Bashkir scientists also do not distinguish legends and legends, using them in their works as folklore terms. However, they note that legends and the term "history" among the people are considered unambiguous [Fanuza Nadrshina, 1985: 4]. In the "Russian-Uzbek Explanatory Dictionary of Literary Terms" of Uzbek scholars, the word "legend" is explained as "tradition" and an interpretation is given to it. "Legends" is interpreted as "rivoyat", "legend" - as "narration". [Khotamov N., Sarimsakov B, 1983: 171-172-299].

It turns out that the word "legend" is close to the concept of "legend". In general, the legend at the level of the genre in

Uzbek folklore as a term has not been fixed. This state of affairs is observed among many peoples of Central Asia. Folklore scholars of these countries, conducting special work in this direction, taking as a basis the possibilities of their national history, adopted the term "narration" (rivoyat) in their folklore studies. And according to scholars studying Kazakh folk prose, the concept of "legend" until the end of the 60s of the last century went under the name of "legend", so they were not studied as independent genres, but were used as one and the same concept. However, over time, relying on the experience of Russian folklore experts, Kazakh scientists gave the word "legend" the concept of "agyz", and the word "legend" - "apsana hikayat", thereby divided them into independent genres [Kaskabasov S.A., 1990: 150-151].

However, there are main criteria that distinguish them from each other: descriptions in legends of events that occurred in distant times, the connection of various totemic, animistic, fetishistic, shamanistic beliefs with the basis of the plot, deities, saints, prophets can act as heroes and still differ through a strong fantastic semantic description. Historical events prevail in the stories of legends, therefore, they focus on their detailed explanation. Due to the fact that the heroes of legends are basically historical personalities, supernatural natural forces do not participate in

them. There are few plots or episodes in legends, in some places it is limited to one plot, compositional construction is not at the appropriate level, but there are many options, differing in ethnographic, geographical, historical, thematic features. Uzbek folklorists briefly and clearly describe the differences between legends and legends: "If legends are described on the basis of fictional events, then the legends describe historical events described by artistic techniques" [Zhumanazarov U, 1993: 172]. In fact, the most significant difference between legends and traditions is the presence or absence of historical events in the plot. If the semantic content of events is given too far from the truth of life and does not correspond to reality, then you have a legend, and if the edge of events is directed at a real historical object, and here the task is to explain, study this phenomenon, then it belongs to the genre of legends and is included in the corresponding group of information. In the legends, you can limitlessly use pictorial and artistic techniques, especially hyperbolism and fantastic digressions. In legends, however, such opportunities are extremely limited. They serve only to explain the reality of certain events, or to idealize this object. “For legends, amazing elements of events are not required” [Myths of the peoples of the world, 1988: 45].

In order to sharpen the events and enrich the content of the plots based on historical and life information, legends in prose works were formed into an epic form. The term "legend" of the scientist has long been adopted by folklorists. Scientists and researchers began to call the folk heritage with historical roots as legends.

In the process of studying the genre features of the Karakalpak folk legends and dividing them into topics and relying on the theoretical aspects of scientific folkloristics, we came to the following conclusion.

The components that form the legends are distinguished by features that are constantly used depending on the content of the legend and explain the historical event, historical person, clans and tribes, the name of the area and the water source with epic approaches. These components consist of the following: historical events (this includes all types of legends), the idea emanating from them (they can be found in the form of oral stories), at the next stage they turn into a single folklore genre (enriched with geographical, ethnographic, anthroponymic, ethnonymous, toponymic and folklore information).

The stages and time of the formation and development of the Karakalpak folk legends are based on the content of the events that are stated in them. They are of a public nature. Any characteristic event can be reflected in the legends. The attitude of our ancestors to work, customs and traditions, as well as the historical, social and cultural level of that time, played an important role in the emergence of legend.

Ethnonymic, toponymic, historical legends, as well as legends about folk melodies and legends on religious themes have an internal relationship. Sometimes they are difficult to distinguish from each other.

Ethnonymic legends serve to explain the origin of clans and tribes; toponymic - serve to explain the reasons for the origin of the names of the area, historical - the history of the origin of our ancestors; legends about folk melodies serve to explain the history of the origin of the names of each melody and work.

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Rezyume: *Maqola qoraqalpoq xalq nasridagi hikoya janrini o‘rganishga bag‘ishlangan. Maqolada qoraqalpoq xalq og‘zaki ijodida rivoyatlarning kelib chiqishi muammolari, manbalari, o‘rganish masalalari va mavzuga oid bo‘linishi tahlil qilingan. Qoraqalpoq og‘zaki ijodi ijodi asrlar osha avloddan-avlodga o‘tib, xalqning ma’naviy madaniyatini o‘ziga singdirib, o‘zida aks ettirgan bebaho merosi bilan yangilanib bormoqda.*

Qoraqalpoq xalq og‘zaki ijodida adabiyotlarni to‘plash, xalq og‘zaki ijodi namunalarini o‘rganish borasida bir qancha ishlar amalga oshirildi. Ertak, maqol, hikmat, topishmoq, aytishuv (ashula musobaqasi), doston (she’r) kabi janrlar mustaqil tadqiq etilgan.

Shu bilan birga, ular hali o'rganilmagan; aniqlik va yechim kutmoqdalar. Qoraqalpoq folklorida izlanishni taqozo etadigan ana shunday muammolardan biri afsona janridir. Hozirgacha afsona janri maxsus ilmiy tadqiqot ob'ekti bo'lmagan.

Резюме: *Статья посвящена изучению жанра повествования в каракалпакской народной прозе. В статье анализируются проблемы происхождения легенд в каракалпакском народном устном творчестве, их источники, вопросы изучения и их тематическое деление. Творчество каракалпакского устного творчества, переходящее веками из поколения в поколение и обновляющееся бесценным наследием народа, впитавшим и отразившим духовную культуру народа.*

В каракалпакском фольклористике проведен ряд работ по сбору изданий и изучению образцов устного народного творчества. Самостоятельно исследованы такие жанры, как сказки, пословицы, поговорки, загадки, айтысы (певческие конкурсы), дастаны (поэмы).

В то же время они еще не исследованы; они ждут разъяснений и решения. Одной из таких проблем, требующих исследования в каракалпакском фольклористике, является жанр легенды. До сих пор жанр легенды не был объектом специального научного исследования.

Kalit so‘zlar: *xalq og‘zaki ijodi, janr, rivoyatlar, mavzu, ertak, din.*

Ключевые слова: *фольклор, жанр, легенды, тема, сказка, религия.*

THE PROBLEM OF HISTORICISM IN LITERARY CRITICISM

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Summary: *The article examines the problem of historicism in literary criticism, as well as the study of various scholars about the significance of historicism as one of the main criteria.*

Keywords: *historicism, literature, novel, artistry, historicity, art, V. V. Kozhinov, problem, literary criticism.*

Historicism in literature is the artistic assimilation of the concrete historical content of a particular era, as well as its unique appearance and color. The problem of historicism takes on a special character when it comes to the historical genre, i.e. about a novel, a poem, a drama, in which the goal is to recreate the human life of past times. In this case, the writer inevitably encounters the demands of historicism and consciously strives to fulfill them. But in a more hidden and often unconscious form, historicism appears as an integral property of any truly artistic work, for it is, first of all, the ability to grasp the leading tendencies of social development, manifested in national events and individual destinies. A genuine work of art is always deeply contemporary; it recreates the most essential features of its time, regardless of what topic it is devoted to - the great historical events of its era, the intimate life of a person, or even the existence of a person among nature. But the organic contemporaneity of true art is nothing more than an expression of the historicism of the artistic assimilation of life, the artist's ability to embrace life in its movement and development, to depict it as the transformation of the past into the future - otherwise the present cannot be embodied.

Artistic historicism is qualitatively different from historicism in science. The artist's task is not to formulate the laws of historical development, but to capture the subtlest reflections of the general course of history in the behavior and consciousness of people. It is possible to show the external influence of historical events on human destinies in a simple documentary essay; a novel limited to this task will not be truly artistic, for art is called upon to embody concrete historical content in the integral image of a person.

In Russian literary criticism, there are enough authors who consider historicism one of the main criteria. This opinion is shared by N. Znamenskaya, Yu. Andreev, L. Aleksandrova, I. Gorsky, B. Reizov, G. Makarovskaya, L. Gorelova, S. Petrov, A. Bakanov and others, sometimes putting different meanings into this concept. Thus, B. Reizov, a researcher of the French historical novel of the era of romanticism and creativity of V. Scott, calls historicism “the reconstruction of the psychology and problems of the era” [5. 322]. V.Kozhinov defines historicism as “the ability to grasp the leading tendencies of social development, manifested in national events and individual destinies,” emphasizing that “the artist's task is not to formulate the laws of historical development, but to capture reflection of the social course of history in the behavior and consciousness of people ”[3. 322]. The most accurate in this respect is the approach of A. Bakanov, who understands by historicism the temporal conditionality of social phenomena, the individual life of people. I. Gorsky shares this point of view, paying special attention to the concreteness of their image. The researcher believes that in order to achieve it, the writer needs to be able to motivate people's behavior with the conditions of their life, to be able to generalize his observations of a person and his connections with society. In fact, the approach of I. Gorsky does not differ from the general principles of realistic art. But N. Znamenskaya argues that the concept of historicism is not equivalent to the concept of artistic reliability. The researcher shares the opinion of S. Petrov that historicism is "an image of the life of a person and society in the process of their development, in motion, in accordance with the spirit of the times, as a product of a certain literary era in the fate of a nation in world history" [4. 103]. Both researchers emphasize the national aspect in this concept. However, the thesis about the need to depict the past as a dynamic process is of the greatest value in their reasoning. T. Komarovskaya pays special attention to this. The principle of historicism is one of the

main in the analysis of works about the past in her work "Problems of the poetics of the historical novel of the United States of the twentieth century." The author of the monograph approaches history as a process that is constantly developing and obeying objective laws.

So, historicism, understood by us as the principle of perception and reflection of the past as a dynamic process that naturally develops in accordance with the objective conditions of time, is an important feature of the historical novel.

The problems of artistic historicism are investigated in the works of Yu. M. Lotman, A. M. Panchenko, Yu. V. Stennik, K. G. Isupov, P. V. Bekedin, P. P. Gaidenko, L. K. Dolgopolov. Historical and philosophical concepts of D S. Merezhkovsky and A. N. Tolstoy and their dependence on the socio-cultural context. The creative heritage of A. N. Tolstoy is currently being considered by literary critics in a new cultural and ideological aspect.

The term "historicism" is very widely used by researchers, especially in Russia, but so far there is no convincing generally accepted explanation of its meaning. In Russian literary criticism of the twentieth century, historicism was understood as broadly as possible. So, V.V. Kozhinov writes: "Historicism in literature is the artistic development of the concrete historical content of a particular era, as well as its unique appearance and color" [1. 227]. In this sense, historicism becomes almost a synonym for realism, and certainly a measure of the artistic value of a work, that is, the category of poetics is replaced by an ideological category [1. 227]. In this case, historicism is everywhere - from Homer's poems to postmodern works, since any work of art somehow embodies the era.

However, at the same time V.V. Kozhinov understands historicism in the narrowest possible sense of the word - as a sign of the historical genre. He notes that, although historicism is present in any truly fictional work, starting with the most ancient epics, but at the same time, this historicism is, as it were, not completely full-fledged, slightly flawed, since “until modern times, humanity did not possess truly historical thinking and knowledge. Historicism is most clearly formed in the work of W. Scott. After Scott, an intensive development of truly historical literature begins; historical narratives of Pushkin, Merimee, Gogol and others are created, who really recreated the past both in its historical content and in its unique appearance ”[1. 228]. That is, on the one hand, historicism is everywhere, and on the other, “The problem of historicism takes on a special character when it comes to the historical genre, that is, about the novel, poem, drama, etc., in which the goal is to recreate the human life of the past. times. In this case, the writer inevitably collides with the requirements of historicism and consciously strives to implement them ”[1. 229]. This point of view - historicism as a feature of the historical novel - is also widespread enough. So thinks, for example, I.P. Shcheblykin [8. 33].

Historians understand historicism differently. The definition in the Soviet Historical Encyclopedia reads: "Historicism is the principle of scientific thinking, which considers all phenomena as developing on the basis of certain objective laws" [2. 557]. Approximately the same point of view is contained in the article on historicism in the French dictionary of L. Armentiere, and in the definition of M.G. Sokolyansky: he interprets historicism as a principle of artistic development of reality, based on an understanding of the laws of development and temporal determinism of society and assuming the author has a certain historical concept [6. 37-40]. Consequently, history ¬ rism is present in works whose authors have a certain concept of historical development, philosophy of history, etc. Which, of course, is true, but, as it seems to us, it is not enough.

Historicism, however, is not the only feature of the historical novel. It has long been noted that this genre has absorbed many previous literary traditions: the novel of education, family - biographical, adventure novel, etc.

Therefore, we will also rely on the point of view of M.I. Steblin-Kamensky, who defined historicism as "the hypothesis of non-identity", that is, the assumption that the psychology of medieval man is not identical with the psychology of modern man. That is, historicism appears not

when a difference is noticed in the way of life, way of life, etc., but when the differences in human psychology are realized [7. 7].

And also as an example, I would like to add that many writers of the Stalinist era, in order to get away from the dangers of modern Soviet themes, turned to the composition of historical novels and plays. The appeal to history suddenly became popular. Writers are increasingly attracted by the highlights of the historical past and the military victories of the Russian people. The novel "Peter I" by A. N. Tolstoy was written in the years when such revolutionary historical novels as "Emelyan Pugachev" by V. Shishkov, "Razin Stepan" by A. Chapygin, "The Tale of Bolotnikov" by G. Shtorm, "Chingis -khan "by V. Yan," Kyukhlya "by Yu. Tynyanov and many others. They reflected the main events of Russian history and the fate of the Russian people, its revolutionary performances. The novel "Peter I" by A. N. Tolstoy is the first and only historical novel about Peter I and the Peter's era.

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Rezyume: *Maqolada adabiy tanqiddagi tarixshunoslik muammosi, shuningdek, tarixshunoslikning ahamiyati haqida turli olimlar tomonidan olib borilgan tadqiqotlar asosiy mezonlardan biri sifatida ko‘rib chiqiladi.*

Резюме: *В статье рассматривается проблема историзма в литературоведении, а также изучение различных ученых о значении историзма как одного из главных критериев.*

Kalit so'zlar: *tarixshunoslik, adabiyot, roman, badiiy ijod, tarixshunoslik, san'at, V. V. Kojinov, muammo, adabiy tanqid.*

Ключевые слова: *историзм, литература, роман, художественность, историчность, искусство, В. В. Кожинов, проблема, литературоведение.*

THE ROLE OF THE TRANSFER DOCUMENT AND THE DISTRIBUTION BALANCE IN THE REORGANIZATION OF THE LEGAL ENTITY IN THE PROTECTION OF CREDITORS' RIGHTS

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Summary. *The process of reorganization of a legal entity consists not of a set of actions carried out randomly and without any rules, but of a set of orderly actions, the beginning and end of which are carried out on the basis of the relevant documents. Therefore, just as the formation and operation of a legal entity are formalized by the relevant documents, its reorganization is based on certain documents. Such documents include the decision of the founders (participants) or bodies of the legal entity on the reorganization, the transfer document and the balance sheet, along with correspondence to send the relevant notifications to creditors in the prescribed manner and time. A transfer document is an act that resolves the issue of transfer of rights and obligations of the reorganized legal entity to legal successors and contains the relevant information. In turn, the distribution balance sheet is a document that determines the distribution of rights and obligations of the reorganized legal entity among the legal successors. The current legislation provides for the rules of the transfer document and the distribution balance, the requirements for the content and execution of these documents in general. This leads to different approaches to understanding and interpreting these documents in law enforcement practice. Moreover, in national civil law, too, there is no specific research devoted to the legal nature and essence of the transfer document and the balance of distribution. This, in turn, highlights the need to study the role of the transfer document and the distribution balance sheet in protecting the rights of creditors in the reorganization of legal entities.*

Keywords: *legal entity, transfer deed, distribution balance, legal succession, property, reorganization, founding document, rights and obligations, debt.*

The transfer document is a document that affects the determination of the subsequent fate of the rights and obligations of the reorganized legal entity, which serves to link the legal successors and the rights and obligations transferred to them. The transfer document reflects the obligations of all creditors and the legal succession to the obligations of the parties in dispute. The question of whether the provisions on the rights of the reorganized legal entity are reflected in the transfer document is not directly reflected in the legislation. However, the fact that the "obligation of the reorganized legal entity to the debtors" is specified in the transfer document, which means that it is the rights of the reorganized legal entity, which is transferred on the basis of legal succession.

In particular, Article 51 of the Civil Code, which deals with the content of the transfer document, stipulates that this document represents all obligations of the reorganized legal entity to all creditors and debtors, including the disputed obligation of the parties. Speaking about the legal nature of the transfer document, Kh.Rakhmonkulov states the following: in the division or separation of a legal entity, the fate of the property is decided on the basis of the transfer document and the balance of distribution, and these documents determine the scope of rights and obligations.

The commentary to Article 51 of the CC on the transfer document states that the transfer document and the distribution balance sheet are given importance as documents defining the content of the rights and obligations recognized and disputed, which are transferred from the reorganized legal entity to its legal successor (legal successors).

According to A.M.Belyalova, the preparation and approval of the document on legal succession will allow the participants of the reorganized person to make a reasonable assessment of the feasibility of the reorganization, to make a reasoned decision on the need to maintain its membership in the corporation.

In our opinion, the transfer document in the reorganization is a document that acts as an act of transfer of property, which is used in civil law relations. The CC sets a number of requirements for the conclusion of an act of transfer of property between the parties to the relevant contractual relationship. In particular, the first part of Article 486 of the Civil Code provides for the transfer of real property from the seller to the buyer, while Article 493 provides for the act of transfer of the enterprise from the seller to the buyer as the main document. According to this article, the act of transfer of the enterprise must contain the following information:

1) the composition of the enterprise and the fact that creditors have been notified of the sale of the enterprise;
2) information on identified deficiencies in the transferred property;
3) a list of property that could not be transferred due to loss.

In addition, the rules of the deed of transfer in the CC are set in relation to the lease relationship. According to the second part of Article 541 of the Civil Code, the lessor will have to prepare a deed of transfer of property and submit it to the lessor for signing. In addition, the second part of Article 578 of the Civil Code stipulates that the lessor shall transfer the building or structure to the lessee in accordance with the deed of transfer. The rules for the transfer of the enterprise on the basis of the deed of transfer are also reflected in the legislation (Article 581 of the Civil Code).

In general, civil law requires that the transfer of property from one person (subject) to another and that the transfer of the obligation to preserve the property and the risk of accidental death not be subject to future disputes between the people involved in the process. However, the transfer of property from one person to another may affect not only the interests of the parties to the relevant legal relationship, but also the interests of third parties involved in the process. For example, in the sale of an enterprise or the reorganization of a legal entity, the transfer of property becomes important as an object of satisfaction of creditors' claims. Therefore, this document should also include a list of creditors and their claims.

It should be noted that there is no consensus in civil law on the naming of the document on the transfer of property. If Article 51 of the Civil Code calls this document a "transfer document", in Article 54 of the Law "On Limited Liability Companies and Additional Liability Companies" this document is called a "deed of transfer". Articles 93-94 of the Law "On Joint Stock Companies and Protection of Shareholders' Rights" also refer to this document as an "act of transfer". In the Russian text of Article 51 of the Criminal Code, this document is called a "transfer act". In this case, it would be appropriate to call this document an act, as the transfer process is aimed at formalization and is concluded between the parties whose mutual interests in some sense collide. This is because the Uzbek dictionary defines it as "dalolatnoma (dalolat+noma) - an official document drawn up and signed by several people in order to confirm any activity, event or situation, to testify to it". The distribution balance is the sum of the existing property, assets, property claims and debts of the reorganized legal entity. The transfer document and the distribution balance sheet are the most important documents to be drawn up in case of reorganization of a legal entity, one of which cannot be drawn up separately from the other. On the contrary, these two documents are significant in that they complement each other. Therefore, in case of reorganization, the distribution balance is drawn up and formalized together with the act of transfer. The distribution balance sheet reflects the distribution between the existing property of the reorganized legal entity and the legal successors of this property. In accordance with paragraph 10 of the methodology "Formation of financial statements in the implementation of reorganization" IFRS No.23 of "The National Accounting Standard of the Republic of Uzbekistan" approved by the Order of the Minister of Finance of the Republic of Uzbekistan dated to April 12, 2005 No.37 (Registration No.1484, June 27, 2005) the following shall be attached to the deed of transfer or distribution balance in accordance with paragraph:

1) a financial report containing the composition of assets and liabilities and their value from the date of registration of their transfer to the date of the last reporting date. In this case, the report is prepared in accordance with the Law of the Republic of Uzbekistan "On Accounting";

2) acts of inventory of assets and liabilities of the reorganized legal entity (registration documents). These acts approved by the Ministry of Finance of the Republic of Uzbekistan on October 19, 1999 No.EG/17-19-2075 of "The National Accounting Standard of the Republic of Uzbekistan" (IFRS No.19) are carried out in accordance with the "Organization and conduct of inventory" (Registration No.833, November 2, 1999);

3) primary documents on tangible and intangible assets. These documents include the act of acceptance and transfer of fixed assets; act of acceptance and transfer of intangible assets; the act of acceptance and transfer of inventories; includes various consignment notes. There are also primary documents on tangible and intangible assets, as well as documents on the seizure of other assets;

4) documents for registration of accounts payable and accounts receivable. These documents include:

- list of property of the reorganized legal entity;
- list of obligations under civil law contracts;
- a document confirming that the creditors have been notified of the transfer of settlements with the relevant budgets, state trust funds, etc. to the legal successor.

The second part of Article 51 of the Civil Code clarifies who will approve the transfer document and the distribution balance. Accordingly, approval is made by two entities (individuals). In the first case, these documents are approved by the founders (participants) of the legal entity, in the second case, the authority to do so is given to the body of the legal entity that decided to reorganize the legal entity. It is understood from this rule that if after the establishment of a legal entity the founders became participants and the establishment was terminated, the deed of transfer and the balance sheet of the distribution must be approved by the body that decided to reorganize. For example, in joint-stock companies, the founders become shareholders after the establishment of the company, and the most important issues related to the activities of the joint-stock company are adopted directly by the general meeting of shareholders. That is the document of transfer of the joint-stock company and the distribution amount are approved by the general meeting of shareholders. The transfer document and the distribution balance sheet shall be submitted to the relevant state body together with the constituent documents for state registration of the newly formed legal entity or amendments to the constituent document of the existing legal entity after due approval. There is no clear provision in the current legislation that a legal entity may be re-established as a result of reorganization. Article 42 of the Civil Code, which deals with the formation of legal entities, contains only the subjects that make decisions that form the basis for the formation of a legal entity and the general procedure for their formation. This article does not provide for the re-emergence of a legal entity as a result of reorganization. However, a legal entity is formed only on two grounds, namely, the establishment and reorganization of a new one. In order to fill this gap in the legislation, the first part of Article 42 of the Civil Code should be defined as follows: a legal entity is formed as a result of the establishment of a new legal entity or reorganization of an existing legal entity. It is also important to determine the date of approval of the deed of transfer or distribution balance in the prescribed manner. In this case, the founders or the relevant body within the period of reorganization provided for in the agreement (decision) of the founders, notify creditors, shareholders and participants of the decision on reorganization, their claims for termination or early performance of obligations and compensation for losses, inventory of assets and liabilities, etc..

According to experts, the legislature did not give these documents a law-making feature, that is, without these documents it is impossible to transfer the relevant rights and obligations.

Yu.A.Krylova writes that the transfer document and the distribution balance cannot be considered as a law-establishing document, because the legal succession in the re-transfer does not depend on the existence of these documents.

V.A.Rakhmilovich noted that the transfer document and the distribution balance sheet are evidence of the decision on the distribution of rights and obligations of the reorganized legal entity. The legal successors shall have the rights and obligations related to the reorganized legal predecessor, which are not expressed in these documents, or even identified during the reorganization. Taking into consideration that the composition of the property and liabilities of the reorganized legal entity does not correspond to the composition of the property and liabilities to be transferred to the legal successor as a result of the reorganization, some authors consider it necessary to abandon the content of the obligations which should be specified in the agreement on addition (subtraction) or in the decision on separation (division).

In our opinion, the transfer document and the balance sheet are documents that are valid due to the specifics of the forms of reorganization, serve to identify all the rights and obligations in the reorganization and record the extent of their transfer to legal successors. The need for these documents in today's world of modern technology, electronic accounting systems is really important. This is because it is not difficult to prepare the information to be reflected in the transfer document and the balance sheet of distribution and to express them in the decision on reorganization or in the agreement on merger and acquisition of legal entities. In addition, as noted above, the fact that the transfer document and the distribution balance sheet are not documents that create the right, the need for these documents and the requirements for them are not reflected in the legislation. However, the fate of rights and obligations in the reorganization of legal entities must be decided on the basis of the specifics of the forms of reorganization, it is appropriate to retain in the legislation the requirements for registration of the transfer document or one of the distribution balances. O.I.Agapova analyzes the compatibility of the transfer document and the balance sheet with the information in the balance sheet of the organization and makes the following comments: the property (right to property) specified in the transfer document (distribution balance sheet) may not always be compatible with the assets to be reflected in the balance sheet of the organization. These documents must be prepared in accordance with the requirements of civil law, using accounting data. Continuing her opinion, O.I.Agapova writes that the transfer document (distribution balance) is a document of registration of legal succession on the obligations of the reorganized legal entity. The analysis of the existing normative-legal documents shows the need to strengthen students at the legislative level in relation to the documents formalizing the legal succession. In particular, the transfer document (distribution balance) should state all debt obligations transferred from the reorganized legal entity to its successors, as well as all information on the right of claim, taking into account the amount of money to each creditor and debtor. It is also necessary to consider the possibility of appealing in court on the transfer document (distribution balance). Noting that these views are relevant, it should be noted that the current civil law should only preserve the act of extradition and clearly define the rules for its content and registration. In addition, it would be expedient to formulate clear rules on the differences between the act of legal transfer and the act of transfer of property, which is used in other civil law constructions.

Another problem in the reorganization of legal entities is the lack of clear rules in the legislation on the form of the transfer document and the distribution balance. As noted above, in the methodology "Formation of financial statements in the course of reorganization" IFRS 23 of "The National Accounting Standard of the Republic of Uzbekistan" approved by the Order of the Minister of Finance of the Republic of Uzbekistan dated to April 12, 2005 No.37 (Registration No.1484, June 27, 2005) there are special rules for the preparation of the application. However, this normative-legal document only determines the procedure for the formation of accounting reports in the implementation of the reorganization. However, the transfer document and the distribution balance sheet are not accounting documents, but independent legal documents provided for in civil law. The rules for the formation of financial statements are a description of the content of the

annexes to these legal documents, the terms of their preparation, and a list of options for the assessment of civil law. In addition, this methodology does not set any imperative norms with respect to the form and content of the deed of transfer and the balance of distribution.

In addressing these issues, it will be necessary to determine the legal status of the documents determining the legal succession on the rights and obligations of the reorganized organization, as well as the requirements for its content.

Based on the above analysis, it is expedient to add the following addition to the first part of Article 51 of the Civil Code after the word "rules":

as well as the procedure for determining the type, composition, value of the property, reorganization of the legal entity in connection with the emergence, change, termination of the rights and obligations of the legal entity, which may occur after the date of the transfer act.

Article 51, paragraph 3, of the Civil Code stipulates that the transfer document (distribution balance) has not been submitted or that the issue of legal succession has not been expressed in this document. In this case, the legislature must refuse to state registration of a legal entity that has emerged as a result of reorganization.

In this regard, it is appropriate to draw attention to two different approaches between the first and third parts of Article 51 of the CC. The point is that the first part of this article stipulates that the transfer document and the distribution balance represent the legal succession for all obligations of the reorganized legal entity, while the third part provides for legal succession only for obligations, not all obligations. In order to distinguish between the terms "all obligations" and "obligations", to ensure the correct and appropriate use of terms and words in the legislation and the uniform interpretation of legal norms, the word "obligations" in the third part of Article 51 of the CC should be replaced by "all obligations".

It would also be appropriate to draw attention to the ambiguity between the second and third parts of Article 51 CC. The second part of this article stipulates that the transfer document (distribution balance) together with the constituent documents must be submitted not only for state registration of new legal entities, but also for amendments to the constituent documents of existing legal entities. However, the third part of the article deals with the legal consequences of non-submission of the transfer document (distribution balance) only in connection with the state registration of newly formed legal entities, and does not specify the consequences of amending the constituent documents. In order to fill this gap, it is necessary to add the following addition to the third part of Article 51 of the Civil Code after the word "transfer": "amendments to the constituent documents" will be rejected.

In conclusion it is necessary to note, that the transfer document (distribution balance sheet) plays an important role in protecting the rights of creditors of the reorganized legal entity by establishing rules for legal succession, debts and claims in the reorganization of the legal entity. However, in some forms of reorganization of a legal entity, it is necessary to resolve the issue of the need to compile these documents and to leave only one of them, avoiding such dualism in the registration of legal succession in the reorganization.

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Rezyume: *Yuridik shaxsni qayta tashkil etish jarayoni tartibsiz va hech bir qoidalarsiz amalga oshiriladigan harakatlar majmuidan emas, balki boshlanishi va tugashi tegishli hujjatlarni rasmiylashtirish asosida amalga oshiriladigan tartibli xatti-harakat jamlanmasidan iborat bo‘ladi. Shu sababli yuridik shaxsni tashkil topishi va faoliyati tegishli hujjatlar orqali rasmiylashtirilgani kabi uni qayta tashkil etish ham muayyan hujjatlarga asoslanadi. Bunday hujjatlar jumlasiga yuridik shaxsning muassislari (ishtirokchilari) yoki organlarining qayta tashkil etish to‘g‘risida qabul qilgan qarori, bu haqda tegishli xabarnomalarni belgilangan tartibda va muddatda kreditorlarga yuborishga oid yozishmalar bilan birga topshirish hujjati va taqsimlash balansi ham kiradi. Toshirish hujjati qayta tashkil etilayotgan yuridik shaxsga tegishli huquq va majburiyatlarni huquqiy vorislarga o‘tishi masalasini hal qiluvchi va bunga oid ma’lumotlarni o‘zida ifodalovchi dalolatnoma hisoblanadi. O‘z navbatida, taqsimlash balansi esa, qayta tashkil etilayotgan yuridik shaxsning huquq va majburiyatlarini huquqiy vorislar o‘rtasida taqsimlanishini belgilaydigan hujjatdir. Amaldagi qonunchilikda topshirish hujjati va taqsimlash balansiga oid qoidalar, ushbu hujjatlarning mazmuni va rasmiylashtirilishiga nisbatan talablar umumiy tarzda ifodalangan. Bu esa huquqni qo‘llash amaliyotida mazkur hujjatlarni tushunish va talqin etishda turli xildagi yondashuvlarni yuzaga keltiradi.*

Резюме: *Процесс реорганизации юридического лица состоит не из набора действий, выполняемых случайным образом и без каких-либо правил, а из набора упорядоченных действий, начало и окончание которых осуществляются на основании соответствующих документов. Таким образом, как создание и деятельность юридического лица оформляются соответствующими документами, так и его реорганизация осуществляется на основании определенных документов. К таким документам относятся решение учредителей (участников) или органов юридического лица о реорганизации, а также корреспонденция об отправке соответствующих уведомлений кредиторам в установленном порядке и в установленные сроки, а также передаточный акт и разделительный баланс. Передаточный акт - это акт, решающий вопрос о передаче прав и обязанностей реорганизованного юридического лица правопреемникам и содержащий соответствующую информацию. В свою очередь, разделительный баланс - это документ, определяющий распределение прав и обязанностей реорганизованного юридического лица между правопреемниками. Действующим законодательством предусмотрены правила передаточного акта и разделительный баланса, требования к содержанию и оформлению этих документов в целом. Это приводит к разным подходам к пониманию и толкованию этих документов в правоприменительной практике.*

Kalit so‘zlar: *yuridik shaxs, topshirish hujjati, taqsimlash balansi, huquqiy vorislik, mol-mulk, qayta tashkil etish, ta’sis hujjati, huquq va majburiyat, qarz.*

Ключевые слова: *юридическое лицо, передаточный акт, распределительный баланс, правопреемство, имущество, реорганизация, учредительный документ, права и обязанности, долг.*

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ANALYSIS OF THE TERM COMMUNICATIVE COMPETENCE AND ITS IMPORTANCE

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Summary: *The article defines the terms "competence", "communicative competence" and describes the importance of developing the communicative competence of students of educational institutions. In the article, the elements that describe the formation of communicative competence have been analyzed. Also, the article determines the problems and in forming and improving students' communicative competence at the educational process. In addition, the actuality of this study has been clearly defined. The author makes a descriptive analysis of several definitions to communicative competence stated by the scientists in this field.*

Keywords: *communication, communicative competence, lexical competence, pedagogy, educational process, intercultural competence.*

The term "*communicative competence*" is characterized by ambiguity and ambiguity both at the level of the concept itself and at the level of its components. The reason for this phenomenon is that the belonging of the term to the conceptual apparatus of various sciences, such as pedagogy, linguistics, psychology, psycholinguistics, sociology, cultural studies, philosophy and others, which highlight various aspects of this concept. The concept of "*communicative competence*" was studied by both foreign and domestic scholars. N.N. Obozov believes that communicative competence can basically be presented in two aspects: as an orientation of the personality level in different outlook situations, based on knowledge and sensory experience of interpersonal, and how the ability effectively emerged to interact with others with the help of understanding themselves and others, with a constant change in which mental states, interpersonal relations and conditions of the social environment [6]. M.A. Khazanova considers communicative competence as language proficiency, the ability to navigate in the object of communication, personality characteristics (adequate self-esteem, social orientation) of the subject of communication itself. According to G.S. Trofimova, communicative competence is the ability of a level to navigate in various communication situations [3]. The concept of "communicative competence" in the work of A.A. Bodalev was interpreted as the ability to establish and maintain effective contacts with other people in the presence of internal resources (knowledge and skills) [3].

In connection with the allocation of skills in the process of formation, we will designate that communication skills are a complex of conscious communicative actions based on high theoretical and practical preparedness of the individual, which allows you to creatively use knowledge to reflect and transform reality. Their development is associated with the formation of personality new growth.

In addition, foreign researchers to describe the communication process use the concepts of communication, communicative, and domestic scientists in a similar context - the concepts of communication and communicative. The versatility of the concept of *communication* has given rise to many of its interpretations, both in domestic and foreign studies. Only in the English-language literature, by 1969, 96 definitions of the concept of *communication* were proposed. There is a point of view that the basic category is communication that flows between people in the form of communication as an exchange of sign formations (messages). However, there is also an opposite interpretation of the relationship between the concepts of "communication" and "communicative", in which communication is considered the main category, and communicative is distinguished in the structure of the latter (exchange information), interaction (organization of interaction and impact), perception (sensory perception as the basis of mutual understanding) [1].

Any forms of communication are included in specific forms of joint activity in the process of people performing various functions. The activities of one person inevitably intersect with the activities of other people, and this intersection creates a certain relationship of a person, both to the subject of his activity, and to other people. Communication not only mediates joint activity, it allows each of its participants to present some elements, starting with the goal or tasks, objects of activity, generalized information about the experience of participants in the activity and ending with the personality traits necessary for decision-making. The specificity of communication, in contrast to other types of interaction, consists in the fact that psychological qualities of a person are manifested and formed in it. The idea of *intertwining*, the penetration of communication into activity allows us to assume that it is in activity that communication can be *constituted* and through communication the activity is organized and enriched. The rapid economic development of many countries and regions, revolutionary changes in technology give rise to specific features of intercultural interaction, where communication becomes a kind of catalyst for integration processes in engineering. As a result, the density and intensity of long-term contacts between representatives of different cultures continues to increase. In fact, intercultural competence is a meaningful component of communicative competence, which is emphasized by V.V. Safonova: "intercultural competence is a part of the communicative competence of a person studying a foreign language" [7]. We assume that the intercultural aspect should be reflected in the content of communicative competence.

Furthermore, given the traditionally strong component of Russian education, fundamentality - the ability and readiness of a university graduate to practically apply the knowledge gained, to solve various problems, and to act productively become relevant. The formulation of such tasks is within the framework of the competence-based approach. Note that, having originated in England, this approach was developed and comprehended not within education, but was a response to a specific order of the professional sphere. The first demanded competence was communicative. Then the technology "*debate*" was introduced as a mandatory technology for the formation of critical thinking for all schools in England. A.V. Khutorskoy defines competence as the possession of the corresponding competence, including the personal attitude of a person to it and the subject of activity [5], as an established personal quality of a person. A significant addition to the definition of competence for our research is the interpretation of competence by V.V. Bashev, who believes that competence is characterized by the ability to transfer the ability to conditions different from those in which this competence originally arose [2], thereby confirming the idea that competence is an integrative quality of a person, which is successfully implemented in activities, even if the activity occurs in new conditions for the subject, competence integrates knowledge, skills and learned ways of activity in relation to specific conditions, in a specific situation. Analysis of the above definitions of the concept of *competence* allows us to conclude that competence is a dynamic personal characteristic, based on the developed readiness for a certain action on formulated value orientation, manifests itself in activities through the experience of a variety of situations. Based on this typology, the characteristics of the manifestation of communicative competence can be considered *adaptability*, *cooperativity* (cooperation), *integrativity*. Communicative competence is described by the categories *skill*, *readiness*, *possession*, *ability*. Here is another example of the classification of key competencies: 1) political and social competence; 2) intercultural competences, allowing to coexist harmoniously with people of another culture, religion; 3) competencies related to the mastery of oral and written communication; information competence; 4) competencies that determine the ability to learn throughout life.

Pedagogical research of communicative competence enriches the essential characteristics of the concept under study. In this case, in the interpretation of N.N. Dolova, communicative competence is expressed in a set of qualities consistent with the reference profile of an ideal communicant. This integrative personality quality is due to the motivation of communication, manifests itself in the communicant's ability to adequately correlate his own communicative and situational constructs with the communicative and situational constructs of the communicative

partner [4]. The definition touches upon the motivational component of the process of forming communicative competence. Assessing the degree of elaboration of the problem of the formation of communicative competence in the educational process of the university, we note the versatility of research on this phenomenon. The analysis of theoretical research and educational practice reflects the multidimensionality of the concept of communicative competence, highlighting its characteristics that are manifested in activities.

Despite the active interest of scientists in the problem of the formation of communicative competence, the relevance of which is set at the level of both Russian, Uzbek, Karakalpak and international educational experience, there is a shortage of scientific knowledge and practices that reveal the potential of the educational capabilities of the university in the formation of the communicative competence of students in the technical direction of training. The difference between the technical areas of training from the humanitarian ones lies in the significant difference in the volume of communicative practices, the lack of demand for communicative competence in the educational process, and, as a consequence, in its implementation. The communicative competence of students in pedagogical areas of training is a dynamic integrative professionally significant personal quality that allows for productive intercultural professional interaction in solving engineering problems and communication situations within the framework of professional activities, including the following components: motivational-value, cognitive, activity, reflexive-evaluative.

Thus, the formation of the communicative competence of students in pedagogical areas of training is a purposeful and organized process of activating students in a communicative educational environment for through the implementation of step-by-step pedagogical activities: orientation - enrichment of the content of education with material that actualizes the motivational value attitude to intercultural professional communication; familiarization - activation of students' activities to enrich knowledge and acquire communicative experience; consolidation - the organization of reflection and self-assessment of the results of communicative activity at the orienting and communicating stages and the setting of new goals. The formation of the communicative competence of students in pedagogical areas of training will be effective in the implementation of pedagogical conditions: - enrichment of the content of education with material that actualizes the value attitude to interpersonal, intercultural professional communication, which is expressed in the expansion of the content with material that ensures the intellectual development of students, the formation of meta-knowledge, professional and personal qualities through the implementation of the principles of thematic interdisciplinary integration, diversity, multi-functionality, dynamism; - content filling and continuous actual updating of the communicative educational environment, as a joint product and as a process of communicative interaction, based on the system integration of humanitarian and professional contexts; - activation of students' activity in a communicative educational environment by personality-oriented pedagogical technologies with pedagogical support of students. Therefore, the formed communicative competence at the external level is manifested in the possession of strategies, tactics and techniques for solving communication problems, and on the internal level it is expressed by the emergence of a need, communicative intention, the willingness and ability to cooperate, show empathy, carry out creative intellectual activity, quickly adapt to new conditions.

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Rezyume: *Maqolada “kompetentlik”, “kommunikativ kompetentsiya” tushunchalarining ta’rifi berilgan va ta’lim muassasalari talabalarining kommunikativ kompetensiyasini rivojlantirishning ahamiyati tavsiflangan. Maqolada kommunikativ kompetensiyani shakllantirishni tavsiflovchi elementlar tahlil qilinadi. Maqolada, shuningdek, o‘quv jarayonida talabalarning kommunikativ kompetensiyasini shakllantirish va takomillashtirish muammolari aniqlanadi. Bundan tashqari, ushbu tadqiqotning dolzarbligi haqida so‘z etiladi. Bu maqolada, muallif ushbu soha olimlari tomonidan taqim etilgan kommunikativ kompetentsiyaning bir nechta ta’riflarining tavsifiy tahlil qiladi.*

Резюме: *В статье дается определение понятий «компетенция», «коммуникативная компетенция» и описывается важность развития коммуникативной компетенции студентов образовательных учреждений. В статье проанализированы элементы, описывающие формирование коммуникативной компетенции. Также в статье определены проблемы и в формировании и повышении коммуникативной компетентности студентов в учебном процессе. Кроме того, была четко определена актуальность данного исследования. Автор проводит описательный анализ нескольких определений коммуникативной компетенции, сформулированных учеными в этой области.*

Kalit so’zlar: *muloqot, kommunikativ kompetensiya, leksik kompetensiya, pedagogika, ta’lim jarayoni, madaniyatlararo kompetensiya.*

Ключевые слова: *коммуникация, коммуникативная компетентность, лексическая компетентность, педагогика, образовательный процесс, межкультурная компетентность.*

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PHONOSTYLISTIC FEATURES OF PHRASEOLOGICAL SYNONYMS AND PHRASEOLOGICAL VARIANTS IN THE KARAKALPAK LANGUAGE

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Summary: *Indicators of the vocabulary of any language are synonyms and variants. The semantic richness of the Karakalpak language is also evident through the phenomenon of synonymy and variability in it. Such semantic phenomena can be found not only in words, phrases and sentences of the language, but also in the phraseologisms, which is the fruit of folk art, ready for us, constantly formed. The article analyzes the sound (phonetic) harmony, euphonic features, phonetic repetitions in phraseological synonyms and phraseological variants of the Karakalpak language in the phonostylistic direction.*

Keywords: *phraseologism, phraseological synonymy, phraseological variant, phonetic harmony in phraseologies, euphony, phonetic repetition.*

Phraseological synonyms and variants are a wonderful artistic expression of the vernacular, a rich variety of figurative meanings, a variety of sounds and expressions, expressiveness, and give artistic, conceptual, emotional-expressive meaning to speech. Phraseologisms are synonymous with each other and with individual words and their potential of impact, emotional and expressiveness is fully reflected. In phraseological variants, the different components change and retain the same meaning. Phraseological synonyms and phraseological variants of the Karakalpak language are distinguished by their phonostylistic features. Their study helps to reveal the rich artistic and phraseological potential of the Karakalpak language.

Numerous manifestations of synonymy and variation make the language of the literary work more effective, artistic, figurative, and increase its effectiveness. For example: -O'z o'zi o'zime tayaq bolip, aytiwg'a **batilim barmay atir-aw**… **Jamani jawdin' basina**! Sol balanin' oqtay bolg'anina quwanip kelip otirippan. Burin erke boldi. Qin'ir bolg'an son', **sho'p sindirip, ot isirip ko'rgen emes edi**. Al, sol o'zi qirsiq bala buginli kuni eseyip, ortan' qolday adam boldi da qaldi**. Qol qabisin** aytpaysan' ba onin'! .. Qoy desen' qilmaydi. "Men isleymen, menin' **qolimnan keledi**!..." dep alip – uship shulg'ip tur-aw shirag'im. **Gaptin lapsi-lamiri,** dunyada adamg'a Bergen bilimnen artiq shiyrin miywe joq shig'ar dep oyladim. (- it was a stick to me and **do not dare to say**… **To the head of the enemy of evil!** I'm glad that boy was agile. Before he was fondling. When he was stubborn, he **did not break the grass and put out the fire (never worked)**. That stubborn boy got older and became helper. How **helper** is he. .. he doesn't put off. "I want to, I **can do it**! ..." says he, ready for everything. **Mainly**, I thought that there was no sweeter in the world than giving the knowledge to man.) (O.X.)

Synonyms and variants are also characteristic of phonologically compatible phraseologies, and show their richness of meaning along with their phonetic artistry. For example: Sebebi, jeti atamizdan ber jaginda babalarimiz qaraqshiliq penen shug'illang'an. (Because **from our seven ancestors**, our ancestors were engaged in piracy). (J.S) Jeti pushtima jeterlik g'arg'islarim bar. (I have curses enough for my seven generation) (J.S.). Here seven ancestor and seven generation express the meaning "generation".

Phraseologisms, which artistry is marked by sound repetition of the component, are a manifestation of the inherent phraseological richness of the Karakalpak language. For example: Muzappat hakim **buwini qatip, beli bekigenne**n keyin kem-kemnen kamalina jetisti. (Muzappat hakim gradually became old after **tightened hisbones**). (O.Kh.) **Bas suyegi, buwini qatpag'an** baladan o'sh aldim dep[tursanba? (Are you saying that I took revenge on a **young** child?) (J.S.)

Phraseological variants are a manifestation of the change of phraseological meaning and are found in alliterative phraseologies. For example: Tag'I el aldinda murnin'di tartip, **zar en'irey bersen'**, senin' boslig'in'di biledi de, khabar ketpey qaladi (If you sniff and **cry i**n front of the people again, your condescension will be known and the message will not be sent). (J.S.) Al apam bolsa elden kosheyik, ekew g'anamiz diywana bolsaq tap kunimizdi ko'rermiz, - dep **zar jilaydi**. (but my mother, says :let's leave the country, we will have a living even we're two and wanderer-she **cries**). (Zh.S.) – Juwaday solg'aysan', qaraqshinin' kushigi – dep uyge zar jilap kelgen Mirg'imay sheshemnin dawisinan shorship oyandim. … Zar jilap, jer toqpaqlap g'arg'ang'anin esitip "ilayim g'arg'isi tezirek kelip, qirshin ketkeymen" dep jilar edim. (I woke up to the voice of my sister-in-law Myrgymay, who said : wilt like stick, bandit's puppy and came home crying: … When I heard him crying and knocking on the ground and cursing, I said, "I wish the curse would come sooner and I would leave" – I cried. (J.S.) – Qulinim! – dep zar eniredi apam. (-My son! My mother moaned). (J.S.)

In the language of fiction, masters of the word use such phraseologisms as synonyms with individual words. For example:

Al akesi otir **"bilsh" etpey** bunda, And his father is sitting here, without saying a word,
Ko'rmedim bunin'day **arsiz** akeni, I have never seen such a bold-faced father ... (I.Yu.)

In this example, the phraseologisms bilsh etpey and arsiz are synonymous with each other.

Such phraseologisms serve to exaggerate the sign, figuratively describe the actions. Example: Suwiq, qatip qalg'an dene **muz qara kesek**. (A cold, frozen body is like **lump of ice**). (S.S) Awildan shiqqanda kunnin iraqti jilli siyaqli edi. Al, hazir eki qulag'im shimlap, ashig'anday. Bet-awzim **muz qara kesek**. (When I left the village, it was like warm. And now I feel my ears hurt. My face is like a lump of ice). (O.Kh)

Zh.Eshbayev: "Phraseological variants cannot be considered as are meaningless repetitive groups of words in our language according to the lexical and grammatical similarities. On the contrary, they serve as a tool to increase the artistic and expressive potential of thought in speech", he said, noting that" the elements that create variability are the result of phonetic changes "[2.27-29].

In some cases, it is not possible to replace phraseological units with synonyms and variants, replacing them with other phraseological units based on their meaning in the context. Contextual framing, stylistic meaning and colors do not allow using them in this way. For example: O'zi de **bassina bolg'anday** suliw edi. (She was **very** beautiful). (M.N) "Such phraseologies used in the language of the work in order to achieve certain stylistic goals in its way reflect the mastery of the vernacular, sharpness, attentiveness, ingenuity in giving a lot of meaning in a few words. For example: Sebebi ol Shundiy oqiwda jurgende aydin jaqtisi menen har tuni tan'g'a shekem ketpendi ura-ura menshik juwerisinen basqa nahan bir qiytaq mash aralas lobiya, ulken bir aniz tari, Tuwbaydin kun shigar jiqqinindagi qumlaqqa bir awiz qabaq koknar sewip taslap, ol da **bassina bolip tindi**, sonda sonsha miynetine Sozanay qayispay kim qayissin! (Because, when he was studying at Shundiy, every night till the morning with the light of the moon, in addition to his own corn, to a large lawn he threw Phaseolus aureus mixed with beans, a big bent millet, a little poppies on the sand near Tuwbai's eastern hill, and **tired and calmed**, who will help if Sozanai does not help to such a task!) (P. 112)"[6.169]. Such phraseologies contain rich emotional-expressive meanings, so their meanings can be distinguished by context.

Phraseologisms of ko'zin joyiw and ko'zin qurtiw (kill) are variants. For example:

Begdiyar

Meyli, jeter endi. Qoyinshi soni. Well, that's enough. Never mind.
Sen arag'a Tustin, keshirdim ozim, You intervened, I apologised,
Tilesem ele de qurtaman kozin. If I wish I'd kill him. (I.Yu.)

The phraseologisms iyt muti and iyt irqin (cheap) are close in meaning. For example:

- Biz jaqta **iyt muti** ko'knar, temeki, poppy and tobacco are **cheap** in our side.
- Al bizde jantaqqa o'ser jambilsha. And we have a melon grows on thorn. (I.Yu.)

Bizde hamme narse **iyt muti**, sirttan koterip kelgendi jek koredi dep bopsidim. (I said that everything we have is **cheap**, hates to bring from outside). (M.N.) In this case, the adjective phraseology of the iyt muti greatly reduces the sign.

"Lexical variants of verb phraseologies, first of all, formed as a result of the exchange of synonymous words in the components, and secondly, as a result of the exchange of close words belonging to a thematic group. While some of the verb phraseologies are often used in variants, a certain group does not have its own variants. For example, alajipti kesisiw (argue), ko'zine sho'p saliw (betrayal, lie), tulipqa mo'nirew (upset), tal shaynaw (to tell a lie), salisi suwg'a ketiw (deeply thingking), sirkesi suw ko'termew (sensitive) and so on. They are word combinations that are indistinguishable in any part, the components of which have lost their basic lexical meaning". [5.15]

Hazirgi jaslardi qoya ber sira, Let alone today's youth,

G'iyt etsen', **jabisar darhal jag'an'a**. If you tell something, they **argue with you** immediately. (I.Yu.)

Ko'rpeni serpip jibergeni de sol, anaw apalaqta-jumalaq **jup jag'asinan jabisa ketti**. (That's only he blew the blanket away, that **began to fight**). (Sh.S). In the works of K.Pakhratdinov and K. Bekniyazov the following phraseologies which come with the word jag'a (collar) are indicated: «jag'adan (jag'asinan) aldi (tutti) - 1) quarrel; 2) confused; jag'a jirtisti - quarrels, fights; jag'asina asildi (jabisti) - quarrel, accusation, slander; jag'asina qol saldi, jag'asinan aldi (tutti) - quarrel, fight; upset; threatened; jag'asina tupirdi - 1) surprised; 2) scared; 3) frustrated; jag'asin jirtti - hit, beat; jag'asin usladi - was surprised; 2) scared; 3) very disappointed. "[4.62-63] The components of the phraseology used in the examples as"jabisar darhal jag'an'a" have been replaced according to the requirements of the text. They are phraseologisms that are used in the vernacular in the form of "jag'asina jabisiw" in the correct order, and these phraseological units come with certain stylistic changes and are used appropriately. And when used in the form of "jup jag'asinan jabisa ketti", the component of "jup" acts as a magnifier.

Influential lines created by the people are clearly reflected in their patterns, which are depicted with sounds. For example: Jol jurgen sayin tagi da bir-birine sibaylas otirg'an etek-etek el korindi. Bir-birine usamaydi. Qaybir awildin' **arasi at qayirim jerde**, basqasi **tuye jeldirimde buldiraydi.** Biraq, har awildag'I aq otaw menen boz uyler **barmaq basip sanag'anday** ushew-tortewden artiq emes. … Sonliqtan, esiklerinin' aldinda **boz sirdanday dala bolip, qula duzdegidey** uzin quyin shan'g'itip atir. (As we traveled, we saw sparse people close to each other. They do not look like each other. In some villages the distance is **close**, in others **very far**. However, there are **no more** than three or four white houses and yurts in each village. … Therefore, in front of their doors there is a **steppe** and a long hurricane like in desert is coming). (O.Kh.)

Word masters skillfully use such phraseological synonyms and phraseological variants in figurative expression of ideas. For example: Aradan **suw simirim** waqit otti. Hammenin qulagi uyde. Biraq uyden ses semir esitilmey tur edi. (It's been a **while**. Everyone's ears are listening the home. But there was no sound from the house). (O.Kh.) Bunnan keyin uy ishin **jim-jirtliq basti**. (After that, the house was **quiet**). (O.Kh.) Jaydin qublaga qaragan ulken eki ayneginen de shiranin gungirtlew jaqtisi shig'ip turipti. Al, ishte **ses-semir, qibir etken jan joqtay**. (From both large windows facing the south of the house, the indistinct side of the lamp was visible. And there is **neither sound nor anyone** at inside) (O.Kh.)

The phraseologisms of qol qishiw and alaqani qishiw (itchy palms or hand (it means fight)) come as variants in some cases. For example: Onin **alaqani qiship**, kelgen qangimaylar menen bir galle kormekke qushtarligi da bilindi. (He **wanted to fight** with the strangers). (H.O.) Murat Haitmuratti: -Qolin'iz qiship baratirsa, joldas Haitmurat, - dep irkti… -Tap alin', pajalista. (Murat Haitmurat:-If you want to fight, comrade Haitmurat, he said .... - Take it, please ...) (Sh.S.) There is superstition "Itching of the palms". It is understood that if a person scratches his palm, he will get a lot of money today". [1.248].

Phraseological synonyms are used to describe a person's mood, condition, character, personality, psychology, etc. For example:

Sonda nege qaygi shegip jas jurek, Then why does a young heart suffer,
Sonda nege qabaq tuyertas tunek? So why are they very frowning? (I.Yu.)
Jigitte un joq, qabag'I qaris jabilgan. The young man has no voice, his eyelids are frowned (Sh.S.)

In this case, the state of the character, feelings, mood, inner feelings, and sadness are expressed by phraseological synonyms with a predominance of emotional-expressive colors.

The meanings of phraseological synonyms are colorful and effective, and clearly reflect the feelings, attitudes and views of the speaker. Therefore, they enrich the language of the work with their artistry and expressiveness. For example:

Olar **paydasina putin** og'ada, They are very **business-like**,
Suwdi bo'gep turip isher sag'ada, stopped the water, drink at the beginning.
Ayaqtagi uw ishse de ayamas, do not spare even people at end drink poison,
"Dosliq" dep qiyg'irip qoyar nabada. He shouts "Friendship" otherwise. (I.Yu.)

Al, Tanirbergenov oqiwg'a bara almawi, uy mashqalasi, uy paydasi, **paydakunemlik** esin aldi. (And Tanirbergenov thought about the inability to go to school, homework, home benefits, and selfishness). (K.A.)

"The choice and use of phraseologies by the writer in accordance with his needs is in line with his thoughts, aesthetic tastes, socio-political and philosophical views." [3.54]. They convey ideas figuratively, according to the semantic features of phraseologies. For example: Olardin kokiregin erte bastan basip, **jureklerine suw burkip, kozlerine korsetip qoymasaq bolmaydi**. (We have to talk with them early, c**alm them and show them our strength**). (O.Kh.) Bugin mektep har waqittagidan da quwanishli: **eki ko'zi to'rt bolip, to'sek tartip jatirg'an** Giyas oqiwga keldi. (Today school is happier than ever: Giyas, who **has missed and is in bed**, came to study). (O.Kh.)

In short, the phraseologies that are based on sound (phonetic) harmony constitute a certain group among the phraseological synonyms and phraseological variants. Their inherent beauty, musicality, rhythm and harmony add to the essence of such phraseologies a unique imagery and artistry. They serve for the richness and impact of the language of fiction.

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Rezyume: *Har qanday tilning lug'at tarkibining ko'rsatkichlari sinonim va variantlardir. Qoraqalpoq tilining semantik boyligi undagi sinonimiya va o'zgaruvchanlik hodisalarida ham namoyon bo'ladi. Bunday semantik hodisalar faqat tilning so'z, ibora va gaplarda emas, balki biz uchun tayyor, doimiy shakllangan, xalq amaliy san'atining mevasi bo'lgan frazeologik birliklarda ham uchraydi. Maqolada qoraqalpoq tilining tovush (fonetik) uyg'unligi, evfonik xususiyatlari, frazeologik sinonimlardagi fonetik takrorlar va frazeologik variantlar fono-stilistik yo'nalishda tahlil qilinadi.*

Резюме: *Показателями лексики любого языка являются синонимы и варианты. Семантическое богатство каракалпакского языка проявляется также в явлениях*

синонимии и вариативности в нем. Такие семантические явления можно найти не только в словах, словосочетаниях и предложениях языка, но и в фразеологизмах, являющихся готовым для нас, постоянно формируемым плодом народного творчества. В статье анализируются звуковая (фонетическая) гармония, благозвучные особенности, фонетические повторы во фразеологических синонимах и фразеологических вариантах каракалпакского языка в фоностилистическом направлении.

Kalit so‘zlar: *frazeologik birlik, frazeologik sinonimiya, frazeologik variant, frazeologizmlardagi fonetik uyg‘unlik, evfoniya, fonetik takror.*

Ключевые слова: *фразеологизм, фразеологическая синонимия, фразеологический вариант, фонетическая гармония во фразеологиях, благозвучие, фонетический повтор.*

УДК 343.2

COMPARATIVE ANALYSIS OF COMPULSORY MEDICAL MEASURES IN THE LEGISLATION OF FOREIGN COUNTRIES

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Summary: *This article analyzes the comparison of the use of compulsory medical measures under the criminal legislation of the Republic of Uzbekistan and foreign countries.*

Keywords: *Compulsory medical measures, security measures, mental illness, insanity, mental assistance.*

A certain scientific interest for the study of the problems of compulsory medical measures under the criminal legislation of the Republic of Uzbekistan is the study of the application of this institute in foreign countries. Comparison of this institute will expand the subject of the science of criminal law, thereby enriching it with new knowledge. It seems that it is the comparison that will allow us to identify those problems that have not been posed or have not yet been solved by jurisprudence. It should be noted that this is achieved in the process of comparative research, and not as a result of studying foreign law alone. Therefore, the statement "everything is known in comparison" in this case is quite true.

In the modern criminal law of a number of foreign countries, compulsory medical measures are terminologically referred to as "security measures". However, security measures include not only the use of medical measures, but also many different sanctions and restrictions applied to criminals. In our opinion, the legislation of the Republic of Uzbekistan is more priority in this regard, since the institution of compulsory medical measures is independent and therefore should exist separately from other criminal law measures that pursue other goals. For example, confiscation is a property security measure under the Italian Criminal Code. In the legislation of the Republic of Uzbekistan until 2001, confiscation of property was also applied, but it was an additional type of punishment**[1].** Consequently, when applying medical measures, the goal is to treat a person, and when confiscating this goal is absurd, which once again proves the independence of the institution of applying compulsory medical measures, which has its main purpose not inherent in other measures.

Covering the issues of the distinctive properties of the institution in question in the foreign and criminal law of the Republic of Uzbekistan, it should be noted that the system of security measures is evaluated by its supporters as the embodiment of the idea of re-socialization, as early preventive measures. Thus, security measures of foreign states can be applied to persons who have not committed a criminally punishable act only on the basis of its public danger, which, in our opinion, goes beyond the scope of criminal law, and also violates human rights. The criminal law of the Republic of Uzbekistan applies compulsory medical measures only to persons who have committed a socially dangerous act in a state of insanity or the onset of this condition before sentencing or while serving a sentence with a mental illness.

Along with the distinctive properties of legislation, there are many similar norms for the application of medical measures, as well as norms that should be borrowed from other countries. In this regard, it would be preferable to continue the study by considering the criminal law norms governing the use of medical measures of each foreign state separately.

According to the modern criminal law of England, security measures are applied to the insane who have committed illegal acts, as well as to criminals suffering from alcoholism and drug addiction.

A person who has committed an illegal act in a state of insanity is sent to a special psychiatric institution by a court decision. As in the legislation of the Republic of Uzbekistan, the

duration of detention in an institution is not set in advance and is largely predetermined by the success of treatment. A person who has committed a crime under the influence of alcohol or drugs, abusing alcohol or drugs, is subjected to compulsory treatment in institutions for alcoholics and drug addicts. The duration of this measure is set for a period of six months to three **[2,P.284]** years

The criminal law of Great Britain**[3,P.355]** applies to persons who have committed a crime and suffer from alcoholism such a security measure as detention in a special institution for drug treatment patients. The court has the right to send a person to such an institution for up to three years if he is convicted of a crime and the court recognizes that the crime was committed under the influence of intoxication and the criminal himself or the jury believes that he is a "habitual drunkard". The regime of such an institution was similar to the conditions in prison, as a result of which the latter could be replaced by detention in an institution for drug-related patients. UK law applies internment in a special institution to persons who have committed a socially dangerous act and suffer from mental disorders. The decision on referral to such an institution can be made both before the opening of the main proceedings – by the decision of the jury on the incapacity of the person to participate in the process, and as a result of the main proceedings by the verdict "guilty, but insane"**[4,P.399].**

French criminal law is also known for security measures. Such measures in France are applied to persons recognized as insane due to mental illness, to "dangerous" alcoholics, drug addicts and substance abusers. They are aimed at preventing criminal actions on the part of a dangerous subject, and are related to his personality, not to actions. Unlike sanctions, which are based on the criminal's guilt and must correspond to its severity, security measures under French criminal law are addressed to the state of the individual and must respond to the threat to society emanating from him. For example, hospitalization of persons with a diagnosis of mental illness can be appointed not only by the court, but also by the administrative authority (the Minister of Internal Affairs, the prefect and other bodies**[5,P.81]).**

From the point of view of the legislation of the Republic of Uzbekistan, it seems unthinkable that a compulsory medical measure will be imposed by administrative authorities on a mentally ill person who has committed a socially dangerous act and poses a danger to himself and society. Therefore, in the criminal law of the Republic of Uzbekistan, only the court is endowed with this competence. In this regard, the approach of the Uzbek legislator seems to us more preferable, since it is hardly possible to apply a compulsory medical measure to a person who poses a danger in his mental state administratively. As for persons who do not pose a public danger, according to the legislation of the Republic of Uzbekistan, the court can transfer the necessary materials to the health authorities to resolve the issue of treating these persons or sending them to neuropsychiatric institutions, but not to the prefect **[6]** - as under French criminal law.

Security measures in Japan consist in the fact that a criminal or a person with properties that indicate the possibility of a criminal act on his part is isolated from society**[7,P.512]**. The result is assessed as "a criminal - legal effect achieved in addition to criminal penalties**.[8,P.501]**" Japanese legislation provides for an appropriate hospital for mentally ill persons. If there is a danger that they, without being hospitalized, may cause bodily injury to themselves or harm others, it is allowed to place them in certain hospitals forcibly under the Law on Mental Hygiene and Welfare of Mentally Disabled Persons.

In Switzerland, the institution of compulsory medical measures is also reflected in legislation. Although not allocated to an independent section in the Criminal Code of the Republic of Uzbekistan, this institution is contained in the section called "punishment, security measures and other measures". Structurally, the legislative material is located in two articles that regulate the application of measures to the mentally ill and measures aimed at treating people who abuse alcoholic beverages and narcotic substances.

A distinctive feature of Swiss criminal law is the absence of a coercive nature of such a security measure as the placement of a drug addict who has committed a crime in a medical institution. According to Article 44 of the Swiss Criminal Code, the court sends a person (who has

committed an illegal act) suffering from drug addiction for treatment only at the request of this person**[9,P.102]**. Previously, the court finds out the suitability of this person for treatment and whether he has a desire to be cured. When a drug addict is sent to a medical institution, the execution of punishment is postponed.

The Italian Criminal Code provides for the use of security measures along with punishment. Security measures in this country apply only to socially dangerous persons who have committed an act provided for by law as a criminal offense. In addition, the Italian legislator determines that a person is considered socially dangerous, including a person who is insane or not provided for by law as a criminal offense. When determining the public danger of a person, not only his mental state is taken into account, but also the motive of the crime already committed, the nature of the offender, his behavior during and after the offense, as well as behavior and life before the commission of a criminal offense, personal, family and social living conditions.

In the USA, legislation has been widely developed that provides for the application of security measures depending not on the number of crimes committed, but on the mental state of the persons who committed them**[10,P.242]**. Terminologically, these measures (depending on the legislation of a particular state) are designated as "isolation of defective offenders", "compulsory treatment of alcoholics", "social rehabilitation of drug addicts" and others. Also in the United States, coercive measures of a medical nature are applied to persons prone to committing sexual crimes. In the legislation, these persons are terminologically designated as "criminal sexual psychopaths", "sexually dangerous persons". A sexual psychopath is a person suffering from such a mental disorder that causes a criminal tendency to commit sexual crimes.

Currently, both surgical and "chemical" castration is practiced in the USA. Surgical castration, performed through medical surgery, is used (for example, in the state of Texas) as an alternative to imprisonment. This measure is imposed only at the request or with the consent of the person who committed a sexual offense. "Chemical" castration is the introduction of an injection of the drug depo – provera to the criminal, which greatly dulls sexual desire.

The use of such an unusual security measure as castration in the United States, perhaps, will cause many to object in terms of its discretion not as a security measure, but as a punishment.

In our opinion, compulsory medical measures in the criminal legislation of the CIS countries, for example, the Republic of Belarus, deserve great attention, which in turn are referred to in it as "compulsory security and treatment measures". The first thing I would like to draw attention to is the purpose of applying compulsory security measures and treatment. Thus, the Belarusian legislator in Article 100 of the Criminal Code of the Republic of Belarus carries out a conditional division of goals related to the following categories of persons:

1) mentally ill persons who have committed socially dangerous acts - prevention of their commission of new socially dangerous acts, protection and treatment;

2) the commission of a crime by a person recognized as less sane - creating conditions for treatment and achieving the goals of criminal responsibility;

3) persons who have committed crimes, suffering from chronic alcoholism, drug addiction or substance abuse - treatment, creation of conditions conducive to achieving the goals of criminal responsibility.

In the legislation of the Republic of Uzbekistan, the purposes of applying compulsory medical measures are the same for all categories of persons to whom these measures can be applied. Thus, in accordance with Article 91 of the Criminal Code of the Republic of Uz, compulsory medical measures are aimed at treating and preventing the commission of new socially dangerous acts by these persons**[11,P.242]**. This approach, it seems to us, is more rational, since compulsory medical measures and punishment are applied to persons to whom such measures are imposed along with punishment, and as a result, both the goals of compulsory measures and the goals of criminal responsibility will be achieved.

Undoubtedly, it will be useful to consider the experience of consolidating the institution of compulsory medical measures in the criminal legislation of Ukraine. Firstly, the Criminal Code of

Ukraine, unlike all the above-mentioned legislative acts, fixes the legislative definition of compulsory medical measures. According to, art. 92 of the Criminal Code of Ukraine, compulsory measures of a medical nature are the provision of outpatient psychiatric care, the placement of a person who has committed a socially dangerous act that falls under the signs of an act provided for by a special part of this Code in a special institution for the purpose of mandatory treatment, as well as prevention of the commission of socially dangerous acts by him**[12,P.87].**

Secondly, the Criminal Code of Ukraine contains a norm on the application of compulsory treatment to persons who have committed a crime and suffer from an illness that poses a danger to the health of others. Most likely, the legislator refers to such diseases as tuberculosis, venereal diseases and, of course, the plague of the XX century - AIDS. It is well known that the number of people affected by these diseases is increasing every day, not only in Ukraine, but also in Uzbekistan. Thus, the comparison allows us to conclude that the degree of detail of the criminal law regulation of the institution of compulsory medical measures in foreign countries has both similar and distinctive features. However, in most of the Criminal Codes of the countries under consideration, the concept of the measures under study is not given, which should be considered a significant gap in criminal legislation.

At the same time, it should be recognized that the foreign experience of some states can be useful in terms of further improvement of the legislation of the Republic of Uzbekistan. In particular, it would be advisable to make the following addition to the criminal legislation of the Republic of Uzbekistan: the application of compulsory medical measures to persons who have committed a crime and suffer from tuberculosis, sexually transmitted diseases and, of course, AIDS, which pose a danger to the health of other persons - according to the experience of the criminal legislation of Ukraine.

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Rezyume: *Mazkur maqolada O'zbekistan Respublikasi va ayrim xorijiy davlatlar qonunchiligida tibbiy yusindagi majburlov choralarini qo'llash masalalari tah'lil qilingan.*

Резюме: *В данной статье проанализированы применения принудительных мер медицинского характера по уголовному законодательству Республики Узбекистан и зарубежных стран.*

Kalit so'zlar: *Tibbiy yusindagi majburlov choralari, xavfsizlik choralari, ruhiy kasallik, aqli zaiflik, ruhiy yordam.*

Ключевые слова: *Принудительных мер медицинского характера, меры безопасности, психическое заболевание, невменяемость, психический помощь.*

DEVELOPMENT OF PROBLEMS OF THE THEORY OF THE CATEGORY OF VOICE IN MODERN LINGUISTICS

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Summary: *The article is devoted to the study of the concept of collateral problems in linguistics . The category of collateral is also traced within the framework of a wide functional and semantic field of collateral, differences in collateral values, the absence of any semantic differences in collateral constructions and the opposition of the activity / passivity of the subject in principle in the language system in sentences.*

Key words: *the category of Voice, semantic, interaction, meaning, interpretation, language.*

A.V. Bondarko defined the Voice as a grammatical category formed by the opposition of such series of grammatical forms, the meanings of which differ from each other by different linguistic semantic interpretation of the conceptual relationship "subject- concept action- object", which is determined by the different in accordance with the conceptual categories of the subject and object, on the one hand, and the semantic content of the sentence members representing these categories, on the other. It seems to us necessary to consider the category of Voice within the framework of a broad functional and semantic field of collateral[1].

The following lines are traced in the structure of this field:

1. Relation of components of a syntax structure of a sentence to components of its semantic structure.
2. Interaction of the category of Voice with lexico-grammatical categories and subcategories of semantic actors.
3. Relationship of components of the category of Voice by lexico- semantic groups of characteristic verb lexemes.
4. The dependence of the collateral forms of a characteristic component on its video-time characteristics.
5. Relationship of the category of Voice to the liability/security category.
6. Relationship of the category of Voice to certainty/uncertainty category of semantic actors[1] Бондарко (1978)
7. Interaction of the category of Voice and word order category

In the center of the functional-semantic pledge field lies the grammatical category of the Voice. V.A. Bogoroditsky gave the following definition of the Voice category.

If active voice designates action which is made by the subject over whom - either or than - or, then the same action can be presented from the object testing it, verbal actions carry the name of passive voice.[2] Three major characteristics of the category of Voice are related to this definition.

1.The Voice is a synthactic morphological category, so its analysis is associated with the study of the structural-semantic device of the proposal. At the same time, the syntactic component of the Voice for languages of the nominative system is universal, and the morphological component varies from language to language in a rather wide range.

2. The syntactic essence of the category of Voice consists in the ability to change the correspondence between two rows of components: components of the semantic structure of the sentence - named actants and components of the syntactic structure of the sentence - to be supplemented (additions).

Thus, active and passive collateral allow the speaker to differently represent in the syntactic structure of the sentence the same interconnected semantic actants - subject and object. From this, in turn, it follows that the Voice characteristic of the actants are obtained only if there are at least two of actants in the semantic structure of the proposal. Therefore, in our opinion, in relation to no active or one active constructions, the Voice qualification of the proposal is not applicable.

3. The category of Voice expresses a different orientation of the attribute in relation to ts grammatical medium - the subject of the sentence and the second mandatory component - supplement. The reasons and consequences of varying the grammatical orientation of the trait are described differently. [Тимофеев, 1958, с8-10; Смирницкий А.И , 1959,265-267; Гухман М.М, 1984, с 8-14; Шендельс 1970, с112,124; Адамец 1973, с 99-100; Буланш 1986.]

Differences in Voice meaning are in two types:

1)Specialist solve such problems 2)Such problems are solved by specialists.

1) Куслар уя салады (Birds build a nest) 2)уяны куслар жасайды (A nest is built by birds);

1) К.к. Мен тойдым - (я насытился) – 2)ол мени тойдырды (он меня насытил)

It can be explained as follows. With an asset, the subject is interpreted as an independent substance - the carrier of a predicative feature, the object is as a substance dependent on the predicative feature, and the concept of action - as a predicative feature with centrifugal orientation. In passive, the object is interpreted not as an independent substance - the carrier of a predicative feature; subject is represented by indirect addition as a dependent substance occupying a peripheral position in the content-syntactic structure of the sentence; the concept of action is interpreted as a predicative feature with a centripetal orientation[3].

The most important distinctive feature of this concept of Voice in comparison with its other interpretations is that it refers to the attitude of the subject and the object to two-sided syntactic entities with their plans of the content of the expression - subject and complement, and not purely formal syntactic positions.

The denial of the presence in the subject and the addition of any own semantics allows some researchers to insist that the Voice constructs do not have any semantic differences.

So, V.V. Bogdanov believes that the tendency to see some significant differences in collateral constructions is due to grammatical aberration, when semantic relevance is attributed to all formal differences.[4]

We find similar points of view in Yakhontov and Silnitsky A.A.[5] It is not surprising that in such works, as a rule, there is no special stage of analysis aimed at identifying semantic differences between diapeses.

The fact that such differences are not linguistic constructs, but reality, convinces the very existence and synonymous functioning of collateral constructions in all languages of the nominative system. In this regard, Z.D. Popova expresses the idea that the similarity of the denotative situation, even its complete identity, does not guarantee either identity or proximity of the syntactic value. The same situation is observed in the following sentences:

1) Tom caught Jerry – Jerry was caught by Tom.

In Karakalpak language

2) Mag'an No'kiste u'y berse, men shad bolip keter edim- Men No'kiste u'y bersem men shad bolip keter edim

The above sentences are depicted in different ways: the opposition of the activity/passivity of the subject is fundamentally in the language system.[6]

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Rezyume: *Maqola tilshunoslikda nisbat muammolari tushunchasini o‘rganishga bag‘ishlangan. Nisbat kategoriyasi, shuningdek, keng funksional va semantik ta’minot sohasi, nisbat ma’nolaridagi farqlar, nisbat inshootlarida semantik farqlarning yo‘qligi va til tizimidagi prinsipial faoliyat passivlikning muxolifat jumlalari doirasida kuzatiladi.*

Резюме: *Статья посвящена к изучению концепции залоговой проблематики в лингвистике . А так же прослеживается категория залога в рамках широкого функционально- семантического поля залоговости , различия в залоговых значениях, отсутствие у залоговых конструкций каких-либо семантических различий и противопоставление активности/ пассивности субъекта принципиально в языковой системе в предложениях*

Kalit so‘zlar: *nisbat kategoriyasi, semantika , o‘z-aro ta’sir, ma’no, interpretatsiya, til.*

Ключевые слова: *Категория залогов, семантика, взаимодействи, значения, интерпретация, язык.*

THE METHOD OF FORMATION THE TRAINING PROCESS IN THE ANNUAL CYCLE OF TRAINING YOUNG FOOTBALL PLAYERS AT THE STAGE OF PRIMARY TRAINING

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Summary: *The article is about the methods of one year cycle in the training process of young football players on the preparation stage.*

Keywords: *physical education, cycle, loading, experiment, control, sport, training, football player, physical quality, technique, tactic.*

Problem statement. Analysis of the current lesson programs for the CYSS and the CYSSOR in football shows that these documents mainly detail the content of the programs of educational and training groups and groups of sports improvement.

Methodological support of groups of initial training, improvement of software content for technical and physical training of young football players at the stage of initial training is still a problematic issue. The general tasks of training in educational and training groups and groups of sports improvement are organically linked with the main goal of the system of long-term training of sports reserves in football in sports schools with the training of highly qualified football players who are harmoniously developed physically and spiritually.

The generalized tasks of teaching in groups of initial training are the following: to provide versatile physical training of students on the basis of the section of general physical training of the CYSS in football, to instill interest in systematic training in football, to identify promising children and adolescents for the subsequent improvement of their sports and technical skills in educational and training groups.

Our studies of the structure of the competitive and training activity of young football players at the stage of primary education showed that there is a discrepancy between educational programs and the modern requirements of the game training of young football players.

The above problematic questions substantiated the relevance for the development of a methodology for constructing a training process in a one-year training cycle based on the allocation of priorities in the technical training of the use of active learning methods and the introduction of modern innovative pedagogical technologies into the educational process at the stage of primary education.

The purpose of the research is to develop and substantiate the optimal variants of training structures for building a one-year training cycle for young football players at the stage of initial training.

Research methods and organization. To increase the effectiveness of training young football players at the stage of initial training, the structure of the annual training cycle has been developed using the methods of modern innovative pedagogical technologies of programmed training and the associated-sequential organization of loads of various orientations.

The programmed teaching methodology was used to teach technical and tactical actions of young football players. Teaching technical and tactical actions took place in the following groups and the following duration:

1) Training of kicks and head kicks on the ball - 5 weekly micro cycles (MC);

2) Teaching the technique of stopping the ball and catching a rolling and flying ball - 4 week MC;

3) Dribbling the outside and inside of the lift - 3 weekly MC;

4) Throwing in the ball - 1 week MC;

5) Dribbling an opponent (dribbling) and deceiving moves - 3 weekly MC;

6) Shots and passes - 1 week MC

7) Conclusion to free space and positional play - 1 week MC;

8) Player custody and ball tackling - 2 week MC.

Total: 20-week MC or 5 months.

To train each group of technical and tactical actions, special training programs were developed using modern computer technology. The structure of the trained programs consisted of the following steps and personnel:

1) Introductory step. This step focuses on describing the elements of the motor base, allowing the player to assess his readiness to learn the general exercise.

2) Operational and practical step. This step is the most characteristic part of the training programs. The technology of the operating room of the practical step is as follows:

a) information frame - contains basic information about the studied structural block of movements of its implementation;

b) the operational frame bears the main load in the training program, presenting motor tasks for mastering a specific component of a motor skill;

c) the correction frame is designed to eliminate errors that appear when performing the main tasks of the general sequence;

d) the control frame is intended both to test the theoretical knowledge of each football player and to perform a normal, effective technical and tactical element.

3) The registration step is intended to register the learning process. This step shows the results of control frames both after performing one specific action and after completing a series of exercises. The results and dynamics of the values of assessments and testing of technical and tactical actions can be presented both for one particular football player and for the entire team as a whole. To control the technical and tactical readiness of young football players at the stage of initial training, 22 motion tests were developed and tested for stability.

Thus, the process of teaching technical and tactical actions of young football players lasted 20 weeks MC or 5 months. This made it possible to develop the structure of the macro cycle (large cycle) of the annual training cycle at the stage of initial training.

Before training the technician in tactical actions of young footballers, we have developed a programmed methodology for developing the conditioning abilities of young footballers.

For the development of conditioning abilities, a selective load was applied in conjugate-sequential organization during the macro cycle for 7 months (28 week MC) in the following form:

a) at first, a block of loads was used, aimed mainly at developing endurance with a length of 10 weeks MC, or 2.5 months; b) then a block of loads was applied sequentially aimed at the development of power abilities of speed and coordination for 6 weeks MC or 1.5 months.

Organization and research results. The above results served as the basis for the development of the structure of the annual cycle of training young football players at the stage of initial training.

The structure of the annual cycle is as follows:

a) the annual cycle consists of 2 large cycles – macro cycles;

b) the task of the first macro cycle with a duration of 28 weeks MC (7 months) was to develop the conditioning abilities of young football players on the basis of the conjugate-sequential organization of selective loads (see above).

c) the task of the second macro cycle, 20 weeks long MC (5 months) was active training in technical and tactical actions of young football players.

To assess the effectiveness of the proposed methodology for constructing the structure of the annual training cycle of young football players at the stage of the initial experiment, a comparative experiment was carried out. In the compositions of the control and experimental groups, 18 young football players of the groups of initial training of the Children's and Youth Sports School No. 1 of the city of Nukus of the Republic of Karakalpakstan took part. The age of the subjects was 9-10 old.

The footballers of the experimental group trained according to the methodology developed by us for constructing the training process in the annual training cycle, and the footballers of the control group trained according to the traditional methodology recommended by the programs for children and youth schools.

Before and after the experiment, football players of both groups were tested and pedagogical observation was carried out over the course of football matches.

Comparative analysis of the results of testing according to indicators assessing the technical-tactical and physical training of young football players showed the following:

a) if at the beginning of the experiment the average values of indicators of technical-tactical and physical training were approximately at the same level in both groups, then at the end of the experiment the increase in the values of indicators of the experimental group was much more preferable than that of the control;

b) the study of significant differences showed that out of 57 indicators in the structure of preparedness of young football players in the experimental group, the reliability of differences is observed in 45 cases, and in the structure of indicators in the control group only in 8 cases.

Summarizing the above, we can formulate a conclusion that the analysis of the dynamics of indicators of physical and technical-tactical training of young football players of both groups and the presence of reliability of differences in indicators at the end of the pedagogical experiment testifies to a significantly better preparedness of young football players in the experimental group. This substantiates the effectiveness of the proposed methodology for constructing the training process in an annual cycle at the stage of initial training.

Conclusions

1. To build the training process in the annual training cycle of young football players at the initial training stage, it is recommended to plan 2 macro cycles (large cycles)

2. In the first macro cycle, it is recommended to plan the load of a selective (predominant) orientation, providing for the conjugate-sequential development of physical qualities: endurance, strength, speed and dexterity (coordination) on the basis of programming methods and the organization of the training process.

3. In the second macro cycle, it is recommended to conduct mainly technical and tactical training of young football players based on the application of methods and principles of programmed training.

4. It has been established that the application of the principles and methods of programming and the organization of training, as well as programming and the organization of the training process, significantly increase the activity of the trainees and contribute to a better course of the training management process.

5. The results of the above pedagogical experiments have confirmed the effectiveness of the proposed methodology for constructing a one-year training cycle for young footballers from groups of initial training.

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Rezyume: *Maqolada boshlang‘ich tayyorgarlik bosqichidagi yosh futbolchilarning mashq jarayonini yillik siklda olib borish uslubiyati haqida so‘z borgan.*

Резюме: *В статье рассматривается методика построения тренировочного процесса в годичном цикле на этапе начальной подготовки юных футболистов.*

Kalit so‘zlar: *jismoniy tarbiya, sikl, yuklama, eksperiment, nazorat, sport, mashq, futbolchi, jismoniy sifatlar, texnika, taktika.*

Ключевые слова: *физическое воспитание, цикл, нагрузка, эксперимент, контроль, спорт, тренировка, футболист, физические качества, техника, тактика.*

CIRCUMSTANCES MITIGATING PUNISHMENT NOT PROVIDED FOR IN THE CRIMINAL LAW AND FEATURES OF THEIR APPLICATION

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Summary: *This article examines the circumstances mitigating punishment not provided for in the criminal law and their application, and also gives a number of proposals for inclusion in the Criminal Code.*

Keywords: *The German doctrine of mitigation of punishment, the French doctrine, the provision of medical care to the victim after the crime, the crime of the elderly.*

In nineteenth-century criminal law theory, there were two doctrines of mitigation of punishment - the German and the French. The German Doctrine argued that all grounds for mitigating punishment should be regulated by law. According to the French Doctrine, the judiciary has the right to consider any grounds not provided for by law as a mitigating circumstance[1].

Today, in modern criminal law, both doctrines are used to varying degrees in creating a system of mitigation of punishment. It is known that our domestic criminal law contains mitigating circumstances, as well as other cases that are not provided by law, but are taken into account in mitigation. In the theory of criminal law, mitigating circumstances are conditionally divided into several types.

M.V.Leonidov [2] divides these cases into three categories: mitigating circumstances provided for by law, mitigating circumstances not provided by law, and mitigating circumstances in the presence of special (additional) rules for the imposition of punishment for a crime.

Our national legislation does not limit the scope of mitigating circumstances provided for in Article 55 of the Criminal Code. Therefore, other circumstances not specified in this article may be considered as mitigating circumstances when imposing a sentence [3].

The generalization of the case law shows that there are more mitigating circumstances in the judgments than are provided for in the law. This raises the issue of theoretical and legal analysis of the nature of these cases and the study of the rules of their application in practice. When the courts take into account mitigating circumstances not provided for by law in imposing a sentence, the judgment must be based on why the case was considered a mitigating circumstance.

The mitigating circumstances not provided for by the law alone do not indicate a reduction in the social risk in the offender's personality and actions. In sentencing, courts often limit themselves to showing that the circumstances of the crime have been taken into account without a detailed analysis of the evidence. However, the recognition of such cases as a mitigating circumstance should be based on the judgement [4].

Paragraph 7 of the Resolution of the Plenum of the Supreme Court of the Republic of Uzbekistan No. 1 of February 3, 2006 on the practice of imposing penalties for crimes also states that the verdict should be based on the conclusion that the circumstances not provided by law are mitigating.

In addition, some authors consider it appropriate to establish a strict list of mitigating circumstances and oppose the use of mitigating circumstances not provided for in the law, arguing that this would prevent the formation of a single case law. According to Danelyan, the list of mitigating circumstances (cases provided for by law) cannot be left open, they can be justified as follows: in fact, in any criminal case can be found various circumstances that affect the punishment. However, one judge may consider them and the other may not. This is due to the principle of fairness, the diversity of mitigating circumstances and the fact that judges use them without a good understanding of their legal nature, which leads to differences in judicial practice. Therefore, it is necessary to establish a strict list of mitigating circumstances, as well as aggravating circumstances.

In this case, it is worthwhile to cite the views of some authors who disagree with the above statements. Skripchenko also said, "The law does not describe the identity of the offender and all the cases of reducing the social risk of the crime. Therefore, the judiciary has the right to consider mitigating circumstances not provided for in the criminal law "[6].

In our opinion, it is not advisable to establish a strict list of mitigating circumstances. For example, two individuals were charged with the crime of aggression. One of them injured the victim and hid from the scene, the other provided medical care to the victim after the injury, or the first of the assailants was a minor, and the other was a dangerous recidivist or had a minor in the care of one of the assailants, in the latter it is not present.

In this case, the fact that the victim received medical care after the injury and has a minor in his care can be considered a mitigating circumstance (these cases are not provided for as a mitigating circumstance in the first part of Article 55 of the Criminal Code). If we establish a strict list of mitigating circumstances in the Criminal Code, in the above case, mitigating circumstances not provided by law are not taken into account in the imposition of punishment, and lead to the imposition of the same punishment on offenders.

Pursuant to Article 7, paragraph 2, **of Decision of the courts on the practice of sentencing for a crime**, According to the second part of Article 55 of the Criminal Code, the following cases are also recognized as mitigating circumstances in sentencing:

1) the presence of a young child in the custody of the defendant;

2) The perpetrator provides medical or other assistance to the victim immediately after the commission of the crime;

3) The crime was committed out of pity for someone;

4) First time commission of a crime of low social risk and other circumstances.

Although not provided for in criminal law, one of the factors that can be taken into account by courts when sentencing is the presence of a young child in the custody of the defendant. This situation falls into the category of mitigating circumstances that characterize the culprit. This mitigating circumstance is mainly taken into account when sentencing women with young children. Another important point is that if the offender treats a young child rudely, engages him in a crime or other immoral act, or commits a crime against them, there can be no grounds for mitigation of punishment.

Although the provision of immediate medical and other assistance to a victim after the commission of a crime is not directly provided for in our national law as a mitigating circumstance, it is one of the mitigating circumstances in the criminal law of most states. This is mainly understood as the various types of assistance provided by the perpetrator, regardless of the consequences for the life and health of the victim [7].

We believe that the provision of medical care will serve to prevent further harm to the life and health of the victim if the crime is committed far from the settlements. Other assistance to the victim may include the transfer of a person to a medical facility after the perpetrator has committed a crime, the provision of clothing, food, and so on.

The next mitigating circumstance is the fact that the elderly person has committed a crime. In this case, the fact that a person is old is a condition that reduces the level of social danger of the act. This situation may serve to impose a lighter sentence on an individual under Article 57 of the Criminal Code. However, in the first part of Article 55 of the Criminal Code, the commission of a crime by an elderly person is not recognized as a mitigating circumstance. It is necessary to include in our national legislation both the principle of humanity and the mitigation of the crime of an elderly person, based on advanced foreign experience.

In view of the above, it is recommended that the following be included in the Criminal Code as direct mitigating circumstances in order to improve mitigating circumstances:

- Presence of minor children in the care of the perpetrator;
- Provide immediate medical and other assistance to the victim, regardless of the consequences of the crime;

- The crime was committed by an elderly person.

In conclusion, it should be noted that the direct definition of the above-mentioned mitigating circumstances in the Criminal Code of the Republic of Uzbekistan, firstly, serves to bring criminal law in line with international requirements and standards on the basis of modern jurisdiction, and secondly, ensures effective and reliable protection of the rights and legitimate interests of the guilty person by applying mitigating circumstances in imposing a sentence on the perpetrator.

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Rezyume: *Ushbu maqolada jinoyat qonunida nazarda tutilmagan jazoni yengillashtiruvchi holatlar va ularni qo'llash xususiyatlari o'rganilgan hamda Jinoyat kodeksiga kiritish uchun bir nechta takliflar keltirilgan.*

Резюме: *В данной статье исследуются обстоятельства смягчающие наказание не предусмотренные в уголовном законе и их применение, а также дается ряд предложений для включения в Уголовный кодекс.*

Kalit so'zlar: *Jinoyiy jazoni yengillashtirishning nemis ta'liymotı, francuz doktrinasi, jinoyat sodir etilgandan keyin jabrlanuvchiga tibbiy yordam ko'rsatish, keksa shaxsning jinoyat sodir etishi.*

Ключевые слова: *Немецкая доктрина смягчения наказания, французская доктрина, оказания медицинской помощи потерпевшему после совершения преступления, преступления престарелых.*