CONTENTS

Medical sciences	
Article	
CLINICAL DIAGNOSTICS OF SYMPTOMATIC EPILEPSY IN CHILDREN	
KNADIOUIIA AMINOV M.D. CHARACTERISTICS OF ADAPTATIVE PERIOD IN INFANTS BORN WITH INTRAUTERINE	4
GROWTH RETARDATION DEPENDING ON GESTATIONAL AGE	
Umarova L.N.	8
Materials of Conferences	
RISK FACTORS OF INTRAUTERINE FETAL INFECTION	
Ayupova A.M., Shokirova S.	11
THE SURFACE TENSION EXPERIMENTS AT THE DIAGNOSIS OF ASYMPTOMATIC NEUROSYPHILIS	
Barkalova E.L., Tcentilo S.V., Barkalova E.B.	11
PROTECTING REPRODUCTIVE HEALTH OF YOUTH Kalininskava A.A. Shakhatradinova N.K. Gaidarova A.F.	12
CARRYING OUT SELF-EVALUATION OF A MEDICAL INSTITUTION IN TERMS OF OUALITY CONTEST	12
Pavlov V.V., Vakulich E.A., Nikolskaya O.G.	13
IMPROVING QUALITY OF PUBLIC MEDICAL CARE	
Pavlov V.V., Nikolskaya O.G., Suslin S.A.	14
THE LATE DIAGNOSIS OF BRONCHIAL ASTHMA CHILDREN LIVING IN UFA (REPUBLIC OF BASHKORTOSTAN)	
Samigullina N.V., Faizullina R.M.	16
EFFECT OF MATERNAL HSV INFECTION ON ADAPTABILITY OF HYPOTROPHIC INFANTS	
Umarova L.N.	16
THE PLAYERS' CENTRAL NERVOUS AND NEUROMUSCULAR SYSTEMS FUNCTIONS AGE DYNAMICS	15
Vysochin Y.V., Gordeev Y.V., Denisenko Y.P. I EVEL SL SELECTIN IN BLOOD SERUM OF PATIENTS WITH SCHIZOPHRENIA	17
COMORBIDITY PYODERMA	
Yusupova L.A.	19
Agricultural sciences	
Article	
THE WEEDS IN MULTI-ROW BARLEY AGROCENOSIS IN THE MODAL CHERNOZEM	
Pigorev I.Y., Ageeva A.A.	20
Materials of Conferences	
FORMATION OF STATE INVESTMENT DAIRY CATTLE DREEDING	
IN KRASNOYARSK REGION	
Tsygulyonok O.M.	24
Architecture	
Article	
ARCHITECTURE IN THE GLOBAL WORLD: THE SYNERGY ASPECT	
Kholodova L.P., Babich V.N., Zhuikov S.S.	25
Pharmaceutical sciences	
Article	
PHARMACOLOGICAL-KINETIC RESEARCH AND STUDY OF AN ACUTE TOXICITY	
OF THE PREPARATION PYRACIN-RG IN AMPULES	
Yunuskhodjayev A.N., Shabilalov A.A., Khodjayeva I.A.	36

Technical sciences Article	
PHASE CONJUGATION BY STIMULATED BRILLOUIN SCATTERING IN HEXANE	
Zaitsev G.I., Kolesnikov G.I.	40
LIGHT SCATTERING AND PROPAGATION OF ELASTIC WAVES IN SATURATED WATER	
Zaitsev G.I., Kolesnikov G.I.	43
Materials of Conferences	
RESEARCH ZYMOHYDROLYSIS ALBUMENS OF MILK	
Bessonova O.V.	46
ANALYSIS AND STABILITY ENSURING OF ELECTRONIC STRUCTURES TO THERMAL INFLUENCES (ASONIKA-T)	
Shalumov A.S., Shalumov M.A., Semenenko A.N., Tikhomirov M.V.	46
THE DRAINAGE LOCAL DRY AREAS WITH GROUND WATERS OVERFLOW IN THE UNDERLYING AOUIFER	
Turkin A.A., Sibirina T.F., Tzuglenok N.B.	48
THE TURBULENT JET FLOWS RESEARCH	
Turkin A.A., Sibirina T.F., Tzuglenok N.V.	49
THE VALVE OPENING CONTROL TIME CALCULATION	50
THE TECHNOLOGICAL PROCESS RESEARCH FOR WELLS' OPERATION	50
Turkin A.A., Sibirina T.F., Tzuglenok N.V.	51
Short Reports	
THE COMPUTERIZATION OF THE SILICON OXYGEN REFINING	
Tyutrin A.A., Nemchinova N.V.	54
Biological sciences	
Materials of Conferences	
NEW METHOD OF DESCRIPTION AND INTERPRETATION OF CLASSICAL FORMULA	
FOR RETICULAR FENESTELLIDA (BRYOZOA)	57
Ozngibesov V.P.	30
Short Reports	
TYPES OF CONSTITUTION OF LYMPHATIC SYSTEM	
Petrenko V.M.	57
Ecological and conservancy	
Materials of Conferences	
GEODYNAMIC AND TECHNOGENIC PROCESSES IN THE AREAS OF OIL AND GAS PRODUCTION AND THEIR ECOLOGICAL CONSEQUENCES	
Kopylov I.S.	59
ECOLOGIC CONDITION OF COOLING WATER RESERVOIRS OF KRASNOYARSK	
Sibiring TF	59
	57
Economic sciences Materials of Conferences	
Gavrilkova N Y	61
THE BEHAVIOR OF ENTERPRISES IN THE CONDITIONS OF RISK	01
Dianova O.V.	61

CONTENTS	3
 FACILITAING MODIFIED RATE OF COMPLEX PERCENT AS AN INDEX OF ECONOMIC EFFICIENCY OF INVESTMENTS INTO INNOVATIVE PROJECTS Minakova I.V., Anikanov P.V. EXPLAINING THE NECESSITY TO ORGANISE A PROCESS OF MANAGING RISKS AT ENTERPRISES IN MODERM CONDITIONS Titovs E.V., Pyzhikova N.I. 	62 64
Historical sciences Materials of Conferences	
Hasanov E.L.	65
Legal sciences Materials of Conferences	
PROPERTY COMPLEX AS A SUBJECT OF CIVIL TRAFFIC Voskresenskaya E.	69
Pedagogical sciences Materials of Conferences	
THE DIFFERENTIATION CHALLENGES RESEARCH HISTORICAL AND PEDAGOGICAL PRECONDITIONS IN THE STUDENTS' SOCIAL AND ENVIRONMENTAL EDUCATION SYSTEM <i>Shilova V.S.</i> THE DIFFERENTIATION CHALLENGES RESEARCH PSYCHOLOGICAL PRECONDITIONS IN THE STUDENTS' SOCIAL AND ENVIRONMENTAL EDUCATION SYSTEM	71
Shilova V.S. Short Reports	72
VOCABULARY TRAINING IN THE HIGHER EDUCATIONAL INSTITUTION Yeszhanova S.T., Akhmetov A.M., Sagitov A.A., Mussatayeva N.B., Mukashev E.K., Omarova A.A., Sharipov R.R.	74
Physical and Mathematical sciences Materials of Conferences	
QUARK MASS UNIT Dubas L.G.	77
Sociology Materials of Conferences	
YOUNG TUTOR OF HIGHER EDUCATION INSTITUTIONS AS A SOCIAL GROUP <i>Mikhailova T.V.</i> THE PERSON'S COMPETENCE FORMATION THEORETICAL PRECONDITIONS IN THE FIELD OF THE SOCIAL AND ENVIRONMENTAL RELATIONS	79
Shilova V.S.	80

CLINICAL DIAGNOSTICS OF SYMPTOMATIC EPILEPSY IN CHILDREN

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The aim of the study was to determine the features of informativnes of MRI and EEG studies in children with symptomatic epilepsy after meningoencephalitis. MRI and EEG studies were performed in 35 children with symptomatic epilepsy after meningoencephalitis. Symptomatic epilepsy in children after meningoencephalitis developed in quite early periods $(0,93 \pm 0,25 \text{ years})$ and is characterized by multiple lesions, which are mainly bilateral and symmetrical, with a clear demarcation from the surrounding tissues in MRI studies. EEG studies identified diffuse character of brain changes which were observed in most of the children, at a reduced amplitude level with hypersynhronization and with signs of epiactivity.

Keywords: epilepsy, meningoencephalitis, electroencephalography, magnetic resonance imaging

Relevance. Epilepsy in children has its own periods which is unique to a certain age period – «fragmentation» of seizures, symptoms that mimic spontaneous locomotor activity or unconditioned reflexes of neonatal period, etc [7]. Therefore, in complicated cases of the diagnostics of epilepsy it is important to assess not only clinical manifestations of seizures, but also results of paraclinical investigations such as electroencephalography, magnetic resonance imaging and disorders of psychomotor retardation, organic neurological symptoms. However neuroimaging methods provide only views about the structural changes of the brain without the possibility of evaluating its functional state. Developmental disorders of motor and mental function often accompany with seizures in children, but it is not always the necessary condition for their occurrence [3]. Moreover, a number of pathological conditions of childhood epilepsy, such as Landau-Kleffner syndrome, status epilepticus in slow wave sleep phase may not have seizures in their structure. Their diagnosis is usually based on the EEG data [2]. Meningoencephalitis – a serious disease of the brain and its meninges. In any case, such complication is a serious pathology, which has a poor prognosis and residual neurologic deficit. Severity of residual effects depends on the degree of damage to the central nervous system. Symptomatic epilepsy after meningoencephalitis in this group of children is 27,8% of cases [5]. Some authors suggest about arachnoiditis, meningoencephalitis measles and influenza etiology in the origin of epilepsy [4]. The inflammatory changes of the brain are not a rare finding in neuroradiological examination of children with symptomatic epilepsy after meningoencephalitis [1]. In the analysis of the literature we have found that among many aspects of this problem is less studied the nature and mechanisms of epileptic seizures. Great interest in symptomatic epilepsy has importance of association between the rudeness of organic brain damage and the severity of the epileptic process.

The aim of the study was to determine the features of informativness of MRI and EEG studies in children with symptomatic epilepsy after meningoencephalitis.

Materials and methods of research

MRI studies were performed in 35 children with symptomatic epilepsy after meningoencephalitis. Children ages ranged from 1 to 12 years (mean age was $5,7 \pm 0,55$ years). The patients were examined and treated at the Department of Neurology in Tashkent Paediatric Medical Institute for the period from 2010 to 2012.

Debut of epileptic seizures was observed after underwent disease which developed in stages of clinical manifestations of meningoencephalitis with high fever, headache, repeated vomiting, lethargy, or, conversely, of excitement. The average age of onset ranged from birth to 1,5 years. Disease duration was $4,8 \pm 0,51$ years.

MRI studies were performed on standard technology (axial, coronal and sagittal planes). The studies were conducted in three planes – axial, coronal and sagittal – using standard axial debut with a basic overview orbito-meatal plane.

The proposed method of MRI scan for epilepsy is an advanced MRI technique which has been first applied in Uzbekistan.

EEG - a method based on the recording of electrical activity (biopotentials) of the brain, gives an indication of its functional status, severity of disorder the child's nervous system, to monitor the dynamics of the process, and to identify the presence of convulsive changes and the functional state of deep structures of brain. [3]

EEG was performed using a 16-channel electroencephalograph «Neyrocartograf MBN-1» with a spectral mapping of scientific medical company «MBN» (2008 edition).

The data obtained were subjected to statistical analysis on a PC Pentium-4 program package developed in EXCEL using a library of statistical functions to the calculation of the arithmetic mean (M), standard deviation (σ), standard error (m), relative values (frequency,%), t-test (t) with the computation of the probability of error (*P*). Differences of mean values was considered significant at a significance level of *P* < 0,05. At the same time adhere to the existing guidelines for statistical analysis of data from clinical and laboratory studies.

Results of research and their discussion

Data analysis of neurological status in children with symptomatic epilepsy after meningoencephalitis indicated severe symptoms of organic lesions revealed not only in large areas of the cortex but also in subcortical structures

Medical sciences

of brain (prevalence of spastic hemiparesis, hyperkinesis, gemigipestezii). Less harsh symptoms of organic brain damage in children with symptomatic epilepsy after meningoencephalitis, were observed in children with less disease duration from the time of exposure of the pathological factors. In a study of 35 children with the consequence of meningoencephalitis with symptomatic epilepsy in 5 (14,3%) children found midline shift of the brain, in 12 (34,3%) children found asymmetry of the lateral ventricles. Subarachnoid perivascular space enlarged in 22 (62,9%) of children, which in the majority of cases in the fronto-temporal region of the brain. Expansion of the subarachnoid space was recorded in 19 (54,3%) of the children mainly due to cortical atrophy of the cerebral hemispheres. In the white matter of the brain in 6 (17,1%) patients revealed multiple foci and areas of cystic degeneration.

Piaarahnoidal peculiar type of contrast enhancement of vessels in the area of inflammation may be considered typical of debuts viral encephalitis (Fig. 1).



Fig. 1. Patient Z., 6 years. Acute viral encephalitis:

a – T2-FSE (TRR4900/TEE86; 1 – axial plane: bilateral unexpressed zoneof temperate increase T2 signal intensity without clear contours, localized mainly in the opercular regions of both hemispheres, mostly on the left; b – FLAIR (TRR8890/TEE136). Axial plain: linear transmantin zone in opercular regions extending from the crust down to the contours of the lateral bodies of lateral ventricles; c, d – T1 SE (TRR300/TEE90). Axial plane, intravascular contrast enhancement (Magnevist 10 ml). In the presented MRI images clearly demonstrated phenomenon of «vascular gain» or piaaarahnoidal contrast enhancement (Fig. 2), which is character to regional or diffuse inflammatory processes associated with increased vascular permeability and impaired blood-brain barrier

In the future, it is possible calcification of foci, in particular, after cytomegalovirus encephalitis. Since calcification is generally nonspecific response of brain tissue to the impact of various damaging factors, then to make definite conclusions about the genesis of the underlying occurrence of cerebral calcification phenomena in the absence of clear clinical and anamnestic data must be retained (Fig. 2).



Fig. 2. Patient T., 14 years old. Acute viral encephalitis. 0,5 T MRI: a – T2 FSE (TRR4080/TEE81, 9). Axial plane: unclearly restricted zone of slightly increased T2 signal and unclear differentiation of gray and white matter in the right occipital-parietal lobe; b – FLAIR (TRR8890/TEE136). Axial slice shows linear transmantinal zone in opercular regions extending from the crust down to the contours of the lateral bodies of lateral ventricles; c, d – T1 SE (TRR300/TEE90). Axial slices, intravascular contrast enhancement (Magnevist10 ml / jet)

In this case, it is important the role of diffuse weighted images that can visualize strictly localized nature of encephalitis and indicate about generalization of process. The main neuroradiological symptoms of viral encephalitis are primarily multiple lesions in white and gray matter, their predominant bilaterality and symmetry, a clear demarcation of the surrounding tissues. Naturally, it is a about post inflammatory process, when the process was through, and neuroimaging professionals have to deal with the case of brain where structural disorders were completed. The paraclinical and instrumental methods of examination are vital for the correct diagnosis, choice of treatment. EEG should be first mentioned which can definite the brain activity with symptomatic epilepsy after meningoencephalitis. The results of EEG studies are presented in Table.

When comparing the EEG parameters we have established that brain changes of a dif-

fuse character were observed in most of the children, at a reduced amplitude level with gipersinhronization, signs of epiactivity, which did not exclude the involvment of deep brain structures.

Conclusion

Thus, symptomatic epilepsy develops quite early after meningoencephalitis $(0,93 \pm 0,25$ years), and their causal role in the genesis of epilepsy was confirmed by frequently finding focal atrophic changes and arachnoidal cysts, which often cause the formation of the epileptic focus and development of seizures. EEG pattern characterized by diffuse character of brain changes which observed in most of the children, at a reduced amplitude level with gipersynhronization, signs of epiactivity, which did not exclude the involvment of deep brain structures.

Trme of EEC abanges	Number of patients with EEG abnormalities			
Type of EEO changes	Number	%		
Cerebral disorders	14	40		
Diffuse changes of brain	23	65,7		
Involvment of stem structures	9	25,7		
Focal changes	6	17,1		
The disorganization of the cortical structures	4	11,4		
Disrythmic EEG type	11	31,4		

EEG changes in symptomatic epilepsy after meningoencephalitis

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CHARACTERISTICS OF ADAPTATIVE PERIOD IN INFANTS BORN WITH INTRAUTERINE GROWTH RETARDATION DEPENDING ON GESTATIONAL AGE

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High percentage of perinatal damages in mature and premature infants with IGR with marked abnormalities in health in neonatal period constitutes a serious menace in forming problem dispensary groups.

Keywords: newborns, premature, IGR, adaptation

One of the urgent problems of current medicine is the increase of the number of newborns with syndrome of intrauterine growth retardation (IGR) [1, 3, 6]. The value of this pathology is determined by its large unit weight in neonatal morbidity and mortality.

By WHO data the number of newborns with this pathology ranged from 31% in Central Asia, up to 6,5% in developed countries in Europe and IGR incidence varies from 3 to 7% in USA. Among all children, died in parental period, including stillborns infants with IGR comprise 30–50% [2, 7, 9].

Despite the achievements in perinatology, there is no trend for reducing this index [4, 7, 8]. The level of morbidity and mortality in parental period is 3-8 times higher in hypotrophic newborns; they retard from their same age newborns in physical and psycho-emotional growth both in the first year of life and more older age [4, 5].

Considering this fact, we studied physical state and period of postnatal adaptation in infants with IGR.

The aim is to study the formation of adaptive, physical capacities in infants with IGR during early neonatal period depending on gestational age.

Materials and methods of research

There was carried out the analysis of clinical manifestations and conditions of main life support systems in 211 children.

Diagnosis of IGR and prematurity at birth were the criteria to study the patients. Our estimates of states were confirmed by:

- small body mass and length at birth;
- mass and growth coefficient at birth < 60;

- disproportional (dysplastic) body-built;

- presence of hypotrophy with absence of growth deficit at birth;

Additionally, at prematurity there considered the decrease of body mass and length lower than tenth percentile of score tables in comparison with proper indices of physical development to the given duration of gestation. Infants were divided into several groups: 1 group – mature infants born with IGR – 108 patients; 2 group – premature infants with IGR – 53 patients; 3 group – control group; infants born at term with normal mass and length indices (60-80) - 50 patients.

Results of research and their discussion

According to studied medical records 161 infants with IGR were investigated, of them 18 (11,1%) infants with IGR hypoplastic variant and 143 (89,9%) infants with hypotrophic variant.

Considering mass and growth coefficient, infants with hypotrophic variant were distributed as follows: IGR of I degree (with Tur index 59–55) – 93 (64,1%) infants, IGR of II degree (with index 54–50) – 32 (22,0%) infants, IGR of III degree (with Tur index < 50) – 20 (13,9%) infants. These indices show that in 1/3 infants (35,9%,) who have been established IGR of II and III degrees could have the negative effect on further infant growth.

The analysis of infants of main groups depending on body mass at birth revealed that infants born at term with body mass from 2001–2500 grams comprised 31 (28,7%), of them 13 (24,5%) infants with body mass 1501–2000 grams and 8 (15,0%) infants with body mass1001–1500 grams. In studied group infants with IGR born at term with body mass lower than 2000 grams no detected.

Thus, premature infants with IGR born with mass less than 2500 grams comprised 86,6% to gestation term.

The analysis of premature infants in studied category of infants depending on gestational age revealed that 31 (58,5%) infants were born at term 35–37 weeks, 10 (18,9%) – at term 32–34 weeks, 12 (22,6%) – at term 31-29 weeks of pregnancy.

The given analysis showed that in analyzed group of premature infants 41,5% infants were born at gestation term before 35 weeks. This could effect on particularities of the course of adaptive period at birth so far as it is in early neonatal period with maximum tension that adaptive reactions are passed.

The indication to infants transfer to 2 step of medical care is the presence of pathological state and and/or low degree of maturity. So, premature infants with IGR needed in early rehabilitation in 97,1% (p < 0.05) cases, infants

Table 1

with IGR born at term in 26,4% (p < 0,05), and infants of control group in 10%.

Thus, premature infants needed the therapy at 2 step of general care more frequently than infants with IGR and infants of control group. Indeed, it is connected with more severe state at the moment of birth and in early neonatal period, immaturity, they must be transferred to 2 step of medical care. At the same time, mature infants with IGR followed in hospital more frequently than control group of infants.

The level of health in neonatal period in followed infants was characterized with detection of several pathological states (Table 1).

		iten with forein neonatal p	ciioa
Groups Pathology	Mature infants with IGR $(n = 108)$	Premature infants with IGR $(n = 53)$	Control group $(n = 50)$
PDCNS	92 (99,4)*	53(100)**	26 (52)
IUI	35(32,2)*	28 (52,6)**	6(12)
Bowels dysbacteriosis	13(14,7)*	21 (39,4)**	-
Hyperbilirubinemia	48(44,2)	42 (78,9)**	9(18)
Anemia	54 (50)	39 (73,3)**	-
СМ	7(6,44)	5 (9,4)	1(2)
Retinopathy	3(2,76)	9(19,9)	
RDS	4(6,68)	24(45,1)	

Characteristics of the level of health in children with IGR in neonatal period

N ot i c e. The value of differences (p < 0,001) in comparison with indices: * – groups of mature infants with IGR and control group; ** – groups of premature infants with IGR and control group.

As seen from the given data, diagnosis of perinatal damage of CNS of various degree of severity is the main diagnosis of our patients in neonatal period. The frequency of PDCNS varies from 52% (control group) to 99,4% (in mature infants with IGR) – 100% (in premature with IGR).Distribution by degree of manifestation of perinatal damage of central nervous system (PDCNS) is shown in Table 2.

Table 2

Characteristics of perinatal damage of central nervous system by degree of severity

Sex	Mature infants with IGR $(n = 108)$	Premature infants with IGR $(n = 53)$	Control group $(n = 50)$
Boys	52 (48,2)	27 (51,4)	24 (48)
Girls	54 (52,8)	26 (49,6)	26 (52)

Perinatal damage of CNS was diagnosed more in premature infants whereas in mature infants with IGR – mild and moderate degree of severity was reliably higher the indices of control group in both cases. These states were direct threat for newborn life in peri-postnatal period, they formed the basis to further range of pathological processes estimated as complications or residual effects [11].

Neurological pathology in most number of cases combined with pathology of parenchymal organs, later development of infection-inflammatory processes that resulted in disability since childhood in many cases.

Conclusions

The incidence of birth of infants with IGR has been revealed equally in both sex. Hypotrophic variant occurred in 9 times more in studied infants with IGR than in IGR with hypoplastic type. Premature infants were born with duration of gestation up to 35 weeks comprises more than 40% that determines the high risk of the development of postnatal complications in neonatal period. High percentage of perinatal damages in mature and premature infants with IGR with marked abnormalities in health in neonatal period constitutes a serious menace in forming problem dispensary groups.

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RISK FACTORS OF INTRAUTERINE FETAL INFECTION

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There were investigated 200 pregnant women with a high risk of intrauterine fetal infection maternity department of the Andijan regional perinatal center. The gestation time is 28–40 weeks.

High risk factors of intrauterine infection (IUI), which have diagnostic value, in addition to having a maternal history of chronic somatic diseases and inflammatory diseases of the female reproductive organs, were second pregnancy, complications during pregnancy with this threat of termination, obesity, anemia, acute respiratory infections.

Clinical high risk factors of IUI of newborns were moderate and severe conditions in the first day, degeneration of the skin and its derivatives, morphofunctional immaturity, regurgitation syndrome, impaired neonatal adaptation.

There was a significant relationship of the intrauterine infection of different etiology (enterovirus, herpes simplex virus, cytomegalovirus, influenza virus) with a history of maternal chronic disease (71,6%), miscarriages and stillbirths (41,5%), and such complications of pregnancy, as the threat of termination of pregnancy (37,6%), exacerbation of chronic disease (77,5%).

We have identified the fact that there hotbeds of acute or chronic infection in the history of women with intrauterine infection of the fetus, on the one hand, indicates the lack of specific immunological defense mechanisms and non-specific factors of resistance in the mother, and the other, is evidence of the existence of persistent infection. The main pathogenetic mechanism of disorders of the fetus is infectious factor. In the group of women with a high risk intrauterine infection fetoplacental insufficiency occurred in 35,2%. Infectious-inflammatory diseases of pregnancy adversely affect all parts of the fetoplacental complex. Infection of the ovum is often accompanied by abortion or subsequent delay in fetal development.

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THE SURFACE TENSION EXPERIMENTS AT THE DIAGNOSIS OF ASYMPTOMATIC NEUROSYPHILIS

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Analysis of the clinical features of modern syphilis in Ukraine reveals two significant tendencies: on the one hand, the cases of infection with malignant course have become more frequent, on the other hand, the number of patients with latent forms of the disease has increased. The neurosyphilis (NS) is the lesion of the nervous system caused by a syphilitic infection, and results in specific changes of the liquor cerebrospinalis (cerebrospinal fluid, CSF). The NS diagnostics can be complicated because the syphilitic process in the nervous systems can either be asymptomatic or do not exhibit any clear clinical indications [1]. The traditional methodology used in the initial diagnostics of NS is based primarily on data obtained from the serologic studies of blood and CSF.

Clinical and anamnestic features of 33 patients with asymptomatic neurosyphilis (AN) were analyzed. The majority of the patients belong to a reproductive and able-bodied population. In 60% of the cases under study AN develops against the background of syphilis sustained earlier and treated with repository medicine of penicillin. Subjective symptoms are characterized by an asthenoneurotic syndrome in 70% of the cases.

Parameters of liquor in 33 patients with AN have been investigated. The average amount of cellular composition in the liquor was 20.3 cells/mm³. Pleocytosis (more than 8 cells/mm³) was observed in 57% patients. 10 person - had 20 cells in liquor with maximum amount 100 cells in mm³. The average level of protein was 0,16 gr/l, which is in line with the norm. Concentration of protein in liquor higher than 0,4 gr/l is one of the diagnostic criteria of NS. In our research only 14,5% of the patients examined had the level of albumen higher than the norm. The index of Pandi reaction was 1.5. A negative VDRL reactions made up 58% and highly positive results were observed only in 32% patients. The most informative parameter of NS diagnosis is an immunofluorescence reaction with integral liquor. The positive reaction was observed in 56% and highly positive - in 44% of patients. In this case the probability of a correct final diagnosis is between 30 and 70%. Therefore, the development of new highly informative methods for the study of CSF is of high interest for the diagnostics of this pathology.

The chemical composition of CSF is quite similar to that of blood serum: water, 89–90%; solid residues, 10–11%. The solid residues contain both organic (proteins, amino acids, hydrocarbons, urea, glycoproieins and lipoproteins) and inorganic substances. Most of the organic substances are surfactants; this fact makes it possible to employ dilational rheology studies of the CSF for NS diagnostics.

Presented below are the results obtained by the examination of 63 patients with NS and syphilis. The first group consisted of 33 patients suffering from AN, without any neurologic symptoms, but with positive syphilitic tests and changes in the clinical analysis of CSF. The reference group consisted of 30 syphilitic patients without any accompanying neurologic diseases.

The surface tension experiments were performed using the drop/bubble profile analysis tensiometers PAT2 (SINTERFACE Technologies, Germany). In this study the pendant drop configuration was used. The temperature of the measuring glass cell was controlled at 25 °C [2].

In the process of comparing tensiometric and rheologic characteristics a number of authentic distinctions were revealed: reduction of the level of a stress viscoelasticity module and surface-tension, increase of tangent of slope angle and time of relaxation in a stress experiment in patients with asymptomatic neyrosyphilitic. A correlation analysis has been carried out between clinical, serum and tenzioreometrical indices.

The following results have been obtained at patients with AN: reverse correlation dependence between stress visco-elasticity modulus and pleocytosis – (-0,7), with protein (-0,6); direct correlation with immunofluorescence reaction (0,9). Direct correlation dependence between FTA and time of relaxation (0,6), reverse correlation (-0,5) with surface-tension, as well as reverse correlation (-0,5) between the tangent of maximum angle of slope tenziometric line and content of protein.

The dependencies discussed above show the applicability of the studies of the CSF dilationai rheology for the diagnostics of the neurosyphilis and subsequent differential diagnostics of the concomitant diseases. A value of a1 above 40 mN/m undoubedly indicates the absence of nervous system pathologies for the syphilitic patients. If this value is lower than 32 mN/m it can be concluded that the syphilis is accompanies by neurologic diseases, mainly a discirculator or toxic encephalopathy.

The values of the parameters a_1 , a_2 and b_1 which describe the dilationai rheology at the harmonic oscillations of the drop area, exhibit essential differences (p < 0,1) between the group of patients and the reference group. The significant differences (p < 0,05) were observed in the a_1 values (the elasticity at the frequency 1 rad/s) for the patients from first and reference group. It should be noted that a strong correlation (r = 0,9) exists between the values of a_1 and E (stress modulus) for groups of patients. This is just what should be expected, because these parameters refer to different method of dilationai rheology studies (stress and harmonic deformation) both involving a quite small contribution of the imaginary constituent into the surface visco-elasticity.

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PROTECTING REPRODUCTIVE HEALTH OF YOUTH

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The article presents an evaluation and operational experience of «Youth-friendly clinics» that have been organized in Russia according to a program of the International organization of healthcare in collaboration with infantry fund of UN (UNICEF).

Demographic situation in Russia remains unfavourable in both quantitative (decrease in population) and qualitative (decrease in expected life period, demographic aging) meanings. A high death rate, drop of birth level and natural decrease in population in Russia (since 1992) are defined by a negative impact of economic and social factors that have obtained a stable long-term nature. Incase reproductive behavior of the country does not change and if one-child family remains a prevailing type of Russian families, grave forecasts that predict death of Russian nationality as an ethnos can become scary realistic (A.E. Ivanova, 2008, V.I. Starodubov, L.P. Sukhanova, 2012, O.G. Frolova and others, 1999). The explained facts define the significance of preserving reproductive health of the youth.

A great number of models, aimed to assist a teenager, exist in the world: from separate actions of doctors-specialists to narrow-specialized clinics or centers that provide complex medical and social services to the young. In order to generalize the existing information and experience the International organization of healthcare (IOH) in collaboration with population funds of UN (UNFPA) and Infantry funds of UN (UNICEF) has developed joint program on creating youth-friendly clinics (YFC) in 1995 (T.N. Kozhukhovskaya, L.M. Aliyeva, 2012).

A «youth-friendly clinic» (YFC) is an institution that provides complex medical, psychological, and social assistance to teenagers on problems of preserving health according to the following principles: voluntariness, affordability, amicability, and trust. Over 130 YFC have been created in Russian Federation by now.

Within YFC the consultations of the following doctors-specialists have been organized: obstetrician-gynaecologist, urologist-andrologist, legal adviser, social adviser.

YFC provide the following free services:

Phone consultation with specialists or direct consultation in a clinic;

Examination and preventive inspection with specialists;

- Watching video films;

 Receiving brochures, pamphlets, memos on problems of health lifestyle, planning family, contraception, prevention of narcomania, alcoholism, and smoking, infections that are passed on sexually;

– Pregnancy test.

The main requirement towards organization of YFC is placing a clinic in a comfortable and wellequipped building with a separate entrance. A territory, provided to teenagers only, decorated by teenagers, considering their wish and suggestions. Objectives of YFC are:

1. Diagnosis, treatment, and prevention of diseases via organizing consultations and annual prevention examinations.

2. Informational and consultative maintenance, aimed to alter teenager's attitude towards their own health and form a desire to follow a healthy lifestyle among them.

Also «Scholl of preparation for healthy maternity and paternity», educational school «Teenager», «School of training volunteers» operate. A work, aimed to train volunteers from students that are ready to participate in enlightenment work with their peers according to the principle of equality. Volunteers help to carry out information campaign of attracting teenagers and youth to YFC. They participate in development and organization of trainings, design of graphic information, assist in carrying out questioning, distributing sanitaryenlightenment literature.

A web-site for Internet consulting has been created within the system of YFC. A teenager can receive a competent answer anonymously and free of charge, and, in case of necessity, he can continue a discussion directly with a specialist. In order to attract teenagers and youth to YFC, Wi-Fi areas have been organized in clinics.

In order to provide medical-social and psychological assistance to teenagers and the young, contact phones operate in YFC. They are available round-the-clock.

Efficiency of measures, aimed to protect reproductive health of the studying youth, that have been implemented at the base «Youth-friendly clinic», has been defined by an increase in knowledge on risk factors of reproductive system diseases, awareness of contraception and undesired pregnancy, change in reproductive behavior (safe sexual relations – from 69,2% to 89,6%, constant partner – from 72,5 to 80,4%, usage of hormonal contraceptives – from 8,7% to 15,7%).

96 out of 100 respondents consider creation of specialized center, where teenagers and young people can ask for medical assistance, as a necessity.

Efforts of medical workers only are not enough to educate a healthy generation in physical and moral meaning. Inter-agency approach is necessary in this case. YFC collaborates efficiently with institutions of education and social protection of people, guardianship and trusteeship, youth organizations, bodies of inner affairs, means of mass media. YFM refer to new modern technologies of serving teenagers, they should be developed extensively.

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CARRYING OUT SELF-EVALUATION OF A MEDICAL INSTITUTION IN TERMS OF QUALITY CONTEST

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The article presents some basic principles of evaluating activity of medical institutions according to a «Self-evaluation» – correspondence to a management model that the institution selects as a standard.

An improvement in activity of a medical institution is grounded upon regular analysis of a real condition of work according to quality of its results (A.A. Kaliniskaya, A.K. Dzuayev, 2009, V.M. Levanov, 2012, V.O. Schepin, L.F. Molchanova, A.A. Kaliniskaya, E.Y. Shaktova, 2011).

In the world practice comprehensive analysis of an organization activity that is carried out by employees of this company, has been called «Selfevaluation». It is an overall and systematic analysis of an institution's activity and its results in comparison to a selected standard.

Self-evaluation takes place according to a model of management that has been selected by a certain institution as an ideal example. It can be a model of bonuses for quality or any other international standard (e.g. standards of ISO 9000) or a model, developed within the institution.

All models of business perfection base upon eight fundamental principles that correspond to the concept of «Universal management according to quality» – total quality management (TQM). It is a direction towards a consumer; leadership and consequent achievement of goals; management of understanding process and facts; involvement of the personnel; continuous cognitive activity and innovations; development of partnership; public relations; orientation towards results. All quality management models of the world as well as models of managing quality of medical care have evolved according to principles of TQM and stages of development of study of quality management.

Self-evaluation according to models of bonuses for quality has become extremely popular during recent years. The most widely-spread in the world practice are: the model of Deming bonus – in Japan, model of Malcolm Boldridge bonus – in the USA, model of the European bonus. In Russia such management model is a one that corresponds to criterions of the bonus of the Government of Russian Federation in the area of quality that is harmonized with the model of perfection of the European fund of quality management (EFQM ExcellenceModel) and used in the contest of European quality contest.

Correspondence to the bonus of the Government of Russian Federation in the area of quality is evaluated according to nine criterions. Each of them is divided into components that contain special evaluation lines. Evaluation is carried out according to an expert method via charging percents that describe achievements of scientists in every component.

Let us outline some advantages of this approach:

 It provides an objective quantitative evaluation according to a unite general criterion complex in terms of a selected model;

 It allows one to evaluate dynamics of an institution development;

 It allows an institution to compare its activity with that of other institutions that participate in a contest;

- It reveals relations between achievements and implemented methods;

It reveals strong points and areas that are to improve, including processes that need to be improved;

- It stimulates study and implementation of experience of other institutions.

Facilitation of self-evaluation is also supported by developers of ISO 9000 standards. As an attachment to the national standard GOST R ISO 9000-2010 «Systems of quality management. Guideline for a continuous improvement» recommendations on self-evaluation are given. The very standard serves as a model in it.

The following definition is given in this standard: «Self-evaluation of an organization is a comprehensive and systematic analysis of activity of this organization and its results according to the system of quality management or the perfection model (e.g. model of bonus of quality)». The same document claims that self-evaluation is a type of activity that is implemented in estimating the system of quality management (SQM) as well as its audits and analysis. In other words, self-evaluation can be used to estimate an organization's activity as a whole, and its SQM only.

Methodic guides in facilitating method of selfevaluation in terms of SQM (according to the standards of ISO 9000) recommend:

 The higher management should create an organization that is directed towards a consumer via using correspondent approaches to evaluate improvement of processes such as self-evaluation and analysis by leaders;

 Results of audits and self-evaluation of an organization should serve as an initial data in estimating efficiency of quality management system that considers interests of consumers and other interested parties;

- Self-evaluation should be discussed regularly in order to evaluate the completeness of the development of quality management system, organization's operation level, and also to find possibilities for future improvements.

 Results of self-evaluation should serve as an information source in studying correction measures;

- Data of self-evaluation can be used as initial data to support processes of improvement.

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IMPROVING QUALITY OF PUBLIC MEDICAL CARE

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The article provides basic principles of management in health care according total quality management (TQM).

State program of Russian Federation «Development of health care» during 2012–2020 includes the principle of total management according to quality (TQM) – «improvement in quality».

Principles of managing an organization of a certain process are especially urgent in health care.

A specific result, an impact over a person's health, correct orientation of a doctor's work improve life quality among the population (E.I. Dubynina, A.A. Kalininskaya, F.A. Sulkina, 2009, V.M. Levanov, 2012, V.O. Schepin, A.F. Molchanova, A.A. Kaliniskaya, E.Y. Shkatova, 2011).

A number of various recommendations, methodical guides, instructions of conducting a patient, treatment forms, medical-economic criterions, standards require a definite universal implementation. In our opinion, their variability is a positive phenomenon. But one should consider that, in order to orient himself in this flow of information and facilitate it correctly, he needs knowledge of basic laws of management (Y.M. Komarov, 2011).

The first principle is direction towards a consumer, in our case – towards a patient, considering his present and future demands. A problem arises before treatment institution – it needs know health characteristics of its potential customers thoroughly. Nowadays, it is impossible to carry out prevention work and medical-social care in an open society without any public organizations. This aspect is also considered in studying self-audit.

In practice analysis of keeping passport of hospitals, filling ambulatory cards and medical reports according to existing standards and plans of medical observation allows one to forecast volumes of medical care and control existing flows of patients. The main objective of this direction is to train population to follow a healthy lifestyle.

The next absolute principle is forming an objective of a medical institution. Without a leading part of a manager, head doctor, administration development of managing quality of medical health is impossible. A manager must create and support an inner environment in which all employees should be involved into the management system. In order to establish it, one should carry out professional instructions considering his knowledge of the process of providing medical care within an institution in accordance with practical purpose of a project.

According to the existing standards of records management, with logical control and practical experience, managers should develop professional instructions, regulations, collective pacts, statutes. It is necessary to clear actions of each administrator from unnecessary functions, as well as of each doctor or nurse. Today this work takes place in four treatment institutions of municipal region of Samara.

Further we study the principle of complete involvement of all levels of institution employees into the process of improving quality of medical care. To do it, workers of our department have prepared lectures according to modern principles of management.

The most important principles in managing quality of treating process are system and process approaches. All the activity of an institution is studied as a whole, as an open system in which process of achieving results and the result itself are studied. The developed indicators of quality should become a basis of models of a final result. Moreover, for 15 years organizers of medical care of our region are familiar with this principle of evaluating their own work.

The next principle of TQM is making management decisions that are based on facts. It means that only analysis of premises and possession of statistic information in dynamic mode allows one to achieve a set goal.

A correct maintenance of records, reflection of basic indexes of a medical institution activity in it is a basis of making a management decision. A special attention is paid to this division in our department.

A result of following and executing principles of TQM will be an improvement in quality of organizing medical care. It is testified by international practice and experience that has been collected in a number of regional healthcare institutions.

During several recent years a work of involving medical institutions into the system of self-evaluation and organization of medical care has been carried out at the territory of Samara region in collaboration with Povolzhskiy quality club. About ten clinics, hospitals have participated in self-audit, and leaders were rewarded with the Prize of Quality. Systematizing record management, correct filling of medical documentation, stages and algorithms of the TQM concept have disciplined operation of these organizations.

Besides, an experience shows that going through a complete circle of contest is localized at a limited time period and requires significant expenses of staff. It is often considered as a one-time measure. These conditions does not allow one to maintain a wide range of institutions in field of improving management of medical care organization quality by attracting them to contests.

A solution of this situation is simple. In is necessary to start introducing methods of consequent small steps (method of Kaizen) that is possible to organize within any institution. It implies carrying out systematic hard work on realizing contents of the described TQM principles on mastering terms in the area of managing quality, forming actives that are aimed to implement the principle of consequent improvement, realizing the necessity of changes and readiness to accept them.

After some initial stage of work, one should plan to take the next step in introducing the model «Self-evaluation of an institution activity» that will allow him to form some kind of a picture of his activity and compare it to certain standards, see his weak points and continue a conscious formation of his strategy.

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THE LATE DIAGNOSIS OF BRONCHIAL ASTHMA CHILDREN LIVING IN UFA (REPUBLIC OF BASHKORTOSTAN)

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Authors performed a study to identify cases of late diagnosis of bronchial asthma (BA) in children. We examined 89 children in fact diagnosed with BA. We investigated the medical documentation of the patients (outpatient cards). A thorough analysis of medical documentation showed time period between the time of the actual diagnosis of asthma, and the time when the diagnosis was already evident. Among the study group of children for intermittent disease was observed in 33 (37%) children, mild persistent - in 26 (29%) children, moderate persistent - in 22 (25%) children, severe persistent - in 8 (9%) children. The duration of dispensary observation was on average 6,5 [4,5, 8,5] years. Early manifestations of allergy were observed in 78 (88%) children, including atopic dermatitis to 1 year occurred in 56 (72%) children, atopic dermatitis over 1 year – in 24 (31%) children, drug allergy - in 17 (22%) children, acute urticaria and angioedema – in 19(24%) of the children, contact dermatitis - in 11 (14%) children. We found that the timely diagnosis of asthma (lag is not more than 6 months) occurred in a third of 29 children (33%) patients. Untimely diagnosis was found in 60 (67%) children. Lag the diagnosis of 6 months to 1 year was observed in 8 (13%) of children, from 1 to 2 years - in 10 (17%) of the children, from 2 to 3 years - in 9 (15%) of the children, from 3 to 4 years - in 18 (30%) of the children, from 4 to 5 years - in 7 (12%) children, from 5 to 6 years - in 2 (3%) of the children, from 6 to 7 years - in 3 (5%) of the children, from 7 to 8 years -2(3%) of the children, from 8 to 9 years - in 1 (2%) child.

In summary, we found that the studied group of children characterized by intermittent course of the disease, early onset of allergic symptoms and delay in diagnosis of 3–4 years from the onset. To improving the situation we have initiated the creation of a universal computer program for the early diagnosis of asthma in children.

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EFFECT OF MATERNAL HSV INFECTION ON ADAPTABILITY OF HYPOTROPHIC INFANTS

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Herpes simplex virus (HSV) infections are the most common viral diseases of a man. According to WHO data, the diseases transmitted by herpes simplex virus take the second place (15,%) after influenza (35,8%) as a cause of death from viral infections [1]. HSV infections present serious threat to reproductive age women as contamination by them during the pregnancy substantially leads to miscarriage, stillbirth, or congenital abnormality of the fetus. The highest prevalence of HSV has cytomegalovirus (CMV) and HSV caused by herpes simplex virus type I and type II [1, 2]. HSV has a leading place among the major causes of neonatal morbidity and mortality. HSV in infants is characterized with polyetiologic, polymorphic clinical symptoms [4]. The character of the course of perinatal and neonatal period substantially determines the future state and quality of life [2, 4].

The aim of the research is to: Study the most significant clinical presentations in term and preterm LBW infants born from mothers with HSV infection in neonatal period and during the first year of life.

Materials and methods. There studied the health of 33 LBW infants born from mothers with HSV infection during pregnancy. Surveyed children were divided into 2 groups. Group 1 included 18 LBW infants born at term 33–36 weeks of gestation. Group 2 included 15 LBW infants born at 37 and above weeks of gestation. Follow-up of infants was being carried out for the first year of life.

Results and their discussion. In assessing the clinical data in preterm infants with low birth weight from mothers who had a history of HSV most often determined by CNS damage, respiratory failure, jaundice and hepatomegaly. In the neurological status the syndrome of motor disturbance was observed in the study group of infants manifested by the decrease in muscle tone (83,3%), while in term LBW infants the motor disturbances occurred in the form of muscle hypertonus in 75% cases. The infants in group 1 in contrast to group 2 had seizures in 22,2% of cases, brain ultrasonography revealed external (38,8%) and internal (16,6%) hydrocepha-

lus. When comparing the data of somatic status of infants of both groups it was found that in premature infants with low birth weight, as opposed to infants born at term, there was hepatomegaly (22%) and conjunctivitis (16,6%). When comparing the frequency of jaundice in these groups, no significant differences were noted.

The follow-up of this category of infants found that a high incidence of viral respiratory infections during the first year of life (more than 5 times a year; 55,5% in group 1 and 46,6% in group 2) was in both groups . The study of biocenosis as an indicator of immunological resistance of the organism in the study groups of infants showed that in the first year of life in 72,2% of infants in group 1 and 50% of infants in group 2 were impaired qualitative and quantitative composition of intestinal microflora. But allergodermia manifestations which can also characterize the state of immune status occurred less frequently (22,2 and 13,3% respectively).

The estimation of neurological status showed that to 1 year of age the disappearance of clinical symptoms of neurological disorders noted in 61,1% of infants in group 2, while in infants of group 1 remained muscle tone disturbances in the form of muscular hypo- and hypertension (50%) and respectively (22,2%), clinical and instrumental investigations confirmed the signs of hydrocephalus in 16,6% of infants. Thus, from the above it follows that:

- the probability of birth of low weight infants with different terms of gestation and different degree of severity of clinical manifestations in postnatal period from mothers with different types of HSV infection in pregnancy is high;

- in term and preterm LBW infants, the incidence of respiratory diseases in the first year of life is found in half of studied children regardless of gestational age at birth, and neurological symptoms in LBW infants with low gestational age persists over a long period due to morphological and functional immaturity of the central nervous system.

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THE PLAYERS' CENTRAL NERVOUS AND NEUROMUSCULAR SYSTEMS FUNCTIONS AGE DYNAMICS

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The adaptation, resilience, and physical performance efficiency challenges are occupied the central place in the modern sports, especially in the soccer, for which are characterized not only the huge amounts of the training and competitive physical activities, but also their combination with the hypoxic, exothermic, and the powerful psychoemotional impacts. So, this is usually accompanied by a lot of the surge of the overstrain and the overexertion, the different organs and the systems injuries and the diseases (e.g. Graevskaya N.D., 1969; Vysochin Yu.V., 1974, 1980, 1989, 2001, 2002; Meyerson F.Z., 1981; Carpman V.L. and et. al., 1988; Meyerson F.Z., Vovk V.E., 1990; Polishkis M.S., and et. al., 1998; Shamardin A.E., 2000; Valeev N., 2000; 2002).

The obvious deficiencies of the Soviet and the Russian cocker players' training system can be traced over the past several decades. On this basis, the clear need is evident to be found the fundamentally new approaches for the efficiency improvement of the cocker players training.

So, the soccer can be characterized, as the activity with the changing conditions of the actions fulfillment, the variable carrying out by the muscular work power at the intensive large amount processing of the extrasensory information. For all this, the physical activities intensity is practically ranged from the moderate to the maximum level during the game. This, moreover, is characterized by the permanent combination of the active actions and the corresponding operations with the brief and short – termed periods of the relative rest (e.g. Suchilin A.A., 1997; Solopov E.N., 1998; Shamardin A.E. and et. al., 1999). Thus, in the soccer, as in all types of the sports, the main criterion for the training system efficiency this or that training system, is considered to be the final result, or the competitive activity success. So, the athletic performance sportive result is practically depended on the many factories: the level of the general and the special physical, technical, tactical, and psychological preparedness of each soccer player in separately and the team, in the whole, that is, the generalized (e.g. integral) of the functional state condition and the functional possibilities of the organism's all the systems, but, most of all, the central nervous and the neuro-muscular systems (e.g. Vysochin Yu.V., 1989; Zolotarev A.P., 1997; Vysochin Yu.V., Den-isenko Yu.P., 2000, 2002, 2010; Braginsky A.,

Golomazov S. and at. al., 2001; Berezantzev A., Davydov D., 2002; Vysochin Yu.V., Denisenko Yu.P., Rahma E.M., 2003; Vysochin Yu.V., Denisenko Yu. P., Chuev V.A., 2007).

The modern soccer is different by its steady increased tensions of the training and the competitive activities (e.g. Shestakov M.M., 1995; Suchilin A.A., 1997; Shamardin V.N., 1998; Shamardin A.E., and et. al., 2000; Lyukshinov N.M., 2003). So, in this regard, the need is constantly increased for the radical improvement of the soccer players' training quality, which it is dictated the need to search and find, and finally, to put into the practice more efficient organizational forms, means, and the necessary methods of the educational and training process (e.g. Zolotarjev A.P., 1997, 2000; Lyukshinov V.N., 2003).

So, the extensive scientific research is, simultaneously, conducted in the different and the various directions. First of all, this is the efficient means and the methods further development of the general and the special physical training and, moreover, the soccer players' physical performance efficiency increase at all the stages of the sportsmanship formation (e.g. Sperling K.A., 1974; Zonin G.C., 1975; Kirillov A.A., 1978; Terentev V.F., 1995; Sarsaniya K.S and et. al., 1999; Zaitzev A., Leven V., 2000; Shamardin V.N., 2000 and et. al.).

However, the attention has been drawn to the rather stereotyping approach in all these challenges solution. So, in the overwhelming majority of the studies and the researches, having devoted to the general and the special physical training, having aimed at the further development of the speed and power, the power qualities, the speed, the agility, the speed and the overall endurance and etc., are, mainly, used the whole variety of the physical activities and their combinations. At the same time, up to the present time, the large experience in the use of a number of the non - traditional means has been accumulated in the various types of the sports (e.g. the midlands, the altitude chamber, the hypoxic, the hyperthermic effects and the impacts, the special breathing exercises, the biofeedback techniques, the active self-regulation and the relaxation tricks, and etc.) in the sports training system. So, all these means are impacted and the influenced on soccer players' human body and the organism have been little studied, and, obviously, so, therefore, they are not almost used in the soccer. The myorelaxation or the muscle relaxation was appeared to be the least explored and studied in the soccer players' training system.

We have not met the works in the analyzed literature on the soccer, except for the laboratories research by Yu.V. Vysochin (e.g. Vysochin Yu.V., Alloy L.M., Morozov Yu.A., 1979; Vysochin Yu.V., 1988; Vasquez O., Vysochin Yu.V., 1993; Vysochin Yu.V., Denisenko Yu.P., 2000, 2001, 2002, 2003; Vysochin Yu.V., Denisenko Yu.P., Chuev V.A., 2007), concerning the special relaxation training of the soccer players. At the same time, it is quite well – known that the myorelaxation or the muscle relaxation, in particular, the skeletal muscles relation rate is no less significant quality, having characterized the neuromuscular system state and the human organism functioning possibilities state, than the contractile muscles characteristics. So, it is quite impossible to be overstated the relaxing muscles functions value in the sports and the labor activities.

Thus, the skeletal muscles relaxation rate is the especially significant one. The study of this challenge has been devoted to this subject of several dissertational theses (e.g. Visochin Yu.V., 1974, 1989; Azbakieva H.A., Shin N.S., 1978; Junayd B.A., 1984; Azhishchenko A.A., 1987; Boldyrev Yu.V., 1989; Levenkov A.E., 1988; Abovyan T.Zh., 2000; Dzhungurova N.V., 2002; Denysenko Yu.P., 2007). The positive effect of the specific exercises, having improved the skeletal muscles relaxation function, on the central nervous system, the visceral organs and the systems activity, the blood circulation rational types formation, the movements coordination, the speed, the endurance, the technical skill, the growth of the special physical health and the athletic performance efficiency at the most different kinds and the types of the sports activity have been proved in them. The researches, having proved the leading role of the muscles relaxation speed in the sportsmen's organism immediate and long - term adaptation mechanism to the large and great physical, the hyperthermal stresses, the resilience to the physical overloads in the mechanisms, the overvoltage prevantage, the traumas and the diseases, and as well as in the mechanisms of the host defense of the human organism from the extreme impacts, and the athletes recovery have been especially significant (e.g. Vysochin Yu.V., 1974, 1980, 1988, 2001, 2002; Devyatova M.V., Vysochin Yu.V., 1980; Vysochin Yu.V., Denisov A.A., Lukoyanov V.V., 2000; Vysochin Yu.V., Denysenko Yu.P., 2003, 2011).

So, the age formation regulations and the functional state development of the central nervous and the neuromuscular systems, having played the leading role in the mechanisms of the special physical performance efficiency and the progress of the sports results and the athletic performance efficiency, as well as in the further formation mechanisms of almost all the sports – important qualities of the soccer players have been appeared to be even less studied.

Therefore, the main objective, of our many – year researches, having stated in the Monograph book, the experimental study of the age – related regulations patterns of the anthropometric data development, the functional state of the central nervous and the neuromuscular systems, the individual and personal development types, the functional activity of the physiological mechanisms of the soccer players' human organism adaptation and the protection from their physical overload have been outlined in it.

It should to be noted, that this Monograph, practically, is the first systematic complex study of the functional state age dynamics at the soccer players' central nervous and the neuromuscular systems, at the age from 9 (e.g. 108 months) up to 35 years (e.g. 420 months), which was permitted to be received a number of the absolutely new scientific facts and data. Firstly, it has been established, that the CNS inhibitory processes and the skeletal muscles relaxation rate are made considerably greater contribution to the progress of the soccer players' sports results, in comparison with the excitatory processes, their maximum force, and the muscles contraction rate. Firstly, it has been proved, that all the parameters, having reflected the anthropometric status, the central nervous and the neuromuscular systems state, the long – term adaptation types, the injuries and traumas appearance probability and the power of the protection physiological mechanisms, have their characteristic age dynamics, which is divided into three main types. First experimental evidence has been proven, that the age of 14–16 years is the most critical for the young soccer players, and it, moreover, is required the special methods development of the sports training at this age.

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LEVEL SL-SELECTIN IN BLOOD SERUM OF PATIENTS WITH SCHIZOPHRENIA COMORBIDITY PYODERMA

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Pyoderma is one of the most common infectious dermatoses with a frequency of occurrence in the general structure of the skin disease to 43%and 17,3% for patients with mental health [2, 3]. Immunological disorders are one of the contributing factors to the development of pyoderma, including comorbid with schizophrenia [1, 2]. In this regard, the need for more in-depth study of disorders of the immune system in these patients is important. **Objective.** Study the level of sL-selectin in the serum of patients with pyoderma comorbid schizophrenia.

Methods. Clinical and immunological study was performed in 40 patients with pyoderma comorbid with schizophrenia at the age of 18 to 70 years. To measure the level of human sL-selectin (leukocyte adhesion molecule-1) in human serum was used immunoassay method using horseradish peroxidase as the indicator enzyme (Bender MedSystems, Austria).

Results. Immunosorbent assay showed that the concentration of sL-selectin were significantly increased in patients with comorbid schizophrenia pyoderma, p < 0,001. In patients with schizophrenia without pyoderma sL-selectin levels were significantly increased compared with the parameters of healthy and 9,3% was lower than in patients with comorbid schizophrenia pyoderma (1569,0 \pm 120,7, $1423 \pm 126,2$ ng/ml, in patients with pyoderma comorbid schizophrenia and schizophrenia without pyoderma, respectively, 907.0 ± 148.3 ng/ml in healthy). The rise of sL-selectin may be a consequence of activation of neutrophils, which causes an increase in the number of adhesion molecules, and confirms that a compromised immune system are involved in the pathogenesis of schizophrenia, and pyoderma.

Conclusions. The results showed that elevated levels of sL-selectin detected in patients with comorbid schizophrenia pyoderma is a risk factor for the development of pyoderma and can be used as a criterion to judge violations of the immune system and to evaluate the effectiveness of therapy in these patients.

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THE WEEDS IN MULTI–ROW BARLEY AGROCENOSIS IN THE MODAL CHERNOZEM

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The weed plants in the spring barley monoculture are usually reduced the grain yield and its quality. During the period of the spring barley tillering, the number of weeds in the typical black soil (e.g. the modal chernozem) is practically reached 28-38 items/m², and their weight -5,7-10,9 g/m². The seeding rate dosage is usually affected on the contamination of the crops. In embodiments with the Suzdalets two – row barley grade, the seeding rate dosage increase from 2 up to 6 mln. items/ha is practically reduced the number of the weeds per 1 m² for 10-15 pcs. So, in multiple – row barley, the reduction is reached 12 - 16 pcs. at the Vakula grade, and the 13-16 pcs. – at the Helios grade. The Bazagran herbicide application is practically allowed to be reduced the barley crops contamination in 2,7–8,7 times. The areas with the highest standards of the seeds sowing are cleaner of the weeds. The multiple – row barley crops, due to the increased tillering, have 1,4 - 2,0 times lower, than the weeds number, and to 1,2-1,9 times their weight, than the two – row barley crops.

Keywords: weeds, multi-row barley, agrocenosis, chernozem

The foreign plants, in the agricultural purpose monoculture, are practically lost their moisture, the nutrients, are spread their diseases and the pests, and are made the soil treatment more difficult, its care, and the harvesting. So, the weed plants competition with the field crops is practically caused the large damage to the agriculture. The spring barley crop losses, depending on the contamination degree, and the weed vegetation species, can be reached up to 30%. In this regard, the weeds number regulation in the monoculture population is practically the significant and the topical relevant condition of the field culture productivity. So, the grain crops contamination reducing is provided the arrangement activities carrying out, as the preventing measures, having aimed at the crops optimal density formation, the weeds skidding prevention in the field, well as the fighter, having connected with the weed plants destruction in the crops [1].

Having given the barley significance in Russia, as the leading grain culture and the major cereal crop, the cereal, malting, and feed purposes, and, in 2010–2012-es, the field researches in the typical forest – steppe black soil (e.g. the modal chernozem) with the new released grade varieties of the Vakula and the Helios spring barley have been conducted by us.

The test area soil has had the weak – acidic reaction of the environment, the average availability of nitrogen, phosphorus and potassium, with the humus content 4.9%. The barley sowing has been carried out with the space between the already made rows of 15 cm and the rate of 2; 3; 4, and 5 mln pieces of the viable and germinating seeds per hectare. The planting dates have been generally accepted for the Black Earth forest – steppe, and the technology – is quite typical for the region. To be controlled the Suzdaletz two – rowed spring barley has been sown simultaneously by the released grade varieties. All these seeds have complete-

ly been met the State Standards (e.g. GOST) on the planting qualities of the seeds sown PC - 1.

So, the barley contamination study has been carried out under the production conditions, where the Bazagran herbicide treatment, at the dose of 3 l/ha, has been held just in the beginning of the tillering phase. The Moscow - 56 winter wheat has been the barley predecessor.

In the result of the carried out researches, in the barley sowing it has been found, that the weed plants species composition, the number and its weight have been dependent on the weather conditions and the rules of the growing season of the sowing seeds. This is practically connected with the different requirements of the weeds separated and the individual species to the basic factors of the life, the competition field changing between the field crops and the weeds. In the weed component structure, the dominant group, the annual weeds group has been, both, as in number, well as in dry weight. The barnyard-grass (e.g. Echinochloa crusgalli), the lamb's-quarters (e.g. Chenopodium album), the yellow foxtail-grass (e.g. Setaria glauca), the odorless chamomile (e.g. Matricaria perforata), the common chickweed (e.g. Stellaria media), the shepherd's purse (e.g. Capsella bursa-pastoris), the shiritsy thrown back (e.g. Amaranthus retroflexus) have been observed their massive spread. And from the perennial weeds have sporadically been met the following: the field (or Canadian) thistle e.g. Cirsium arvense), the field sow thistle (e.g. Sonchus arvensis), the field or trailing bindweed (e.g. Convolvulus arvensis). So, the maximum contamination of the barley crops in the tillering phase had been observed I 2011 and 2012, which were characterized by the intensive rainfall during the growing season. The common chickweed (e.g. Stellaria media) has been the most widespread. Its share in the specific weight in the total mass of the weeds, by the results for the first time determining has

been reached 35–40%. This weed plant has been in the lower tier of the seeding, and the negative impact on the barley further growth and its development has not been had. The minimum contamination has been in 2010, the growing period of which has been characterized by the hot and dry weather.

The contamination in the options experiments with the different varieties and the barley sowing rates in the tillering phase has been the same, as that of the dual, well as the multi – row barleys. So, the observed changes in the weeds number and in their dry weight have been within the experimental error. Thus, during the studies years, it has been established the lasting influence of the seeding rate dose, as the weeds number, well as their weight (see, the Table 1).

Table	1
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Crada	Sowing Rate,	The	The Weeds Amount, pcs/m ²			The Weeds Weight, g/m ²			
Grade	mln. pcs/ha	2010	2011	2012	average	2010	2011	2012	average
Suzdaletz (control)	2	31	36	47	38	8,4	11,6	12,4	10,8
	3	26	34	43	34	8,1	10,3	11,3	9,9
	4	23	31	40	31	7,5	9,4	10,2	9,0
	5(к)	22	30	38	30	7,0	9,0	9,2	8,4
	6	20	26	32	26	6,0	8,4	8,5	7,7
	HCP _{0,5} ,%	1,4	1,6	1,9		0,2	0,3	0,4	
Vakula	2	32	35	45	37	8,8	11,5	12,5	10,9
	3(к)	28	33	42	34	8,0	10,0	11,3	9,8
	4	24	26	35	28	6,7	8,6	9,8	8,4
	5	20	25	31	25	5,8	7,5	8,6	7,3
	6	18	23	29	23	5,0	6,7	7,4	6,4
	HCP _{0,5} ,%	1,2	1,4	1,5		0,3	0,3	0,4	
Helios	2	30	37	46	38	8,4	11,3	12,3	10,7
	3(к)	28	32	42	34	7,6	10,1	11,0	9,6
	4	22	24	32	26	6,4	8,0	9,4	7,9
	5	18	22	25	22	5,3	6,9	7,7	6,6
	6	16	20	23	20	4,6	5,7	6,9	5,7
	HCP _{0,5} ,%	1,3	1,5	1,5		0,3	0,4	0,4	

The Barley Crops Contamination in the Tillering Phase
(Without Herbicide Treatment)

M.A. Dauletov and S.E. Kalmykov have pointed to the great significance in the fight with the seeding rate dose contamination [2]. They have also noted, if agricultural crops are taken up the entire area, and they are grown up rather quickly and vigorously, then the weeds are displaced or they are absolutely absent. And, conversely, if the seeding is lightened and thinned, the established seeding crops sowing norm is not practically respected and observed, or the plants growth is slowed down – the weeds will be «flourished».

In our experience with the Suzdaletz grade, the contamination has been decreased at the seeding rate dose increasing from 2 up to 6 mln pcs./ha in 2010 to 11 weeds, in 2011–2012-es, – correspondingly, by 10 and 15 weeds. So, the weeds number reducing with the seeding rate dose increasing has also been observed at the multi – row barley varieties. In 2010, in the

Vakula grade, the contamination in the studied variants has been reduced from 32 down to 18 pcs/m^2 , in 2011 – from 35 down to 23 pcs/m², and in 2012 – from 45 down to 29 pcs/ \hat{m}^2 . The Helios varieties on the plots of the land, the contamination decrease with the seeding rate dose increasing has been gone more intensely. So, for example, in the version with the maximum sowing dose, the weed seeds number has not been exceeded in $2010 - 16 \text{ pcs/m}^2$. in $2011 - 20 \text{ pcs/m}^2$, in $2012 - 23 \text{ pcs/m}^2$. So, this is indicated on the suppression of the weed vegetation by the barley Field culture, and the decline degree of the weed vegetation number is practically depended on the seeding density. In the variants with the maximum sowing dose, the plants density has been reached the varieties at the Suzdaletz $392 - 448 \text{ pcs/m}^2$; at the Vakula $- 436-485 \text{ pcs/m}^2$; at the Helios - $420-481 \text{ pcs/m}^2$.

The maximum weight of the weeds, to the period of the tillering phase, has been escalated in 2012, and the lowest one, as well as their numbers, - in 2010. The variety influence on the dry substance weight of the weeds has been begun to be appeared on the increased on the rise doses in the rate of sowing. At the dose rate of the sowing seeds 2 and $\overline{3}$ mln pcs/ha, the difference between the varieties has not been significant, but at the dose rate of the sowing seeds 4; 5 and 6 mln pcs/ha, the mass weeds in the sowing of the Suzdaletz grade has been higher, than in the multi – row barley crops. So, in 2010, it, has respectively, been made up 7,5; 7,0 and 6,0 g/m²; in 2011 – 9,4; 9,0; and $\hat{8}$,4 g/ m^2 , and in 2012 – 10,2; 9,2 and 8,5 g/m². While, as at the Vakula grade, under the same seeding standards, it has been, respectively, in 2010 -6,7; 5,8; and 5,0 g/m²; in 2011 году – 8,6; 7,5 and 6,7 g/m²; in 2012 – 9,8; 8,6 and 7,4 g/m². At the Helios grade, the weeds component weight has been for 1,1-2,7 g less, than that at the control varieties, and for 0,3-1,0 g less. than at the Helois grade.

The Bazagran herbicide application (e.g. 3 l/ha) has been helped to be reduced the contamination in 2,7-8,7 times, and some weed plants species have considerably been

depressed and slowed down in their further growth. The two weeks, after the herbicide treatment, the sites survey was shown, that not only the number of the vegetative weeds, but also their weight have been reduced (see, the Table 2). For all this, it can be stated by us, that the complete weeds destruction is not practically even in the crops processing at the optimal time. So, one of these reasons, by the V.V. Isaev's conclusion, is that the weed seeds, having come out their dormancy state, have the two waves of the germination: the early spring biogroup, having overwintered creeping - rooted and rhizomatous weed forming in the first half of the spring and the fall in part; the late spring ones – in the second half of the spring and summer [3]. The emergence of the weeds' second wave is practically confirmed by the fact, that the weeds number in the barley crops after the herbicide treatment has significantly been varied by the variants of the experiment. If prior the herbicide treatment of the weed plants in excess of the variants' number with the minimum and the maximum dose rate of seeding has been made up at the Suzdaletz grade 1,5 time, at the Vakula and the Helios ones, respectively, 1,6 and 1,9 time, then, after the herbicide treatment -2,3; 4,0 and 3,7 time.

Table 2

	The Contamination during Growth						
Sowing Rate, mln pcs/ha	The Tillering Phase		The Phase	e of Earing	The Maturity		
	pcs/m ²	g/m ²	pcs/m ²	g/m ²	pcs/m ²	g/m ²	
Suzdaletz							
2	14	5,7	18	27,5	19	31,4	
3	11	4,0	14	21,8	13	25,0	
4	10	3,5	11	18,0	11	20,1	
5	8	2,7	9	11,4	10	13,7	
6	6	2,0	8	10,2	8	11,9	
Vakula							
2	12	4,3	16	21,2	16	30,1	
3	10	4,0	13	18,3	12	23,8	
4	6	2,7	10	14,7	10	18,2	
5	4	1,8	8	10,0	8	13,0	
6	3	1,1	5	5,2	4	7,1	
Helios							
2	11	4,1	15	17,9	14	26,3	
3	9	2,7	12	14,3	11	20,2	
4	5	1,9	7	8,0	8	14,0	
5	4	1,3	5	5,3	5	8,1	
6	3	1,0	3	2,8	4	6,2	

The Barley Crops Contamination, Depending on Sowing Variety and Rate (the Herbicide Treatment, 2010–2012-es)

This is given the basis to be considered, that if after the barley seeds and the weed plants sowing, they are being grown up, under the same conditions, then after the herbicide treatment and the weeds part destruction, the additional weeds emergence is practically held under the tier of the tillered and cultivated plants, which, in their turn, are inhibited the weeds and are held back their number and the further growth.

So, the subsequent contamination surveys of the barley sowing have been shown, that the weeds number is being grown up slightly. The weeds number by options for the different rates of seeding in the heading phase has been increased up to $8-18 \text{ pcs/m}^2$ at the Suzdaletz variety. The weeds number has been even smaller, and in the phase of their maturity, it has not been exceeded $4-16 \text{ pcs/m}^2$ at the Vakula and the Helios grades. At the time, while, how the weeds mass was being grown up to the period of the earing phase at the grades of the Suzdaletz in 4,8–5,1 times; the Vakula – in 4,7–4,9 times; the Helios - in 4,0–4,4 times. Many weeds' species were continued to be vegetated, before the barley harvesting, having increased their mass. In the period of the barley maturity, the weed component dry mass has been the maximal at the dose rate of seeding 2 mln pcs/ha, and it has been made up at the Suzdaletz grade 31,4 g/m², at the Vakula and Helios varieties, respectively, 30,1 and 26,3 g/m².

As a result, it should be concluded, that the already obtained results are consistent with those of many researches on the herbicides' efficiency in the fight against the weed vegetation and constantly control it [4; 5]. With its growth and the further development, the barley plants are being successfully competed with the weeds for the factors of the life and the vital factors. This is quite clearly indicated by the data on the weeds' number and also their weight in the crops just before the harvest. There has been the significant effect of the variety regularity lack on the crops contamination at the early stages of the growth, and the barley contamination reduction in the variants with the increased seeding rate has been shown and revealed. The multi – row barley crops, due to the increased tillering and their bushiness of the already studied varieties, have had in 1,4–2,0 times lower the contamination on the weeds' number and in 1,2–1,9 time by their weight, than the two – row barley crops.

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Materials of Conferences

FORMATION OF STATE INVESTMENT DAIRY CATTLE-BREEDING IN KRASNOYARSK REGION

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Increase in investment attractiveness of the Western region is one of the most important directions of social-economic development of the territory. Bodies of local self-government possess real abilities to influence investment climate of the territory significantly. An important direction of investment policy is marketing of the territory, in other words, improvement of its "invesment image" in the eyes of potential investors. The first step in territorial marketing is creation of an information field that is necessary to make an investor's decision. As practice shows, the most efficient tool in this case is an investment passport – a complex informational bulletin that is designed for a specific audience – potential investors.

Soil-climate conditions of the Western area of Kranoyarsk region (Achinsk, Balakhtinsk, Biryulyusskiy, Bogotolskiy, Bolsheuluysliy, Kozulskiy, Nazarovskiy, Novoselovskiy, Tyukhtetskiy, Uzhurskiy, Shapyrovskiy district) provide for the development of agrarian sector: agriculture plays one of the leading parts in economic development of the area. Western area occupies the largest part of the region's production of grain, milk, meat of cattle, pork: according to the data of 2007, the part of Western area equals 37,3% of milk, 44,8% of cattle meat, 67,1% of pork production throughout the region.

Dairy cattle-breeding is mostly the agricultural specialization of the Western area.

Creation of investment passport will prove useful for all parties of the investment process in dairy cattle-breeding of the Western area of Krasnoyarsk region: initiators of investment projects will have an ability to learn an immediate state of investment infrastructure and existing requirements, estimate a potential of projects' realization; investors will be able to receive complete information on modern state of dairy cattle-breeding and prospects of its development and also obtain a possibility to to study specific investment projects. At the same time, potential initiators pf projects – agricultural producers of goods can learn new efficient technologies of production, storage, procession of agricultural goods via studying an investment passport.

Besides, all participants of the investment process can use information on possible support of investment activity in dairy cattle-breeding by state authorities.

While realizing an investment process, we will operate with the following indexes of dairy cattlebreeding in the Western area of Krasnoyarsk region (Table).

Index	2011	According to realized investment projects	
Total number of milking cattle, heads	40040	40402	
Gross production of milk, thousand tons	229,35	240,82	
Milking volume per a cow, kg per year	5037	5301	
Output of calves per 100 mother-cows	98	104	
Total investments	292,5 million rubles		

Efficiency of investments into dairy cattle-breeding of the Western area of Krasnoyarsk region

However, these indexes are not a limit of all abilities of the Western area of Krasnoyarsk region.

Besides, in order to form a favourable investment climate in dairy cattle-breeding of the region, and, therefore, increase the investment attractiveness of the whole region, it is necessary to create certain preferences for potential investors to realize project on practice. It can be represented by proving privilege credits, "simplified" model of collecting documents for guarantees, wide implementation of privilege duties and delays, development of compensation agreements.

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The paper reviews architecture in the context of synergetics, considering it as a complex self-organizing nonlinear system. An attempt is made to define a third global style. Once the corresponding author of this paper came across an article by Selim Khan-Magomedov, a Russian historian and theoretician of architecture, in which he wrote about the two global styles: classicism and modern movement. He concluded his article by assuming that in the future these styles are likely to alternate or to coexist. The proposed scenario did not cover all the possible spectrum of ways in which the architectural process could develop, and this article is a result of considering other various scenarios for future architecture. When Vladimir Babich, a mathematician, joined the corresponding author, the thinking process became much more interesting. The involvement of Stanislav Zhuikov, a Master's Degree student then, made it even more exciting. Below the reader will find the outcome of our venture into the future of the architectural process.

Keywords: architecture, synergetics, a third global style, complex self-organizing nonlinear system

The first decade of the new century heads into the homestretch, meaning the end of another phase in history with all of its variety, diversity, ambiguity and contrasts. Global cataclysms, frightening environmental forecasts and political and economic instability stand next to impressive scientific and technological achievements, «information explosion» and improving quality of life. Growing instability *of global development* is becoming obvious, generating lack of confidence in tomorrow and fear of an unknown future. A situation of growing uncertainty, entropy and chaos in the world is naturally reflected in modern-day culture, philosophy, art, and architecture.

Today, the individual needs, perhaps like never before, clear reference points and moral rules. At the same time, globalization, which has affected practically all walks of life, forces us to think and operate universally, globally, on a planetary scale. The eternal questions of the humankind are still awaiting answers, but paramount importance belongs to the *«puzzle of global problems»*. Among these, researchers distinguish the following groups:

1) intersocial problems;

2) issues in the «individual – society» system;

3) issues in the «nature – society» system.

The first group includes problems of war and peace, struggle against terrorism, social and economic problems, rational use of science and technology achievements and neutralization of their negative impact. The second group is presented by issues relating to demography, public health, computerization, human development, and forecasting of the future. The third group includes a range of issues around environmental protection, resources, energy, food, and outer space exploration [1].

While all issues that feature a global scale are open to solution in various areas of science, it is holistic thinking and collaborative action that are capable of yielding appreciable results and ensure success. It is thus worthwhile focusing attention on the decisive condition – *collaborative action*, or synergetics.

1. Synergetics

Synergetics, the science of complex selforganizing systems, is the area of the post-neoclassical period in scientific knowledge that has become a fashionable word but also a very effective tool of scientific research. Evidence of this is growing by the day, coming from professionals in various areas. The high heuristic potential and universal models of synergetics grant it the right to become a new reference point for the world outlook and help the individual find his/her bearings in the chaos of modern-day phenomena. The synergetic world outlook seems to have the integrity that is so much needed today for understanding the surrounding reality.

One of the important postulates of the theory of complex self-organizing systems is the paradoxical idea of determination of the present by the future and, hence, of the past by the present [2, 13, 14]. It suggests the need to review history and take a closer look at the present, in which, following the synergetic principle, we can behold the future and outline a forecast so much wanted in these days of instability and chaos.

At the turn of the 20th century, and of the third Millenium, the mankind is already experiencing the influence of the nascent new world. As we stand poised at the start of this complex and, probably, long process, it is essential to comprehend the past and the present in order to have an idea of what is coming. Knowledge of the future, be it in the form of hypotheses and assumptions based on the past and the present, will help draw up a plan of further action and find fundamental solutions to current and prospective problems.

We believe architecture is in a position to make a meaningful contribution to this forecast. Its role of a «prophet» in the socio-cultural dimension is important and doubtless. The «architectural symbiosis» of science and art, of the rational and the irrational, of practice and theory gives birth to a material product imbibed with spirituality, which in its broadest sense may be called *architectural form*. First and foremost, it materializes the world outlook of this or that time and this or that society. But an understanding of architectural form cannot claim to be complete if it lacks information on the process of its emergence, i.e. *architectural form generation*. This process is underpinned by common values and specific conceptual principles pertaining to a specific reality.

The results of any process are inevitably subject to review and evaluation. In the theory of architecture and art, the most adequate and, thus, popular «descriptive means» for architectural forms is the concept of *style*.

2. Global Style

In spite of having deep historical roots, the notion of style was introduced into art studies in the mid -18^{th} century by the German archeologist J.Winkelmann. Since then, for 250 years style has been the focus of research for many a researcher: H. Wölfflin, E. Cohn-Wiener, M. Dvorak, W. Gropius, E. Cas-A. Riegl, sirer, M. Ginzburg, A. Losev, D.S. Likhachev, V.A. Oparin, A.I. Kaplun, A.A. Rayevsky, N.G. Eliner, Ye.N. Ustiugova and others. The majority of the research works devoted to style in art focus on style formation mechanisms in art and architecture including philosophical, cultural, semiotic, and systemic/synergetic aspects.

The accumulation of knowledge has led to the 'fouling' of the concept of style in architecture and, generally, in culture with excessive information, often repetitive with some variations. Despite this 'bundle' of information around it, style has remained, to this day, the most universal and popular concept and a descriptive means in art and, in particular, in architecture. However, the well-known problem associated with this concept, i.e. its paradoxical uses (on the one hand, it is used to express a specific stylistic characteristic, for example, the style of an author or the style of a building, on the other hand, it denotes certain uniform properties on the scale of epoch or region), is no less relevant today.

It should be noted that modern-day art, characterized by pluralism and poly-stylism, creates even greater confusion. Thus, the concept of style is used to label a certain concrete stylistic phenomenon that exists in parallel to an ocean of others. It is obvious that this concept *per se* cannot accommodate the current frameworks and scales that have grown to the global level and, consequently, cannot perform a uniting function with regard to the «motley» and «mosaic» picture of art in the contemporary globalized world [11]. We need other, more universal and capacious categories and concepts capable of contributing more clarity and order to the information chaos. In architecture, the need for such a universal concept seems to be well met by the notion of *global style*.

The notion of 'global style' was first used by Selim Khan-Magomedov [3, 12] to denote architectural styles, movements and schools falling within one architectural form-building system based on common art composition techniques and means of expression reflecting world culture at a specific time and eternal laws of human existence. The ability of a system to operate on global level and overcome religious, mental and ethnic constraints imparts the quality of universality to it.

To date, two global styles have arisen in architecture. *The first is Classical (Fig. 1)* based on the Greek Order, which has always been present in architecture in this or that form for over two millennia. The Greek Order architecture is perceived uniformly across the world as simply «architecture». The elements of the Order are often used as iconic signs and symbols of architecture.

The second global style is represented by the 20th century Modern Movement, also referred to as «Avant Garde» or «Modernism» (Fig. 2). Avant Garde, dating back to the first third of the 20th century, set itself in opposition against the «Classical Order». Being oriented to «left-wing» fine art and to science and technology, the new style 'extracted' from the Greek Order architecture its essential geometric and constructional forms and discarded the traditional decorative elements that may betray the pertinence of architecture to this or that culture. The «sterility» of the Modern Movement raised it to the level of a universal style [10, 12].

3. The Emergence of a Third Global Style from the Viewpoint of Synergetics

The change from one global style to the other was preceded by a period of transition and growth in instability and chaos. The first global style ended up in eclecticism, and the second one in postmodernism. This obvious historical analogy suggests the hypothesis of a third global style, a likely future of architecture [4, 5]. A synergetic approach may enable us to gains an insight into this situation.

It seems not only justified but also self-evident to apply synergetics to architecture. The theory of self-organization has the advantage that its concepts are versatile and source data may be easily converted between various areas of science. The science of complex self-organizing systems acts as a meta language making it possible to link together and 'translate'

Architecture

any scientific fields using universal principles. In synergetics, we can distinguish seven such principles:

- 1) homeostaticity;
 2) hierarchy;

- 3) nonlinearity;

- a) openness;
 b) instability;
 c) dynamic hierarchy;
 c) observability [6, 7, 9, 12, 13].



Fig. 1. Architecture of the first global style. Classical Style in Architecture

Architecture



Fig. 2. Architecture of the second global style. Modernism

Consideration of architecture as a complex self-organizing nonlinear system enables one to find clear, more profound relationships between the architectural process and the reality.

1) *Homeostaticity*. Homeostasis is a relatively stable state enabling a system to pursue its

purpose, the attractor. The programmatic function of architecture is, first of all, to meet human needs. As material needs are met, other higherlevel, spiritual needs arise, which are the driving force behind progress and human development. Material and spiritual needs and interests stimu-

late and form material and spiritual culture. Architecture is an integral part of culture where it operates at the interface between the material and spiritual components, being a kind of binding element (Fig. 3). In contrast to art, however, this bond is much stronger and much more interdependent. Direct interaction between material and spiritual cultures during critical moments in history transmute an architectural system from one steady state to another. Discoveries in the material sphere inevitably entail certain changes in spiritual preferences, and vice versa. For example, the invention of «motion pictures» by the Lumière brothers brought about a new form of entertainment, which then resulted in the emergence of new functional building type and image, i.e. cinema. The development of perspective drawing generated a new approach to the construction of architectural space in the Renaissance.

If we were to speak specifically about homeostasis in architecture, generally a stable state for an architectural system would be represented by global style.



Fig. 3. Architecture in the system of culture. The synergy model

2) Hierarchy. The principal method of structural hierarchy organisation is the compound nature of higher levels in relation to subordinates. Among the huge number of elements in a self-organizing system there are most stable elements which subordinate all other elements in such a manner that they can be excluded from consideration. This subordination, however, is more of a consensus rather than compulsory. There is a subordinating element, or a parameter of the order, on each of the hierarchy levels. When we consider two neighbouring levels in a state of homeostasis, the principle of subordination means that the longer living variables control the shorter living ones, and a superior controls the subordinate. What is order for the lowest level is an unstructured element of chaos, «building material», for the top level.

In architecture, it is possible to distinguish the dominant, top level – architectural form (Fig. 4) the supreme characteristic of which is integrity implemented in the Vitruvian triad *«firmitas, utilitas, venustas».* These integral elements that distinguish architecture from art or simple utilitarian construction are parameters of order for shorter living elements of the subordinate level levels: materials, processes, means, organization, mechanisms, machines – all employed in creating an architectural form. Thus, for example, knowledge of theoretical mechanics is essential for ensuring the reliability and durability of building structures, while building pigments and paints are needed not only for protecting the structures but also for imparting corresponding aesthetic qualities to them.

3) *Nonlinearity* is a violation of the principle of superposition in a certain phenomenon: the response to the sum of stimuli is not equal to the sum of responses to these stimuli. The nonlinearity of a system lies in its evolution in

a variety of ways; bifurcations in possible ways of development, and irreversibility of evolution. Periodic alternation of various stages in the processes (enhancement and attenuation of the intensity of processes) is also a reflection of nonlinearity.



Fig. 4. The synergy model of architectural system

Like any «human-dimensioned», social system, architecture is non-linear by nature and has several alternative ways of development rather than just one. These ways are many, and they are determined, first of all, by the spectra of the attractor structures, which are inherent, «genetically» embedded in the basic properties of the system. In the history of architecture, there are lots of examples of modal changes. A good illustration is provided by the change of styles: Antiquity and Hellenism, Romanesque architecture and the Gothic style, the Renaissance and the Baroque. Dmitry Likhachev's concept of a romantic and a rationalistic creativity method confirms this (Fig. 5).



Fig. 5. Periodisation of Western European architectural styles according to S. P. Zavarikhin (based on Dmitry Likhachev's concept of creativity methods)

EUROPEAN JOURNAL OF NATURAL HISTORY №3, 2013

30

The position of architecture at the interface between the material and spiritual cultures is proof that architecture is an open system (Fig. 3). The main properties of the architectural system are, no doubted, human related; architecture is driven by human will. In spite of this, however, there are external factors and conditions influencing both the individual and architecture. Thus, for example, climatic conditions dictate the need for certain architectural forms, irrespective of the individual's internal spiritual intentions (Fig. 6).



Fig. 6. The synergy model of architecture in the system «nature – man» (according to N. M. Yalandina, V. N. Babich).

5) Instability is the supersensitivity of a system's non-stationary elements to small influences or fluctuations, which, when in a state of supreme intensity, lead to probable chaotic disintegration of these structures or to «phase transition», that is transition to a new steady state (homeostasis).

Any long process reaches a moment of supreme intensity, a «boiling point» when the rate of development increases and instability and chaos grow dramatically. In this context, it is difficult for the system to adapt to instantly changing conditions. At such critical moment, the threat of a super-explosion and disintegration grows sharply. However, there is also a second scenario – of a «phase transition», change of the attractor structure, change to a new mode of functioning. At a moment of supreme intensity, when the system is in a state of a chaos of doubts and choices against the backdrop of high motivation, something new is born. It is, therefore, especially important to manage the situation proactively during such periods. Moments of supreme intensity in architecture frequently coincide with those happening in society. This can again be illustrated by the example of changes of style in architecture and art; moreover, it is possible to identify specific concrete stylistic phenomena associated with moments of supreme intensity.

6) Dynamic hierarchy. In a broad sense, dynamic hierarchy means properties of the system which are not inherent in its elements taken separately but emerge as a result of integration of these elements into a uniform, complete system. From the point of view of synergetics, this generation of parameters of order when we have to consider interaction between more than two levels and the very process of establishment of parameters of order is essentially a process of disappearance and then birth of one of them in the course of interaction between a minimum of three hierarchical levels in the system. Dynamic hierarchy is the main principle underlying the passage of bifurcationsby the system, the birth and death of its hierarchical levels. At a point of bifurcation, collective variables, parameters of order at macrolevel recover their degrees of freedom in chaos at microlevel, dissolving in it and increasing its degree of chaos. Then new parameters of order are born at new macro-level in the course of direct interaction between mega and microlevels.

An architectural system may be presented as interaction between three hierarchical levels (Fig. 4). The top megalevel is represented by architectural form understood in its broadest sense, as a material embodiment of an architectural phenomenon, a real physical product of architectural activity. We may distinguish three key parameters of order, the meanings of which are associated with the integrity of architectural form formulated in the Vitruvian triad. The parameters of order at mega-level are:

1) structural system and decor;

2) architectural typology, use;

3) image (materialized world outlook of society).

The lowest microlevel is represented, literally, by the building material which the architectural form is made of. The parameter of order in this case may be any of the known or invented real materials, such as wood, stone, metal, plastic, etc. In the development of materials the tendency is towards from natural and combined materials to artificial ones, which naturally influences architectural forms as well.

If «what?» has been determined at megalevel and «from what?» at microlevel, the macrolevel should «answer» the question «how?». This «how?» represents technologies and means of building construction, without which the processing of material and construction of architectural forms is simply impossible. The parameters of order here are knowledge and practical skills, means and techniques of organization in building construction industry.

Interaction between these levels promote the development of the entire architectural system, but the evolutionary process occurs only where appropriate conditions are available. For architecture, such appropriate conditions are various manifestations of material and spiritual cultures, namely: world outlook reference points of society and the individual, moral values, knowledge and achievements of science and technology basis, achievements in art during this or that time. Context and understanding of the environment in which architecture exists are, of course, important. Architecture as a complex open nonlinear system exists only in interaction with other systems. Its orientation to co-evolution with nature and man become important. All is interconnected in this world, and nothing comes and goes without inter-reflection.

7) Observability. This principle implies relativity in the perception of various hierarchical levels of a system, various scales, and various tempo-worlds. Observation of a microlevel from within makes it possible to see the order. But as soon as the scale has increased, for example, to a macrolevel, the ordered structure of the lower level appears as chaos.

A vivid example is the situation with the concepts of architectural science, more specifically, the above mentioned concept of "style". Order in the styles palette of modernday architecture will be visible until observation occurs from within the level of the stylistic phenomena proper, such as major styles, movements, directions. As soon as we go over to the level of a global style, that is a higher hierarchical level, the situation is seen from another perspective.

With regard to 'human-dimensioned' systems such as architecture, it is reasonable to distinguish one more principle – replication. This principle is a kind of extension of the preceding one. In the broad sense of the word, replicator is a certain manifestation of the environment, a self-reproducing unit of information or object. Replicators are capable of copying the principles of functioning and evolution of the environment inside which they exist. However, not only do they just «adopt» the programmes of functioning of their environments and systems but may also enter into conflict with the environment and the original system, the reasons being various: delays in the reproduction of the surrounding reality, inadequate conditions of environments, failures in the process of replication.

In architecture, the most illustrative example of replicator is the phenomenon of architectural style and, naturally, global style. Reflections on the nature of global style suggest that the time of existence of a certain type of social order (Table) corresponds to the period of domination of one of the global styles in architecture [1]. Traditional society is associated with the first global style, Greek Order architecture; industrial society with the second global style, modernism; postindustrial society is likely to be associated with a third, nascent, global style. Chronological correspondence between global style and social order is determined by the nature of comprehension of the being by architecture.

Conclusions

Thus, within the first global style architecture is perceived as art, craft. The construction of any building or structure was organized empirically, with the use of common techniques. It should be noted that up until the Renaissance architectural design existed as simple drawings used only when they were needed. The architecture of the first global style existed under the Historical interrelation between architecture, social production, technology and science

motto «Beauty will save the world». By way of confirming this it may be noted that many a historical monument of architecture are perceived by practically all people in the same way – as works of art. Thus, we could for the architecture of the first global style offer a new name, fully describing its essence, *«Architec-ture of Arts and Crafts»* (Fig. 1).

ARCHITECTURAL GLOBAL STYLES	SOCIETY TYPE	KEY EVENT OF HISTORY	PRODUCTION	TECHNOLOGY	SCIENCE
THE FIRST. ART-CRAFT ARCHITECTURE	TRADI- TIONAL	The Neolithic Revolution (the first agricultural revolution). Around 10,000 BC	Manual labour	Based on empirical and conventional methods and skills	Pre-science. There was sporadical use of science for production
THE SECOND. ART-TECH ARCHITECTURE	INDUSTRIAL	The Industrial Revolution. Period from the 18th to the 19thcentury	Mechanized, manufactory	Industrial	Science was knowledge system of world's rules and laws. Since the middle of 19-th century science has become direct industrial power of society. Science was technological application to production.
THE THIRD. SCI-TECH ARCHITECTURE	POST- INDUSTRIAL	Modern scientific and technological revolution. Period from middle of 20-th century to present	Scientific information, automated	Information, bioengineering, robotics, microelectronics, nanotechnology	There are differentiation and integration of technics, natural and social sciences. Science is becoming direct production power and direct social power. Production is becoming technological application and use of science.

The second global style, which arose during the industrial revolution, may be called «Art-Tech Architecture» (architecture as the art and product of technology) (Fig. 2). This architecture, if we recall history, was profoundly influenced by 'leftwing' art «inspired» by progress in science and technology. The architecture of the second global style was still perceived by architects (less so by lay people) as a work of art but with other paradoxical reference points. In order to understand this paradox, suffice it to quote some coryphees of architecture of that time: «Less is more» (L. Mies van der Rohe); «Form follows function» (L.Sullivan); «The house is a machine for living in» (Le Corbusier). The idea of progress in technology was clear to all; the idea of progress in art was clear only to its creators [10].

Having passed the next bifurcation point – which, it should be noted, lasted for practically the entire century and manifested itself in an acute form in architecture only in postmodernism, architecture is yet in a state of chaos and crisis. Being within it, it is important to select an optimum way of development, one that corresponds to the internal aspirations of architecture and man. Analysis of the modernday situation of postindustrial society suggests a conclusion that architecture is now based on science and technology, which suggests that the architecture of the third global style may be called «Sci-Tech Architecture» (Fig. 7). Indeed, today architecture instantly absorbs any scientific discovery or invention and «tries it on». Architects are no longer be surprised by nonlinear CAD design - suffice it to cast a look at the latest projects and design concepts for buildings and structures that feature forms that were inconceivable in recent past [15,16]. In spite of extensive employment of achievements of science and technology in architecture for new experiments with form, it is becoming important to find solutions to global problems by the means that are available to architecture. Modern-day architects are making effort to resolve these problems. In this connection we can identify a general trend in the architecture of the third global style. It consists in that form-making in modern-day architecture, gravitating to wildlife imitations, is trying

to return to the tradition of likening man-made environment to the natural one. This time, it is not a «stylization» of nature as it was with the Greek Order architecture, or conquest of nature

as in «modernism». It is an imitation of the natural, as best as possible, by means of science and technology as a source of innovation for architecture [8, 16].



Fig. 7. Contemporary Architectural Projects as Signs of Emerging Third Global Style.

Thus, architecture cooperated and is cooperating with the environment and reality, with anthropo- and bio-spheres. It is becoming distinctly visible owing to synergetic knowledge. For architectural creativity, it is still important to produce a beneficial effect on society and nature. This, however, requires global thinking, common resonance, co-evolution with nature and man, and steadfast following after internal, transcendental values.

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PHARMACOLOGICAL-KINETIC RESEARCH AND STUDY OF AN ACUTE TOXICITY OF THE PREPARATION PYRACIN-RG IN AMPULES

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Nowadays, during an early diagnostics and treatment of a number of diseases, a special attention is paid to pathologic conditions that are linked to the lack of zinc microelements and vitamins of group B in an organism. Multiple researches show that zinc participates in almost all stages of cell formation. A special interest towards zinc is linked to its part in nucleic exchange, processes of transcriptions, stabilization of nucleic acids, proteins, and specially components of biologic membranes, and also in the exchange of a number of vitamins. Zinc has been found in composition of over 300 ferments. A uniqueness of zinc bio-efficiency is that none of elements is contained in such a number of ferments and carries out so much different physiological functions. Diversity of physiologic functions of zinc is defined by combinations of this microelement with different vitamins. Particularly, a correct combination of zinc and pyridoxine provides a maximum efficiency of both components, and also a refill of a deficit in an organism that is an urgent solution for a number of problems of maternal diseases, growth and development of a child, maturing, metabolism.

Keywords: early diagnostics, zinc microelements, vitamins of group B, biologic membranes

Thus, researches of recent years point out a special attention towards therapeutic combinative effect of pyridoxine and zinc. During the development and introduction of new medications into medical practice, pharmacological researches play a special part, as their results allow one to receive accurate quantitative data on absorption, distribution, metabolism, and extermination of a medicine, and also show a correlation dependence of pharmacologic activity and pharmacologic parameters of a medication [1, 2].

Pyracin is a complex solution of zinc microelement with pyroxidin. Due to pharmacologically rational doze of the preparation components, Pyracin has a wide range of therapeutic effect. Studies of metabolic activity of the preparation show that Pyracin has hypolipidemic and anti-atherosclerotic activity, decreases contents of cholesterol in periphery blood, general lipids, treglycerides, lipoproteins of low density, products of peroxide oxidation of lipids, increases contents of lipoproteins of high density and phospholipids. Under sugar diabetes with hyperlipidemia, the preparation decreases contents of glucose, pyruvate, and lactic acid in blood. Besides, the preparation is widely used in treating dermatologic-venereologic pathologies in terms of skin displays that are linked to a deficit of zinc (vitiligo, inflammatory and seborrheic alopecia, pustular and phegmonous acne, acrodermatitis enteropathica, difficult-to-heal skin ulcers) [3].

Objective: pharmacologic kinetic research of acute toxicity of the medical preparation «Pyracin-RG», injection solution 0,25%, produced by Joint Enterprise «Remedy Group», Tashkent, Republic Uzbekistan.

Finding a preparation dose for pharmacologic kinetic research was carried out via studying an acute toxicity of «Pyracin-RG». The research has been implemented on white pedigreeless mice of both sexes of mass 18–20 g, 6 animals per a group, total of 24 mice have been used.

The tested solution was introduced to animals one time hypodermically in dose: 15; 2; 22,5; 25 ml/kg.

After a single introduction of the medication, the animals were observed hourly on the day of introduction, 3 times a day on days 2–3 after the introduction, and once a day during the following 7 days of the research. We have examined general condition, behavior, fur pigment, breath, heartbeat, moving activity, and death of the mice.

Under the dose of 15 ml/kg, the first 15 minutes we have been observing breath of increased frequency, grouping, the mice moved slowly, scratched and washed. Under the dose of 20 ml/kg, during the first 45 minutes, a heavy short breath, slow movement, itching, and grouping has been observed. The dose of 22,5 ml/kg led to a heavy short breath, immobility, grouping during the first 1,5 hours, and also strong itching during the first 15 minutes.

Under the dose of 25 ml/kg a strong itching, heavy short breath, immobility, grouping has been observed during the first 2 hours.

Death of animals has not been observed after the introduction of «Pyracin-RG» (Table 1).

Therefore, the preparation does not have a lethal-toxic effect in the studied doses.

Pharmacologic-kinetic parameters of the medication have been estimated according to a quantitative content of zinc in organs and tissues.

43 pedigreeless white male rats of body mass of 180–200 gr have been used in the experiment. A control group has been formed of 3 animals, definition of pyracin in fecal mass has been carried out among 5 animals, and 5 rats have been selected at each checkpoint. The studied preparation was introduces hypodermically to the experiment rats in dose of 5 ml/kg. Tests of blood and organs have
been received in 30 minutes, 1, 2, 3, 4, 6, and 24 hours after decapitation of animals. Fecal masses were also collected once available, as the main criterion of zinc excretion is gastro-intestinal tract. Fecal losses of zinc consist of non-absorbed and secreted zinc endogen.

	Table 1
Results of defining an acute	
toxicity of «Pyracin-RG»	

Number	Dose (ml/kg)	Number of animals/total dead (units)				
1.	15	6/0				
2.	20	6/0				
3.	22,5	6/0				
4.	25	6/0				
Lethal Dose ₅₀ > 25 ml/kg						

Organs, blood serum, and faeces have been analyzed via method of optical-emission spectrometry with inductively-linked argon plasma. 0,500–2,000 of the examined organ have been weighed and transported to teflon autoclaves. 3 ml of nitrous acid and 2 ml of hydrogen peroxide have been added to autoclaves, then they were closed and placed into a facility of microwave dissolution BERGHOF, equipped with the software Speebwave[™] MWS-34+. After the dissolution contents of autoclaves were transited into a 50 ml measure retort and have been added up to the mark of 2% nitrous acid.

Definition of the studied substance has been carried out on optical-emission spectrometer with inductively linked argon plasma Optima-2100 DV (USA). Optimal wave length of the defined channel Zn has been used, with it the element discharges its maximum emission of the absorbed energy. Quantitative content of the studied element Zn in samples was calculated according to the formula (mkg/g):

$Zn = N \cdot 100/C,$

where N is a quantity of metal from the graphic (mg/kg); C is a concentration of the studied sample in the prepared solution.

Organs and faeces of rats contain certain amount of zinc. Therefore, via excluding control data from the experiment rats, we find the quantity of zinc that has penetrated them with the preparation (mkg/g).Considering zinc contents in pyracin, we have re-calculated the preparation dose and established its concentration on the studied object. Multiplying the received results by weight of each organ, we have calculated contents of pyracin in an organ, it is shown in Table 2.

			2	e		< e e	/		
Number				Checkpoints (min	nutes)				
Number	30 minutes	1 hour	2 hours	3 hours	4 hours	6 hours	24 hours		
1	2	3	4	5	6	7	8		
	Liver								
1	705,1	1095	30,779	257,28	716,38	756,74	282,67		
2	607,4	1072	29,74	287,72	727,79	703,6	343,57		
3	584,5	932,6	24,577	346,81	843,02	828,43	288,32		
4	570,2	959,4	24,725	347,1	842,18	726,1	308,74		
5	537,7	842,9	21,383	340,28	781,25	797,28	298,47		
Average	601,0±63,47	980,40±103,9	26,241 ± 3,92	315,84±41,089	782,12±60,398	$762,43 \pm 50,95$	$304,35 \pm 24,076$		
				Kidney					
1	52,01	56,24	54,758	45,636	83,135	59,157	19,509		
2	43,29	40,64	52,353	60,617	94,111	44,23	25,013		
3	38,4	44,46	57,745	73,903	125,42	50,717	21,073		
4	34,3	43,85	48,650	72,144	107,49	54,716	24,555		
5	36,72	56,12	44,479	67,145	113,83	48,852	24,537		
Average	40,940±7,007	48,260±7,372	$51,5976 \pm 5,188$	63,889±11,433	$104,\!800\pm16,\!565$	$51,534 \pm 5,68$	22,937±2,48		
				Lungs					
1	91,82	15,16	1,327	—	_	-	-		
2	121,1	11,34	1,358	—	_	-	-		
3	79,09	8,832	0,811	—	-	-	-		
4	91,52	11,53	1,132	—	-	-	-		
5	110	10,3	1,225	-	-	-	-		
Average	98,71 ± 16,69	$11,43 \pm 2,34$	$1,171 \pm 0,21$	-	-	-	-		
				Lien					
1	2,893	7,259	128,835	22,963	43,625	20,184	7,6677		
2	2,252	8,845	109,591	27,706	43,754	32,539	17,309		

Ouantitative contents of Pyracin in organs in faeces of rats (mkg/organ)

EUROPEAN JOURNAL OF NATURAL HISTORY №3, 2013

Table 2

38

End of the table 2

1	2	3	4	5	6	7	8
3	4,046	10,39	132,89	30,136	38,11	40,172	12,327
4	3,466	7,617	97,7924	41,746	38,809	31,505	14,075
5	2,757	4,658	81,99	48,852	46,979	29,585	13,111
Average	$3,083 \pm 0,69$	$7,754 \pm 2,12$	$110,22 \pm 21,28$	$34,28 \pm 10,683$	$42,255 \pm 3,72$	$30,797 \pm 7,16$	$12,898 \pm 3,48$
				Faeces			
1	1,291	-	-	-	-	125,674	1830,598
2	-	-	12,573	-	-	123,707	1924,699
3	0,627	-	-	-	—	130,456	1794,714
4	1,047	-	14,387	-	—	127,464	1728,33
5	-	-	8,997	-	_	128,44	1742,372
Average	$0,988 \pm 0,335$	-	$11,985 \pm 2,742$	-	_	$127,14 \pm 2,58$	$1804,143 \pm 78,87$
		-	i	Blood (mkg/ml)		-	
1	10,794	18,966	20,406	73,628	24,062	3,934	-
2	10,730	19,396	20,600	73,134	24,040	3,848	-
3	10,772	19,246	20,492	73,522	24,084	4,342	-
4	10,622	19,482	20,126	73,780	24,126	4,300	-
5	10,686	19,352	20,642	73,306	24,040	4,256	-
Average	$10,72 \pm 0,068$	$19,29 \pm 0,18$	$20,45 \pm 0,20$	$73,46 \pm 0,26$	$24,06 \pm 0,02$	$4,136 \pm 0,22$	-

According to the received data on the amount of pyracin in rat blood we have carried out calculations of pharmacological-kinetic parameters for the studied preparation in the application Borgia [4, 5]:

 T_{max} – period of achieving maximum concentration, minutes;

 C_{max} – maximum concentration, mkg/ml; Period of half-absorption, K $\frac{1}{2}$, minutes; Clearance, Cl, ml/min; Area under the curve, AUC;

Average period of hold, MRT $(0-\infty)$.

Pharmacological parameters are provided in Table 3.

Table 3

Pharmacological-kinetic parameters for «Pyracin-RG», solution of 0,25%

Pharmacological-kinetic	Parameter indexes
parameters	for serum
Tmax, minutes	$162,4 \pm 0,894$
Cmax, mkg/ml	$75,123 \pm 0,375$
Ka _{1/2} , minutes	$53,801 \pm 1,041$
T _{1/2} , minutes	$41,992 \pm 0,230$
Cl, ml/min	$0,0438 \pm 0,0004$
AUC	$22529 \pm 732,1$
MRT (0-∞)	$19,54 \pm 0,151$

Thus, the received research data of the amount of pyracin in organs and faeces of rats in definite time periods -30 minutes, 1, 2, 3, 4, 6, and 24 hours after the introduction

of medicine in calculations (mkg/g) show its concentration in blood, liver, kidney, lungs tends to decrease in later periods of the experiment in comparison to its earlier periods. On the other hand, concentration of pyracin in lien and faeces tends to increase, obviously, due to the maximum excretion and accumulation of zinc solutions in the studied biomaterials.

The provided research has shown that in 24 hours after the medicine introduction, 72%of pyracin is removed from rat organism with faeces. In 24 hours after the introduction the medicine cannot be found in an organism. Maximum contents of pyracin in lungs are observed is observed during the first 30 minutes after the introduction, and it is removed in 3 hours. Maximum concentration of pyracin in lien is observed in 2 hours after the introduction, and in 24 hours only 0,05% of the preparation remains. Maximum content of pyracin in kidney is observed in 4 hours after the introduction. After 24 hours of observation 0,9% of the preparation remains in kidney. Concentration of pyracin in liver reaches its maximum concentration in 4-6 hours after the introduction, and 1,23% of the medicine remains in it after 24 hours.

Resume

1. «Pyracin-RG» 0,25% solution does not lead to death of an animal after a single introduciton.

2. Results of the pharmacological-kinetic research show that a maximum concentration of pyracin in blood serum equals 75, 1,23 mkg/ml, period of achieving it – 2 hours

40 minutes, and period of its half-distribution in blood equals 42 minutes. In 24 hours after the introduction Pyracin cannot be found in blood. 72% of the preparation is removed from rat organism with faeces.

3. Study of Pyracin distribution dynamics throughout organs has shown that maximum contents of pyracin in lungs is observed is observed during the first 30 minutes after the introduction, and it is removed in 3 hours. Maximum concentration of pyracin in lien is observed in 2 hours after the introduction, and in 24 hours only 0,05% of the preparation remains. Maximum content of pyracin in kidney is observed in 4 hours after the introduction. After 24 hours of observation 0,9% of the preparation remains in kidney. Concentration of pyracin in liver reaches its maximum concentration in 4–6 hours after the introduction, and 1,23% of the medicine remains in it after 24 hours.

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PHASE CONJUGATION BY STIMULATED BRILLOUIN SCATTERING IN HEXANE

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In the work there is described laser facility, which consists of master oscillator with neodymium glass, quantum amplifier and radiation frequency doubler. High-quality single-frequency radiation at 530 nm wave length with regulated power was used for examination of frequency and energy characteristics of stimulated Brillouin scattering (SBS). With the help of Michelson interferometer and high-speed recording equipment with the method of light heterodyning there was examined the quality of phase conjugacy by SBS in hexane. It was showed that backward scattered wave consists of inverse and non-inverse components, relation between them can be changed either with wave pump power or its phase strong distortion. It turned out that temperature changes in the frequency component of the MB in stimulated scattering are less than in spontaneous thermal scattering.

Keywords: stimulated scattering, phase conjugacy, heterodyning

Introduction. Stimulated light scattering is a process of non-linear interaction of light waves with modes of intrinsic motion environment, at the result of which the intensity of powerful exciting wave decreases and the intensity of weak scattered wave increases. Stimulated light scattering is accompanied with the wave front inverse. In this work there were examined energy and frequency characteristics of stimulated Brillouin scattering (SBS) and there was found out their connection with wave font reversal (WFR).

Experimental facility for SBS study. Experimental facility consisted of single-frequency laser and Michelson interferometer, which served for carrying out and registration of beatings of light waves that are scattered in reference and signal channels.

Laser represented the master oscillator, which was producing light at $\lambda = 1060$ wave length, quantum doubler and frequency doubler. Master oscillator consisted of neodymium glass rod (Fig. 1), concave mirror M_1 , exit flat mirror M_2 , which was combined with longitudinal-mode selector, diaphragm D, eliminating undesirable transverse mode. The crystal of lithium fluoride with F^{2+} color centers was put inside for the modulation of laser resonator's quality. Light impulse in the generator with the help of prisms P_1 and P_2 was directed to three-pass amplifier, which was made like master oscillator (only elements for modulation of quality and mode selection were absent). So that generator's work wasn't be influenced by superluminescence of amplifier, there was set one more modulator of lithium fluoride between these prisms. After the amplification, light impulse got onto KDP crystal, where the radiation transformed into second harmonic with $\lambda_2 = 530$ nm. So that fundamental radiation didn't get into register part of facility, on the way of laser impulse there was put the bluegreen light filter. Frequency doubler had one more important role, because of it the laser got undone from the radiation of stimulated scattering, what didn't allow wave of SBS strengthen manyfold in generator.



Fig. 1. Optical scheme of single-frequency of neodymium laser with frequency doubler: Nd – active element; M1–M4 – mirrors; P1–P3 – right-angle prisms; LiF – crystal of lithium fluoride; KDP – radiation frequency doubler; F – light filter; He–Ne – laser alignment; F and F1 – photocells; KL1 – wedge-shaped glass plate; D – diaphragm; E – sceen Initial radiation at $\lambda = 1060$ nm wave length had regulated energy from 10 to 240 megajoule, duration of impulse at halfheight – about 30 ns and divergence not more that 0,5 millirad. The coefficient of primary emission's transformation into second harmonic was about 15%. With the help of photoelement F1 and storage oscillograph C8-14 there were controlled the time dynamics and the energy of exciting radiation.

For analysis of energy and phase-frequency characteristics of scattered radiation there was used the method of heterodyning at the base of Michelson interferometer (Fig. 2).



Fig. 2. Optical scheme of examination of spectral, energy and phase-frequency characteristic of SBS experiment: K1, K2 – cells with hexane; L1, L2 – lens (F = 50 cm); FP – phase plate; K1, K2 – wedge-shaped glass plates; F2–F4 – coaxial photocells; E – screens for tuning;M5, M6 – mirrors

Radiation of second harmonic was divided with semitransparent wedge KL1 into two beams of approximately equal intensity, then each of them was focused with corresponding lens on the cell with hexane, where SBS arose and propagated backward at the angle of 180°. After second KL1 reflection it was mixed at the F4 detector with pass band of 5 GHz and registered with high-speed storage oscillograph C7-19. As the reference beam while heterodyning there was used SBS, excited with collimated pump beam in the cell of hexane K1 at 20°C temperature. Pump beam was focused on the cell with Л1 lens and controlled with photoelement F3 and oscillograph C8-14. Signal beam while heterodyning represented SBS radiation, which appeared in the K2 cell of hexane as well, but at 35°C temperature. Radiation was focused with L2 lens here. Signal impulse was controlled with photoelement F2 and oscillograph C8-14. Scans of all oscillographs were released with single signal from photodetector F (see Fig. 1): one light impulse of master generator allowed to register four signals simultaneously: pump wave signal (F1), SBS at reference (F3) and signal (F2) channels and signal on their residual frequency with photodetector (F4). Initial phases of signals were equalized with cable delay lines of corresponding length.

Experiment was carried out in the following way. Hexane in both arms of interferometer was initially room-temperature. In these conditions photodetector registered smooth impulse of SBS radiation. When heating the hexane in K2 cell the frequency of SBS decreased, and there arose the signal as beatings at residual

frequency of SBS in the photodetector F4, these beatings were coming from reference and signal channels. From oscillograms there were evaluated the frequency of beatings Δv , as value reciprocal to time interval, which separate two contiguous minimums, and the visibility $V = (I_{\text{max}} - I_{\text{min}})/(I_{\text{max}} + I_{\text{min}})$. Here I_{min} is an average value of minimums' intensity, these minimums are situated to the right and to the left of corresponding maximum. Error of beatings' frequency measurement didn't exceed 5%, error of visibility measurement didn't exceed 10%. The coefficient of transformation of peak power of laser radiation P into peak power of SBS in both channels P_i (*i* = 1, 2) was evaluated with formula $\eta = P_i k_i / P$. Here k_i is the value, which takes into consideration the inequality of wave pump intensity at reference and signal channels. The value n was evaluated up to 6% accuracy.

Results of research and their discussion

According to a theoretical work [1] the coefficient of transformation is bound to tent to one when pump power increasing. The dependence of transformation coefficient η on laser radiation power, gotten during our experiment, is shown on Fig. 3.

It's obvious that in the whole examined interval of pump power value $\eta < 1$. In K2 cell there appeared SBS radiation directed towards pump wave. It contained both inverse (coherent) and non-inverse components of SBS. Inverse component propagated only backward into solid pump beam corner of 0,5 millirad, non-inverse propagated into the whole aperture of recording system.



The same was observed in the reference channel. If radiation of SBS in it is diaphragmed in the way that photodetector has only inverse radiation passing and then mix it with signal wave, it will become possible to judje the quality of wave reversal by the visibility of beatings. How visibility of beatings changes with pump power increasing is shown at Fig. 3b. Comparing to Fig. 3a it can be observed that gain saturation of SBS is accompanied with quality of phase conjugacy deterioration, fraction of inverse component decreases, causing decrease of beatings' visibility. An analogous regularity was registered in work [2].

But the quality of phase conjugation by SBS at the signal channel can be considerably increased, if the pump wave passes through phase (matt) plate before the input to cell. In that case pumping case become heterogeneous and stokes wave of SBS acquire the structure, which is more accurately reversed to pump wave speckle-structure. This wave has primary amplification, other waves discriminate by means of lesser amplification. At Fig. 3a there is shown the dependence of transformation coefficient η on pump power in these conditions. It's obvious that with the same power the deep SBS saturation isn't reached, and the visibility of beatings at Fig. 3b, in contrast to previous case, increases. Thereby if pump wave has speckle-structure, the quality of phase conjugation by SBS increases. but the saturation of transformation coefficient apparently happens with higher power. It should be noted that visibility of beatings had equal value within the limits of whole impulse duration, it concerns all examined values of pump power with phase plate.

The difference of frequencies v_{20} and v_{35} relatively to pumping frequency $\Delta v = v_{20} - v_{35}$ was determined from the oscillograms of beatings, which appear while heterodyning of SBS radiation from the cells of hexane with temperatures of 20 and 35°C. It was gotten as $\Delta v = 1/\Delta t$, where Δt is time between two contiguous minimums at oscillogram. Meas-

urements showed that Δv depends neither on pump power, nor on presence of phase plate on radiation way. Within the limits of whole impulse duration Δv was constant and equal 261 ± 10 MHz. This value can be calculated on the basis of the fact that movement of SBS components relatively to pump frequency [5] is formed with the sound spreading speed v_{i} , with the index of medium refraction *n*, with the scattering angle θ and with the length of exciting light wave λ : $v = 2\lambda^{-1}nvsin(\theta/2)$. As both values v and n do not depend on medium temperature, then v_{20} and v_{35} will be different. Taking into consideration, that during our experiment SBS was excited with the light of wave length of $\lambda_2 = 530$ nm and was examined at an angle of $\theta = 180^{\circ}$, the shift of SBS frequencies within 20 and 35 °C can be written: $\Delta v = 2\lambda_2$ $(n_{20}v_{20} - n_{35}v_{35})$. Using literature information for hexane [4,6]:

Using literature information for hexane [4,6]: $n_{20} = 1,3742$ and $n_{35} = 1,3661$ (at the wave length of 546 nm); $v_{20} = 1098$ m/s, $v_{35} = 1032$ m/s, we get the value $\Delta v = 374$ MHz, what is 113 MHz higher than experimental. Such discrepancy of experimental and calculating results in this case cannot be explained only by linear light absorption, as it is suggested in work [2]. Apparently, other non-linear optical effects have influence on the scattering process [3].

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LIGHT SCATTERING AND PROPAGATION OF ELASTIC WAVES IN SATURATED WATER SOLUTION OF POTASSIUM CHLORIDE RESEARCH

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The analysis of potassium chloride solubility in water showed, that in saturated solution near 22 °C there occurs second order phase transition, which is accompanied with strongly developed fluctuations concentration. Therefore, in this conditions there should be observed anomalous characteristics of light scattering and propagation of elastic waves. With the method of low-frequency light scattering there was experimentally researched the temperature dependence of speed and absorption coefficient of longitudinal hypersound with frequency about 5 megahertz, and also the correlation of integral intensities in Rayleigh triplet's components. The temperature of solution was changing in the interval from 18,6 to 27,4°C. Dependence curves of absorption coefficient and Landau-Plazchek relation on temperature resembled λ – curves within second order phase transitions. Speed of hypersound and ultrasound at 5 megahertz frequency increased monotonously with temperature coefficient of 2,2 m/(sec-degree). Expected dispersion of sound speed – positive or negative – wasn't revealed in work.

Keywords: light scattering, hypersound, fluctuations, phase transition

Phase transition has been attracting attention of researchers for long time because of their effects of many anomalies. Especially interesting are considered to be second order phase transitions (SOPT) and due to isomorphism they are convenient to be researched at binary liquid mixes because of low critical temperature. Most often there were researched mixes of organic liquids [4]. The aim of this work is experimental research of light scattering and ultra- and hypersound spreading at SOPT point's neighborhood in saturated water solution of potassium chloride.

Initial opinion that SOPT appears in it was formed on the base of *KCl* solubility's analysis. Curve of solubility has break in the neighborhood of t = 22-27 °C, derivative of concentration dc/dt changes unevenly. In work [5] it was showed that dc/dt was connected firstly to fluc-

tuations concentration's kinetics $(\Delta c)^2$. They also define the intensity of central component of Rayleigh triplet in the scattered light's spectrum, and the behavior of acoustic waves' spreading depends on them [4].

Molecular light spreading in every clear liquid is owing to optical heterogeneity, which is aroused by isobaric and adiabatic density fluctuations, and concentration fluctuations in solution. Because of different type of their dynamics there is observed a Rayleigh triplet in the scattered light's spectrum – central line and two moved Mandelstam - Brillouin components (MBC). MBC occurs as a result of scattering at adiabatic fluctuations of density, central component occurs at isobaric fluctuations of density and at fluctuation of concentration. Appeared adiabatic fluctuations of density resolve as elastic waves with and give MBC in spectrum. They are moved in frequency to quantity:

$$\Delta v = \pm \frac{2nv}{\lambda c} \sin\left(\frac{\theta}{2}\right). \tag{1}$$

Here n – indicator of liquid refraction; λ – wave length of exciting light; c – speed of light; θ – scattering angle.

light; θ – scattering angle. The width of MBC Γ is defined with absorption coefficient α of elastic waves:

$$\Gamma = \frac{\alpha v}{\pi c}.$$
 (2)

Ration of integral intensities of central component to two MBS (Landau-Plazchek ratio (LP):

$$\frac{I_c}{2J_{MB}} = \frac{I_p + I_c}{I_s},\tag{3}$$

where I_p , I_s and I_c – integral components of light scattered at isobaric, adiabatic fluctuations of density and fluctuations of concentration.

Thereby, from the MBS width move one can define the speed and coefficient of elastic waves absorption, which get to hypersound diapason at 5 GHz frequency. Out of LP ratio one can draw a conclusion about the fluctuations

of concentration dynamics $(\Delta c)^2$, because $I_c \sim \overline{(\Delta c)^2}$.

In this work we have researched the lowfrequency spectrum of scattered light in saturated water solution of potassium chloride in the range of temperatures from 18,6 to 27,4°C, where, apparently, phase transition of higher order exists and where deeply changing fluctuations of concentration should reflect in the spectrum.

Experimental facility included single-frequency laser, producing light at wave length of $\lambda = 632,8$ nm, scanned interferometer of Fabry-Perot and cooled photomultiplier, working as photon counter [2, 3].

To define the speed of hypersound with formula (1) one have to know the indicator of refraction of scattering medium at corresponding temperature and wave length. It was measured at refractometer with the use of the same laser accurate to five decimal digits. Total error of hypersound's speed definition was 0,5%, the coefficient of hypersound absorption and Landau-Plazchek ratio were found out 4% accurate.

Temperature dependence of LP ratio is shown at Fig. 1. It's obvious that to 22,2°C it

increase, then in the narrow range from 22,2 to 23,5 °C it dramatically decreases and to 27,4 °C stays practically invariable. Thereby, LP ratio is anomalous just in that narrow temperature range, where it has jump of *KCl* solubility's derivative by temperature. It confirms the suggestion that both quantities in solution $J_c/2J_{\rm MB}$ and dc/dt are connected with one reason – nonmonotonic change of fluctuation of concentration.



Fig. 1. Landau - Plazchek ratio at different temperatures

Change of medium size of fluctuations always leads to anomalous behavior of medium's acoustic characteristics [4]. At Fig. 2 there showed the results of hypersound absorption's coefficient research. As LP ratio, the coefficient of absorption reaches its maximum at 22,2 °C temperature and decreases dramatically both ways from this point. The type of dependence of α and $J_c/2J_{\text{MB}}$ on *t* resembles λ – the curve of absorption at phase transition of higher order, for example, helium I to helium II. But at temperature dependence of v_{GZ} hypersound waves' speed, defined out of MBC move, no features were revealed (Table 1). With solution's heating the speed of hypersound increases monotonously, what is usually observed at water solutions of electrolytes [1]. Within temperature increase from 18,6 to 27,4°C the speed of hypersound changes linearly from 1670 to 1692 m/sec, that means that temperature coefficient of speed $\beta = dv/dt$ is 2,2 m/(sec·degree), that is less that in pure water, where $\beta = 2,9$ m/(sec·degree).



Fig. 2. Temperature dependence of hypersonic absorption coefficient

Table 2

t, °C	18,6	20,0	22,2	23,0	23,4	23,6	23,8	24,6	25,0	26,0	27,4
$\upsilon_{GZ^{*}}$ m/sec	1670	1675	1678	1680	1681	1682	1682	1684	1684	1687	1692

Temperature dependence of v_{GZ} speed with 5 GHz frequency

For comparison we have researched the temperature dependence of v_{UZ} hypersound speed with 5 MHz frequency. It was changing with echo-impulse method accurate to 0,15%.

Quantities v_{UZ} and v_{GZ} within the error limits agree, that means that both positive and negative dispersion of sound speed, in spite of difference in their frequencies to thousand times (Table 2).

v_{UZ} hypersound speed with 5 M	MHz at different temperatures
------------------------------------	-------------------------------

t, °C	20,6	21,6	22,4	23,2	24,0	24,6	27,4	28,8	29,6
v_{UZ} , m/sec	1675	1678	1679	1681	1683	1687	1691	1693	1695

Usually in phase transition of higher order range, the diagram of v_{GZ} dependence on *t* has a brack, there is observed comparatively big positive dispersion ($v_{GZ} > v_{UZ} >$) [4]. In our solution positive dispersion, apparently, is veiled by negative one ($v_{GZ} > v_{UZ} >$), which was revealed in the water solution of electrolytes [1]. Possibly, far from phase transition of higher order point the phenomenon of negative dispersion will reveal at higher temperatures, as it in [1].

How one can imagine molecular mechanism of the experimental process? In the solution far from critical range, as it's known [5], there exists the short-range order of particles' disposition, which is characterized with average coordinating number z. If z changes in narrow range of temperatures, then quantity of connections between molecules of dissolvent and particles of dissolved substance also changes. It's analogous to phase transition of higher order: regions of solution with one coordinating number pass to regions with other z. In potassium chloride solution the temperature rise and *KCl* concentration at 22 °C leads to z rise, and in the range of 22–23,5 °C, z dramatically decreases. Tend to chaotic condition at particles' spreading means the rise of fluctuations. Because of medium's heterogeneity there appear features of light scattering and elastic waves' absorption.

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Materials of Conferences

RESEARCH ZYMOHYDROLYSIS ALBUMENS OF MILK

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Proteinaceous hydrolyzates are the products of the proteolysis consisting of separate amino acids, their sodium salts and the polypeptide remains. Proteinaceous hydrolyzates actively use for production of specialized products of a baby and sports food. Proteinaceous hydrolyzates are a full-fledged product of a parenteral food at the various conditions, being accompanied proteinaceous insufficiency, reduce also intoxication phenomena. In the course of hydrolysis of proteins there is a rupture of peptide communications of a proteinaceous molecule to formation of Dee – and трипептидов, and also free amino acids that increases digestion of albumens in a live organism. In this regard use of proteinaceous hydrolyzates in production of food in a diet a food, in particular, children is used by proteinaceous hydrolyzates with lack of amino acids in the form of making components of medical foods which allow to optimize biological value and to provide additional functionality to an organism of children of early age [1].

For creation of proteinaceous hydrolyzates as the main component of products of a special purpose, for patients with a gistidinemiya, it is necessary to decide on a type of hydrolysis, the rational parameters of hydrolysis providing the maximum extraction of a histidine from proteinaceous molecules for the subsequent biotransformation of a histidine in connections, not having toxic effect on an organism of the patient [2].

Two ways of hydrolysis of proteinaceous molecules are known and are widely used: chemical (acid and alkaline) and fermentativny [3].

As a result of research of technological process of purposeful removal of a histidine from a polypeptide chain of a dairy proteinaceous concentrate by means of fermentativny hydrolysis by the enzimatichesky system, consisting from ekzo-and эндопептидаз, received: quality эндопептидазы used chymotrypsin (KF 3.4.21.1) which possesses wider substratny specificity unlike other enzymes and mainly splits peptide communications, and also hydrolyzes communications of a leucine, methionine, but it is especially important that this fermental preparation allows to destroy a histidine. Chymotrypsin is most active in the range up to 8,2 at a temperature of 50 ± 1 °C. In quality экзопептидаз used карбоксипептидазу And and аминопептидазы. Karboksipeptidaza A. The analvsis of results of research, showed that at a ratio «enzyme substratum» 1:40 at 6-8 hours of hydrolysis is formed about 2.0 mg/100 Γ a free histidine, and at the same duration of reaction, but at a ratio complex 1:20 enzyme-substratnogo the mass fraction of a histidine reaches more than 2,20 mg/100 rprotein. At duration of hydrolysis of a mix of proteins of cow milk 24 hours are celebrated the greatest extent of extraction of a histidine from a polypeptide chain. So at a ratio «enzyme substratum» 1:40 this value reaches 2,69 mg/100 r protein that is 1,2 times higher, than at the same enzyme-substratnom a ratio, but duration at 8 ± 0.05 hours. At a ratio «enzyme substratum» 1:20 and duration of 24 ± 0.05 hour is observed the greatest extent of extraction of a histidine to 100%.

At enzyme-substratnom a ratio of 1:40 and 1:80 lasting hydrolysis up to $4 \pm 0,02$ and $8 \pm 0,02$ hours, low release practically all amino acids that is not rational use of the ratios given enzyme-substratnykh, in connection with increasing costs of use of these enzymes also is observed.

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ANALYSIS AND STABILITY ENSURING OF ELECTRONIC STRUCTURES TO THERMAL INFLUENCES (ASONIKA-T)

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Purpose and main features of the subsystem ASONIKA-T. Subsystem ASONIKA-T can operate in standalone mode or as part of ASONIKA in combination with other subsystems. Subsystem ASONIKA-T is designed to automate the modeling of thermal processes such as micro assemblies, radiators, heat-removing bases, hybrid-integrated modules, power cordwood structure, cabinets, racks, and atypical (arbitrary) structures electronics. You can use the machine for the analysis of thermal processes the following types of model structures: plate unit housing, modular design, cluster design.

The subsystem, during the design of electronic structures, allows to implement the following design objectives:

- to identify the average temperatures of blocks, printed circuit assemblies and materials bearing structures, as well as the air volume inside the electronic structures;

 to make changes to the electronic structure in order to achieve acceptable thermal conditions;

- to choose the best option in terms of structural thermal work regimes from several existing conceptual options;

- to justify the need and the evaluate the efficiency of additional electronic protection from thermal influences;

- to create, if necessary, an effective program for testing electronic models and prototypes on the thermal effects (in thechoosing problems of the most information tested influences, the choice of sensors and their installation location in the most heat-loaded places, etc.).

The subsystem allows you to simulate the stationary and non-stationary thermal modes of electronics. There is the possibility of taking into account the causes of non-stationary thermal conditions: a change in time of ambient temperature, time variation of the heat capacity of electronic components, the time variation of the heat capacity of structural elements, etc.

There is a possibility of integrating the work of electronics in different conditions: in vacuum and in air, both at normal and at reduced pressure. It is possible to account for different cooling conditions: natural or forced convection, heat, air cooling, the use of heat sinks, etc.

ASONIKA-T subsystem's service software includes a database with geometric and thermo-physical reference parameters of electronic components and construction materials, graphical input of initial data for structures graphical output of results.

Simulation of thermal processes in electronic structures using ASONIKA-T subsystem. For the simulation session, the following background information is required:

- sketch or drawing of the electronic bearing structure;

- thermo-physical material parameters of the considered design;

 heat generation output in the lower-level hierarchy structures that are within the structure under consideration. Output consist of mounted electronic components in them;

- cooling conditions (boundary conditions) design.

The first stage of constructing a thermal processes model (TPM) of electronics module is that the product is divided into conditional isothermal volumes. Electronic component, an element of product design can be shownin the form of these isothermal volumes, which is necessary to determine the temperature, air volume inside the unit, the environment, a set of elements of the product, the entire electronics unit, element parts, and etc. The partition depends on the structure of the calculated object, on the required accuracy of thecalculation temperature, on the assumptions made when considering the heat transfer processes in the product, and etc. Main difficulty is finding the allocation of points in the product, in which the accuracy of modelinghasbeen savedand at the same the complexity of the TPM (the number of nodes) would remain within reasonable limits. To do this, first idealize (simplify) the processes of heat transfer in the product:

- ignore the minor types of heat transfer in the product design (ie, discard irrelevant thermal connection between the nodes of TPM);

- justify and accept conditional insulated these or those groups of bodies (parts, elements). Conditionally an isothermal volume, including several bodies, called the «hot zone».

Next to build TPM electronic block among these conventional isothermal volumes, volumes that are in thermal interaction are allocated. These include:

- bordering single Solid State volumes (conduction);

- volumes, that interact through layers of air (free convection in a confined space);

- volumes that are in the radioactive heat transfer (radiation);

volume of the solid and the volume of the surrounding air (convection);

- contact volumes of two solids (contact thermal conductivity), etc.

In the ASONIKA-T subsystem, TPM is represented by a topological TPM, which isrepresented as an undirected graph. Vertices (nodes) of the graph modelingstructure'srelatively insulated elementary volumes (they correspond to structural elements and components of electronics structure, or fragments). The branches (edges) of the graph represent the heat flow between the volumes of relatively insulated structures in TPM.ASONIKA-T subsystem provides the ability to automatically form TPM standard structures, for non-standard structures there is a graphical user interface in which the user builds himself a topological TPM.

ASONIKA-T subsystem has the ability of taking into account the thermal interactions, and hence the possibility of applying the types of the TPM branches.

Based on of the topological TPM, a system of nonlinear algebraic equations (SNAE) is formed for stationary thermal process or a system of ordinary differential equations (SODE) for transient thermal process. To solve systems of equations, the designer sets the boundary conditions which corresponding to the conditions of electronic operation. The backward differentiation formula (BDF) is used to solve SODE, the fixed point iteration method is used to solve SNAE. To solve systems of linear algebraic equations (SLAE), which include SODE and SNAE (at each time step and / or at each iteration of non-linearities), the LU decomposition method is used with the symbolic factorization and also taking into account the matrix sparsity of thermal conductivities.

After the TPM was created, the calculations are carried out.According to the results the user is able to obtain various textual and graphical information. The data is displayed for both stationary calculation in the form of a temperature tables in the model nodes and for the nonstationary calculation in the form of a temperature dependency graph in the model nodes on the time and temperature table in the time intervals in the model nodes.

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THE DRAINAGE LOCAL DRY AREAS WITH GROUND WATERS OVERFLOW IN THE UNDERLYING AQUIFER

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The systems drainage construction method is known, having included the excavation tranches, the pipe – lines and the collector – drainage system laying, the bore pits excavation on the picket well lines, and the wells installation in these wells - water separators, the wells connecting to the collector - drainage network, the filters' implementation around the well, the tranches' and the bore pits' backfilling. At the well - absorbents installing together with the pipe - line laying, between its tee fitting set units, each of which is connected the flexible perforated branch pipe, whose end is brought up to the surface of the soil, the filter column is carried out around it, and the trench is finally covered. Then, on the filter column border the hole is torn, in which the well is set, and, simultaneously, the flexible branch pipe is connected to the well, with the filter creation.

So, the soil draining way with the drainage water reduction is the closest to the technical nature to the proposed technical solution, and, moreover, it has been taken, as the prototype. The shaft wells and the mine shafts construction, the drilling from the bottom of the last opposing horizontal wells, the removal of them. At the same time, during the counter wells drilling, their location end sections at the different levels and the latest equipment by the water intakes are produced, and during the water drainage, the evacuation is carried out counter located below each well, and, at that, the end sections locations are within the limits of their efficient range. Just after the counter wells drilling, the counter – tunneling is carried out over them the additional drainage wells. The known technical solution drawback is, that the receiving wells are in the same aquifer of the ground (e.g. subsoil and subsurface ones) waters, having based on the impervious layer (e.g. aquiclude).

The new method is aimed at the above – stated disadvantages eliminating of the existing technical solution and, moreover, of its use, can be obtained by a more reliable technical result: the natural water overflow obtaining, through the impervious discontinuity layer, and the water flow from the top to the bottom of the aquifer, the system reliability increasing, and also the works simplification at the installation.

This is, practically, achieved by the fact, that in the process of the draining soil drainage method, having included the wells formation, the ground waters bypass and the removal of them, it, moreover, is proposed to be used, as the common dehumidifying chamber wells, as well as the bore drainage purifying drains, having radiated by the beams into the subsurface and the subsoil filtration zone, where the accumulation of the large amounts of the moisture is, practically, taken its place, having based on the dense layer of the impervious clay. According the filtered beam drains, the water is flowed down into the dehumidifying chamber, from which it is pumped by the pump.

So, the new method efficiency is consisted in the following combination of the essential features, sufficient for the above – mentioned technical result achieving. This is ensured by the fact, that a more improved method of the drainage drying out, which is provided the purifying filtered beam and the radial drainage drying out systems, in which:

- the drainage is occurred, at the expense of the purifying filtered drains, having diverged rays in the subsurface (e.g. ground water) filtration zone, where the accumulation of the large amounts of the moisture is, practically, taken its place, having based on the dense layer of the impervious clay. According the filtered beam drains, the water is flowed down into the dehumidifying chamber, from which it is pumped by the pump for the industrial consumption (e.g. the fountains, the watering, the irrigation and the other water use for the economic purposes and the household needs);

- the drainage is occurred by the filtered drains, having located under the top surface and the under topsoil layer in the active filtration zone, the water is accumulated in the well, which is cut the impervious layer, and it is poured into the underlying aquifer;

- the drainage is taken its place by the filtration radial drains, having situated and disposed in the layer under the sand and the gravel bed plant, under the top surface and the under topsoil layer for all that the water is flowed down into the common dehumidifying chamber, and thence it is fallen into the underlying aquifer;

- the drainage is occurred by the filtered radial drains, for all that there is the process of the under waters collecting and the dumping them down

into the two underlying aquifers, without further preliminary collecting them in the dehumidifying chamber, moreover, the deviated and the inclined wells are also may be used, having penetrated into the underlying ground water carriers.

Thus, the special device for the dehumidifying drainage system is consisted in: the general drying chamber, having made reinforced concrete; the pump for the water pumping; the concrete slab; the measuring piezometer, having combined with the vent pipe; the manhole; the running staples; the pebble – sandy layer; the radial drains with the filtered part; the impervious layer (e.g. the hydro – aquiclude); the wells.

1. The local drying out soil method by the drainage is, practically, to be optimized the water distribution and its further allocation and, moreover, the drainage waters to be re–used in the industry – domestic purposes.

2. The local drying out soil method by the drainage with the water reduction is a more economical one – it is, practically, allowed, without the additional energy – intensive costs use, to be prepared the grounds for the construction of the modern underground structures, the facilities, and the installations.

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THE TURBULENT JET FLOWS RESEARCH

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The mechanism for the artificial turbulent jets creation, on the basis of the ejection principle, has been, previously, described. Corresponding to this mechanism, we have the addition of the wells sand reduction method, and also the device for its further implementation. The jet streams use, at the wells cleaning, is connected with the two main factors:

1) the impurities' removal (e.g. the sand particles) of the turbulent jet;

2) the impurities diffusion transport increase outside the jet;

3) the temperature inversion violation in the well, having created, in result of the sand addition.

Among these above – listed factors, the notable one is the first factor, the other two ones are presented and associated themselves the related and the ancillary conditions, having initiated by the first one.

So, the two air flows interaction (e.g. the generated and the complexing, the upwelling and the downwelling ones) is resulted in the velocity fields, the pressure transformation, and, eventually, – the impurities field transformation (e.g. by its sizes and the sand particles concentration).

So, on the basis of all these provisions, it has been made the mathematical modeling of the wells cleaning process by the turbulent flows, having generated with the ejection using.

This model is included in itself the two sub – models.

Thus, the first of them, is described the impurities concentration change in the turbulent jet, at the moment of the clearance mechanism action; and the second one – outside of the jet.

So, the state variable of this first model, we'll denote $C_1(x)$, and the second one $-C_2(z, t)$. Then, the calculating formulae, having obtained, on the basis of all these models, are taken the following form:

$$C_1 = \frac{\omega}{4\pi D_x^x} \exp\left[-\frac{\nu(H^2 + y^2)}{4D_x X}\right], \qquad (1)$$

where D – the diffusion coefficient of the impurities; v – the velocity of the air stream; q – the flux density (e.g. «the power») impurities source; H – the well height; (x, y) – the coordinates of the points of the horizontal plane.

Having differentiated (1), and equated to the zero, the derivative value $\partial C_1 / \partial x$ at the point $x = x_{max}$, in which the maximum concentration is achieved at the lower boundary of the well (e.g. as the functions C_1 from the distance x and the diffusion coefficient D).

Having taken y = 0, from the following condition:

$$\frac{\partial C_1(x)}{\partial x} = 0, \qquad (2)$$

we get
$$x = x_{max}$$

$$x_{\rm max} = (VH^2)/(4D).$$
 (3)

The time, over which the maximum concentration is achieved, at the fixed distance from the turbulent jet axis (for example, at the distance r), is equal to the following:

$$\tau_{\max} = \frac{r^2}{4D}.$$
 (4)

So, the formula (4) has been obtained by us from the equation (1), on the basis of the study of the maximum function C_1 . Then, it is checked by the immediate formulation in (3) at H = r).

The initial moment (e.g. the reading) time $\tau = 0$ in the sub-model (1) is taken from the start moment of the mechanism actuation of the clearance, and in the sub-model (2) – from the origin moment of the instantaneous linear source of the instant sand particles. Accordingly, x – the distance from the continuously operating impurities source, and τ – the time, which is required to be transferred the turbulent flow, having originated the linear instantaneous source at the distance x.

The sub-model 2 is based on the equation of the diffusion transport of the particles, having presented in the following form:

$$\frac{\partial C_2}{\partial \tau} = \frac{\partial}{\partial z} \left(D \frac{\partial C_2}{\partial z} - C_2 \omega_z \right) + q, \qquad (5)$$

where ω_{z} – the speed of the downwelling vertical flow.

In the general case, $q \neq \text{const.}$ So, the dependence of q on τ can be obtained, on the basis of the sub – model 1.

The results of the numerical implementation of the model are allowed to be got the estimates of the magnitude:

$$C = C_1(z) + C_2(x, y),$$
 (6)

at the time moment τ_{max} depending on the model parameters *V*, *W*, *D*, which, in their turn, are depended on the operating principle and the design parameters of the addition of the wells sand reduction mechanism with the turbulent jets using, having generated, on the basis of the ejection.

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THE VALVE OPENING CONTROL TIME CALCULATION

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Having neglected the membrane mass with the rod and the locking – regulatory body, at moving up, the shut – off and regulating body for the Δh motion, is described by the following equation [1]:

$$\omega_{\kappa} \frac{dH}{dt} = \mu_{VL} \omega_{VL} \sqrt{2gH} - \mu_{SL}(h) \omega_{SL} \sqrt{2gH_{\kappa}}, (1)$$

where: $\omega_c dh$ – the volume part of the over – membrane chamber with the dh height, having filled with the water during dt; $\mu_{VL_2} \omega_{VL}$ – the flow rate coefficient and the inlet section of the calibrated hole; $\mu_{SL}(h) \omega_{SL}$ – the flow rate coefficient and the input section of the branch hole; H_c – the head in the over – membrane chamber; $H = H_{IN} - Hc$ – the head outflow through the calibrated hole; H_{IN} – the head at the inlet of the calibrated hole.

Since the system dynamics is studied at the slight movement of the locking – regulatory body (Δh) , then in order to be simplified, we linearize the non – linear equation (1). For the linearization, we'll introduce the variables deviation from the non – initial values. So, we'll denote:

$$h = h_{a} + \Delta h; H = H_{a} + \Delta H.$$

So, the non – linear function

$$Q_{SL} = \mu_{SL}(h)\omega_{SL}\sqrt{2gH_K}$$

we present in the following form:

$$Q_{SL} = Q(h_o; H_o) + \left(\frac{\partial Q}{\partial h}\right)\Big|_{h=h_0} \Delta h + \left(\frac{\partial Q}{\partial H}\right)\Big|_{H=H_0} \cdot \Delta H + D_2(\Delta h; \Delta H);$$
(2)

where $D(\Delta h; \Delta H)$ – is the non – linear one, having contained the Δh and ΔH product and their degrees, which are over the first one. Because of the small de-

viation values Δh and ΔH , the non – linear part of the series can be neglected, and, thus, to be replaced the non – linear function by its linear approximation:

$$Q_{SL} = Q(h_0; H_0) + \left(\frac{\partial Q}{\partial h}\right)\Big|_{h=h_0} \cdot \Delta h + \left(\frac{\partial Q}{\partial H}\right)\Big|_{H=H_0} \cdot \Delta H.$$
(3)

Having given, that $Q(h_0; H_0)$ is equal to $Q_{VL} = \mu_{BL}, \omega_{BL} \sqrt{2gH}$ and substituted (3) into (1), we'll yield the following:

$$\omega_{K} \frac{dH}{dt} = \left(\frac{\partial Q}{\partial h}\right)_{h=h_{0}} \cdot \Delta h + \left(\frac{\partial Q}{\partial H}\right)_{H=H_{0}} \cdot \Delta H. \quad (4)$$

Having given, that

$$\frac{dH}{dt} = \frac{d(H - H_0)}{dt} = \frac{d\Delta H}{dt},$$

we'll yield the following:

$$\omega_{K} \frac{d\Delta H}{dt} = \left(\frac{\partial Q}{\partial h}\right)\Big|_{h=h_{0}} \cdot \Delta h + \left(\frac{\partial Q}{\partial H}\right)\Big|_{H=H_{0}} \cdot \Delta H.(5)$$

For the dimensionless receiving of all the equation terms, we'll divide it by the coefficient x_{IN} and then, having taken the Laplace transforms (e.g. the entries in the pictures, or in the operator form), we'll obtain the dynamics equation, in the following form:

$$(T \cdot p - 1) x_{INPUT} = K x_{OUT}, \qquad (8)$$

where $T = \frac{\omega}{\left(\frac{\partial Q}{\partial Q}\right)^{h = h_0}}$ – the time constant, having

$$\left(\overline{\partial h}\right)\Big|_{H=H_0}$$

obtained from the equation (7), by means of dividing by the coefficient at x_{INPUT} .

$$K = \frac{H_H \left(\frac{\partial Q}{\partial H}\right)\Big|_{H=H_0}^{h=h_0}}{h_H \left(\frac{\partial Q}{\partial h}\right)\Big|_{H=H_0}^{h=h_0}} - \text{ is the transfer coefficient}$$

p – the symbol (e.g. the operator) of the differentiation.

The characteristic equation of the equation (8) will have the following form:

$$T \cdot p - l = 0, \tag{9}$$

whence

$$p = \frac{l}{T};$$
(10)
$$\frac{\partial Q}{\partial h}\Big|_{h=h_0, H=H_0}$$

Thus, from the equation (10), it is clear, that the check valve operation will be stable, if p has the negative real part. So, the time constant T, in this case, must be the negative one, i.e. the denominator (∂Q)

 $\left(\frac{\partial Q}{\partial h}\right)$ will be less than zero, in other words, it is

presented itself the decreasing function.

So, the resulting equation of the transient regime (e.g. the dynamics) in the coordinates' increments, we'll give the dimensionless form, by means of the h and H relative deviations introducing:

. 7

$$x_{INPUT} = \frac{\Delta h}{h_H};$$

$$x_{OUT} = \frac{\Delta H}{H_H},$$
 (6)

where h_{H} and H_{H} – are some constant baseline values of the water level and the moving (in our case, the head in the over – membrane chamber).

Having substituted the Δh and ΔH values, we'll get the following:

$$\omega_{K}h_{H}\frac{dx_{HX}}{dt} - h\left(\frac{\partial Q}{\partial h}\right)\Big|_{H=H_{0},h=h_{0}} \cdot x_{INPUT} = H_{H} + \left(\frac{\partial Q}{\partial H}\right)\Big|_{H=H_{0},h=h_{0}} \cdot x_{OUT}.$$
(7)

Indeed, at the *h* increase, the flow rate through the calibrated hole is decreased. Thus, here, there is always observed the $\left(\frac{\partial Q}{\partial h}\right) < 0$ inequality.

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THE TECHNOLOGICAL PROCESS RESEARCH FOR WELLS' OPERATION

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It is necessary to be considered the various factors research challenge at the wells' protection process from their sanding up, for the theoretical researches confirmation.

I. The laboratory – bench and development tests have been carried out, without interrupting the wells' operation technological process.

- The Well \mathbb{N} 1 - the water hammer presence at the pump restarting, and, as a result of the increased turbulence (e.g. flows whirling pool), there is the abundant occurrence of the suspended particle:

$$\sum = S \cdot h \cdot q \cdot \rho; \tag{1}$$

$$V \cdot \rho = m_1; \tag{2}$$

$$m_1 \cdot q = F_1. \tag{3}$$

- The Well $N \ge 2$ – at the KOP-1.0 check valve presence, with the adjustable opening time, by the complete water hammer absence, at the repeatedly restarted deep well pump, and, therefore, there are the reduced turbulence phenomenon and the complete suspensions absence in the water:

$$\sum = S \cdot h \cdot q \cdot \rho; \tag{4}$$

$$V \cdot \rho = m_{2}; \tag{5}$$

$$m_2 \cdot q = F_2 \tag{6}$$

and as a result of:

$$q > a; F_1 < F_2.$$

II. The production process testing and the corresponding technological tests – this is the simultaneous water pumping during 10 days and nights (e.g. 240 hours), with the use of the two turbine meters of the BB-50 cold water for the water volume measuring, having flowed through the well № 1 and the well № 2 pipelines, simultaneously at the temperature up to 30°C and the pressure up to 1 MPa: The well № 1: The well № 2:

$$\sum = S \cdot \rho \cdot C_i^1; \qquad \sum = S \cdot \rho \cdot C_i^2; \qquad (7)$$

$$V \cdot \rho = m_{,;} \qquad \qquad V \cdot \rho = m_{,;} \qquad (8)$$

$$m_1 \cdot C_i = G_1; \qquad m_1 \cdot C_i = G_2; \qquad (9)$$

$$C_i^1 > C_i^2;$$

 $G_{1_i^1} > G_2,$

where C_i – the specific concentration of the suspensions.

As a result, by the obtained data, we can see, the specific concentration of the sandy suspensions is very high and the volume of the settled sand is great, that in the well \mathbb{N} 1, which has no the check valve with the adjustable opening time, and also the artificial structure of the pebbly filter. The specific concentration density is quite so small, that in the sedimentation tank, we don't find the settled sand in the well \mathbb{N} 2, having equipped with the check valve with the adjustable the opening time, and the artificial pebbly filter structure.

The production – processing and technological (e.g. operating) experimental tests have already been carried out during the 3 summer months (e.g. 92 days and nights): June, July, and August – in the season of the greatest use of the water resources. So, the check valve KOP-1.0 had been temporarily installed at the production – processing and technological tests on the well \mathbb{N} 1, as a result of which the completely different experimental data were received, which were then recorded in the tests log, where the sand content in the samples was decreased significantly, in comparison with the previous samples. The well flow rate has been remained the same, and it has been equaled to $Q = 6.5 \text{ m}^3/\text{h}$ or $Q = 156 \text{ m}^3/\text{day}$, at the fine sand content 20 g per 1 m³ water or 312 g/day.

So, the experimental data readings from the samples, having taken during the production – processing and technological tests during the 92 days and nights of the experiments have already been given the stable results by the production rate $Q = 14.8 \text{ m}^3/\text{h}$. or $355.2 \text{ m}^3/\text{day}$, at the fine sand content 0,001 g/qm³ in the well No 2, having equipped by the artificial pebble filter and by the check valve KOP-1.0, This was given us every reason to be believed, that the experimental tests had already been confirmed the choice correctness of the input parameters of the processes under their study.

So, the statistic data and the theoretical analysis results have already been allowed, according to the researches plan A, B, C, to be justified the setting ranges and the varying levels of the input parameters to be obtained the statistics equations and the aerohydrodynamics at the operating pumping out:

$$\sum_{j=1}^{m} P_j = 0; (10)$$

$$\sum_{k=1}^{n} \frac{dp_{k}}{dt} = J(P_{k}, C_{k}, t),$$
(11)

where J – the change in pressure; P_k – the pressure; C_k – the suspensions concentration; t – the time.

The equation of the aerohydrodynamics flow patterns:

$$\sum_{k=1}^{n} \frac{dp_{k}}{dt} - \sum_{j=1}^{m} K_{j} \cdot P_{j} = \sum_{m=1}^{l} \sum_{k=1}^{n} J_{m}(P_{k}^{m}, C_{k}^{m}, t); (12)$$

the increase (flow rate) quantity of flow equation:a) by the inflow increasing;

b) by the filtration coefficient increase:

$$\sum_{m=1}^{l} \mathcal{Q}_m = V_{d,v} \cdot K_f \frac{dy}{ds}, \qquad (13)$$

where $V_{d,v}$ – the depressive funnel volume; K_f – the filtration coefficient.

- the external and internal forces interaction equation at the artificial pebbly filter installation:

$$\sum_{i=1}^{k} F_{1} + \sum_{j=1}^{m} F_{j} = 0;$$
(14)

 the kinetics and aerohydrodynamics equation for the nominal characteristics:

$$fJ(P_{K}, C_{K}, t)dt = \sum_{k=1}^{n} P_{k}.$$
 (15)

The variation limits in the factors, under the production – processing and technological exploitation conditions, at the maximum water selection and sampling intake regime, have been allowed to be taken the mathematical description making up production of the initial and the boundary conditions, the differential equations of the processes:

$$\frac{\partial P}{\partial t} + V \frac{\partial P}{\partial x} = f_1(P, C; K_1, K_2; X, t).$$
(16)

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Short Reports

THE COMPUTERIZATION OF THE SILICON OXYGEN REFINING

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Russia has joined the Bologna process for closer relations and harmonization of educational system of European countries with the purpose of creating the single European higher education space. Since 2011 Russian institutes of higher education has passed on to two-level system.

It results from modern requirements to specialists' training that traditional methods of education, which aren't practically oriented to creative thinking and independent work of students, do not ensure required intensity and effectiveness of educational process. That's why the problems of introduction of modern pedagogical technologies, firstly informational ones, which are intended for graduate students' training's quality increasing, for development of their creative activity and independence, are put in the forefront.

Using of computer programs during the educational process for bachelors' and specialists' of technical chief subjects preparation, in particular «metallurgy» school, allows student to clearly imagine processes, basic metallurgy equipment and technology in general.

We have developed and introduced to educational process a computer program «Calculating program of material balance of the silicon oxygen refining (RefOxSi)» (Certificate N 2012618462, Russian Federation [1]) (Fig. 1).



Fig. 1. Active windows of «RefOxSi» program

The process of silicon oxygen refining occurs at extremely high temperatures (1500–1600°C) [2]. That's why it's impossible to retrace its peculiarities in real time and research the mechanisms of impurity inclusions' forming with the use of traditional analysis and control methods. Computer program allow to «carry out» silicon refining virtually and to calculate the composition of resultant product knowing the composition of primary product and process' conditions.

While researching the process of silicon refining with the use of this program students get introduced to all phases of the process, study its thermodynamics, also they can design their own process of silicon's purification and receive final results, estimating the effectiveness of refining.

Also for more deep study of metallurgical silicon refining process the program has reference information about slags and impurities, which are found at the technical silicon refining, it allows to find necessary information about certain impurity's behavior in melt (Fig. 2).



Fig. 2. Reference information about silicate systems of «RefOxSi» program

Thereby, using only computer program, one can not only calculate material balance of refining process, but also find out the composition of every slag, and also retrace an interaction of all components.

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NEW METHOD OF DESCRIPTION AND INTERPRETATION OF CLASSICAL FORMULA FOR RETICULAR FENESTELLIDA (BRYOZOA)

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The rhythmic analysis of diagnostic signs species of Bryozoa executed. «Extreme local linear frequency» on sites of bifurcation of branches has the biological contents and is the specific diagnostic sign of species. If at the moment of growth of a branch in the colony the meaning of local linear frequency of branches on a site of the colony exceeds some critical then the growing branch was eliminations. The branch can adhere to the branch or the dissepiment. At the places between zones of bifurcation of branches the meaning of the extreme local linear frequency of branches directly changes from the least meaning (before bifurcation) through arithmetical average and median meaning up to the greatest meaning (at once after bifurcation).

This phenomenon (elimination of a branch after excess in colony of critical local linear frequency of branches) can serve the proof that the critical meanings of parameters of local linear frequency supervise biologically important properties of colony as biological system. From here follows, that the paleontological description of species necessarily should contain «the extreme formula Nekhoroshev-Nikiforova» (the extreme N-N-formula) for local linear frequencies on sites directly before and after bifurcation of branches. «The classical formula of the basic sizes» (the classical N-N-formula) of mesh bryozoans, offered by the scientists V.P. Nekhoroshev and A.I. Nikiforova, shows round selective arithmetical average of meaning of the linear normalised frequencies of branches, dissepiments and other. The distances centre to centre of these structural elements are lengths of rhythmic elements of colonial structure. If the paleontological description of a species contains arithmetical average meanings of rhythmic colonial elements then all parameters of the classical N-N- formula can be received as opposites to meanings of arithmetical average.

A standard deviation of variants from arithmetical average meaning of variant's parameters have (in most cases) only mathematical (statistical), instead of biological sense. This statistical sense of signs in the paleontological description is very difficult for using for the purposes of classification and diagnostics. This probability follows only from of mathematical model, but not from a biological nature of bryozoans. From here follows that the limiting meanings, really noticed on natural object should always be specified in the description. Therefore numerous measurements of the signs (length of lines and distances) have not advantage for the decision for classification.

There is no need to carry out numerous measurements of rhythmic signs. New method of sign description influences upon results of paleontological description and recognition (diagnostics) numerous species of Fenestellida and raises their value for stratigraphy.

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Short Reports

TYPES OF CONSTITUTION OF LYMPHATIC SYSTEM

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Introduction. Constitution or general construction of lymphatic system (LSy) determines its reactions on all influences of surroundings, including pushes of lymph flow, consists in segmentary organization of LSy. It is conditioned by topography (branching artery) and fold structure of walls (valvae) of lymphatic bud (LB). Thus I divide all LSy segments on 2 groups:

1) the general (common for LB and blood bud) or systemic;

2) the special (own for LB) or local – intervalvar [5, 6].

Own LSy segments unite with another components of general LSy segments and corporal neurovascular segments by means of connective tissue: LSy is the part of cardiovascular system and human body at whole. They have very changeable structure. It is distinguished different somatotypes as morpholocical manifestation of different types of human constitution. Thus it possible to distinguish corresponding types of LSy constitution, which embrace determine individual variants of structure (morphotypes) and physiological reactions of LSy. For example: different number and distribution of valvae on extent of LB with different construction, and, consequently, different number, length and allocation of the intervalvar segments with different sizes determine different variants of lymph transport - function of LB, including correlation of phasic and peristaltic forms of its contract activity, separate and combined contractions of neighbouring lymphangions, including their lymphoid variety - lymph nodes (LN). Thus number and distribution of valvae on extent of human thoracic duct (TD) depend from TD length and type of TD formation [5]. Passive movements (and morphogenesis) of LB are regulated by means of its surroundings [4, 5], for example, muscles: chyle cistern and lumbar crus of diaphragm are passive lymphatic heart (Haller A., 1765; Jossifov G.M., 1930) [3]. Parietal lymphangion of mesentery, which is intimately connected with muscular coat of intestine, look like chyle cistern [2].

Typical anatomy of LSy. Knowledges about it has important practical significance, particularly in surgery. Literature contains few informations about connection of structure of LSy or its part with human somatotype. D.A. Jdanov [3] didn't discover hard connection between degree of widen of LB and lowering of level of TD formation, which happen in connection with age visceral ptosis. I put up

row of forms of TD initial part on its principal projection on vertebral column (from top to bottom): simple confluence of 2 lumbar trunks (under acute angle) \rightarrow simple confluence of 3 lumbar trunks («bunch»), narrow plexus of lumbar trunks \rightarrow wide plexus of lumbar trunks \rightarrow plexus of lumbar trunks with chyle cistern. The conclusion is forced upon one: lengthening and narrowing of human body are accompanied by magistralization of LB with decrease of number of vessels, but shortening and widening of human body - widening of LB by means of increase of number, branching and local widening of vessels to form plexus and cistern. Then people with dolychomorphyc bild (PDB) must have LB of «narrow» type (magistral form - simple confluence of lumbar trunks), but people with brachimorphyc bild (PBB) - LB of «wide» type (vast plexus of lumbar trunks with chyle cistern). Probably, it should be no hardly to connect one of three main forms of TD initial part with one of three main types of human constitution. By my investigations in human fetuses [4] and to judge by drawings of D.A.Jdanov [3], longitudinal disperse of lumbar LN increases in contrary direct. It is must be typical for PDB so as simple confluence of lumbar trunks.

M.S. Lisitsin (1922) [3] found sharp arch in cervical part of TD in adult peoples in connection with narrow thoracic inlet, but the flat arch, when the inlet was wide. According D.A. Jdanov [3], sharp arch in cervical part of TD predominates in PDB, sloping arch – in PBB. My conclusions by results of analysis of both selections:

1) in all ages shortening and widening of human body (PDB \rightarrow PBB) accompany similar changes in TD, including lowering and flattening of arch in cervical part of TD to its complete reduction;

2) shape and topography of the arch depend from human somatotype in more degree, than from the sex.

Unstable connection of LSy construction with human somatotype is causing probably by:

1) insufficiency of investigated materials;

2) extensive individual variations in human development (genotype \rightarrow phenotype) and the LSy, that is conditioned by many factors, including herencia and environment of its realization;

3) age changings, especially in fetuses and children, elderly and old mans;

4) imperfection of known classifications of human constitutions and somatotypes, methods of their determination. Types of LSy constitution are not worked out at all.

Genetic aspects of the problem. Anlage of lumbar LN occurs in human fetuses of 3d month, when secondary adhesions of peritoneum begin. Increasing of volume of the adhesions correlates with increasing of number and level of placing of lumbar LN, level of confluens of lumbar trunks (with withdrawal from diaphragm), but decreasing of capacity of TD initial part. Cause of this is in the connection of both processes with variative growth of abdominal organs and setting of physiological hernia into abdominal cavity [4].

In the row of rodents (rat \rightarrow rabbit \rightarrow guineapig) I discover:

1) decreasing of their mobility and degree of development of their muscles. Media of TD and lymphatic collectors of shin contains 1 muscular layer in rat, but 2 layers in rabbit (compensation of deficite of energy of extravasal factors of lymph flow);

2) thoracic cage is always lesser than abdomen on their sizes (abdominal type of the build), and abdomen increases in connection with increasing of large intestine diametr. In guinea-pig walls of stomack and intestine are very thin, caecum reaches huge sizes, letting in volume only liver. It is caused consumption of many vegetable cellulose. Walls of lymphatic vessels in mesenterium of guinea-pig contain on 1 muscular layer more, than in rat and rabbit. Thus it possible to distinguish digestive and muscular types of constitution in rodents, extreme in their row. Them are corresponded specific features of LSy construction: vast and thick plexuses of small lymphatic vessels and LN with weak development of chyle cistern in guinea-pig and contrary picture in rat [4] – disperse or loose and concentrated or compact morphotypes of LSy. They look like evrireal and leptoreal types of blood bud wide and narrow regions of branching of vessels with slowed-up and intensive metabolism in macroand microslanchnics. Herbivorous rabbit has more lymphatic plexuses and less LN, than omnivorous and quick rat.

I discorvered heavy decreasing of volume and solidity of lymphatic plexuses in lumbar region and thoracic cavity of white rat after its birth. These plexuses usually accompany TD on all or most of its extent even in mature guinea pig, and the TD double on all or most of its extent.

Clinic aspects of the problem. Astenics and hyperstenics succumb to infections. It is may be to connect with hypofunction of lymphoid system. Different types of human constitution are characterized by principal development of different connective tissues (CT) [1]: the astenic type – flabby reacting, thin, gentle CT (the reticular about sinuses of LN ?); the fibrous type (~ muscular) – dense CT (tendon of muscle near chyle cistern ?); the pastose, lypomatose (digestive) type – loose and adipose CT, inclined to delay of fluid (lymphatic plexuses ?). Hence tightening of surrounding CT (conductor of extravasal factor of lymph flow) leads to increasing of transport means of LB, including LN (compare compact, immune and fragmentary, transport types of LN).

Conclusion. Represented materials allow to mark the next parallels:

1) astenic constitution (PDB) – «narrow» morphotype of LSy, compact or magistral (by vessels), lymphoid or «immune» (? – increasing of number, level and area of placing of LN);

2) digestive, hyperstenic or pastose, lypomatose constitution (PBB) – «wide» morphotype of LSy, disperse or loose, capacious;

3) normostenic or muscular-fibrous constitution (PMB) – transport mesotype of LSy.

The mesotype of LSy gives off probably 2 extreme types of LSy constitution with reducing immunity – magistral or compact, responsive leptotype and disperse, pastose or capacious evritype, in which muscular tone reduce. This is compencated by growth of lymphatic plexuses – the nodal in astenics (compact, lymphoid form – network of sinuses in LN with their capacity function, widening to pump part of lymph in venous bud) and the vast, but loose vascular, often with chyle cistern in hyperstenics (disperse, capacity form).

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GEODYNAMIC AND TECHNOGENIC PROCESSES IN THE AREAS OF OIL AND GAS PRODUCTION AND THEIR ECOLOGICAL CONSEQUENCES

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The assessment of an ecological condition of environment of oil-and-gas territories is one of the major tasks at their development, for the purpose of safe development and carrying out policy of rational environmental management. Perm Krai is the large oil-and-gas region (area of 160,3 thousand sq.km) where within the Volga-Ural oilbearing region, openly more than 220 oil fields and gas from which about 120 it is developed, many of them are exploited over 40 years, some are already developed. Searches of new fields are intensively carried out, in the territory more than 20 thousand deep and structural wells are drilled, tens of thousands of kilometers of geophysical profiles are passed. About 10 thousand main oil and gas pipelines on which quite often there are emergencies to ecological consequences are operated. On oil fields of Perm Krai pays attention the following types of change of environment: relief re-planning, deforestation, violation of a soil and vegetable cover, change of conditions of a superficial drain and infiltration in connection with construction of drilling platforms, laying of communications, constructions of settlers for boring solutions and industrial drains. Impact on the geological environment is shown in the following: pollution of fresh underground waters by oil products at the expense of leakages of oil from barns, oil pipelines at accidents, the trade equipment at violation of production schedules; pollution of underground waters by chlorides at breaks of deep brines through defective wells and hydrodynamic gaps; impoverishment of deep brines by pumped fresh waters; radio nuclide pollution of a subsoil (breeds and brines) as a result of the underground nuclear explosions which have been carried out for an intensification of oil production. Feature oil-extracting technogenesis is considerable depth (to 2-3 km) coverage of the geological environment by technogenic loadings and wide scales of negative impact on environment. In regions of oil fields more than 70 centers of pollution of underground waters with an area up to 100 sq. km are revealed. Difficult nature of pollution is shown at an arrangement of oil fields in a coastal zone of large reservoirs. The significant role is played by the geological factors caused by geodynamic, structural and tectonic, neotectonic processes. At

investigation and development of gas and oil fields activization of a deep karst formation with formation of failures is observed. Especially strongly these processes are observed in geodynamic active zones with a high tectonic fracturing of breeds. The most significant environmental problem of oil-and-gas regions of Perm Krai is a liquidation of technogenic hydrodynamic systems in the top part of the geological section which manifestation in a zone of fresh underground waters is observed on many oil and gas fields.

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ECOLOGIC CONDITION OF COOLING WATER RESERVOIRS OF KRASNOYARSK REGION IN AN INITIAL PERIOD OF EXISTENCE

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An impact of biochemical factors over the formation of chemical composition of a reservoir is defined by processes of constant exchange of a substance and energy in biochemical natural circles. Processes of transforming substances in a reservoir are multidimensional: substances participate in processes of dissolution, electrolytic dissociation, complex-formation, catalytic transformations, absorption at the surface of non-organic, organic, and bio-organic materials, are consumed and discharged during processes of hydrobionts' metabolism.

Anthropogenic impact leads to significant alterations in chemical composition of a reservoir: chemical composition of atmospheric fallouts, undersoil and river waters changes. Mineralization of a reservoir water and concentration of polluting substances increases under a regulation of flow due to an increase in area of vapor and accumulation of substances. Plowing soils and cutting woods at the territory of rivers Beresh, Bazyr, Kadat alters correlation between surface and soil flows of the rivers.

We have revealed 14 factors that influence a reservoir ecosystem via the method of factor analysis of a statistic data row according to the quality of cooling reservoirs for a decade. The first of the outlined factors defines about 19% of the total dispersion of the observed indexes, and the second

factor – about 13%. Total share of sum dispersion of all indexes that is defined by an impact of two simple factors, equal 32,0% of their complete dispersion. Considering the nature of a reservoir ecosystem that is affected by a large number of accidental and uncontrolled events, contribution of the two simple factor should be considered significant.

The first and the most influential factor is linked to a leak of polluting substances into the river Kadat with the sough. The researchers have established that during its whole flow the river Karat is exposed to an intense anthropogenic impact. The influence of the polluted water of rivers Kadat, Beresh is reflected at all checkpoints of the reservoir, as the river sough that penetrates the upper part of the reservoir with the flow and circular flow is transported into the central and by-dam parts of the water pool, participates in the formation of bottom depositions in the reservoir. The second factor that influences the quality of water is related to a geophysical situation that impacts temperature regime in a cooling reservoir. Oscillations of the second simple factor have a clear cyclic nature. Temperature of water is a component of the second factor; apart from natural seasonal oscillations, it is revealed to an impact of heat discharge from heat aggregates of hydric power stations. Water temperature significantly impacts processes of dissolution of peat massives in a reservoir bed. Nowadays, ecologic condition of the water intake territory has a significant contribution into the anthropogenic component of factors.

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Materials of Conferences

ECONOMIC MODELLING IN SYSTEM OF FORECASTING OF AGRICULTURAL PRODUCTION

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Economic-mathematical modeling as a reliable method of studying economic processes and systems has proved itself some time ago and is traditionally used to solve a range of economic problems that are linked to an optimal distribution and re-distribution of resources, calculations of rational parameters, and evaluation of alternative variants of developing enterprises, scientifically-grounded territorial location of production, explanation optimal proportions of productive systems, etc.

Productive function occupies an important place in an economy as a model that directly impacts the process of production. This method implies limitation of analysis by external, quantitative correlations without questioning its essence and qualitative content. Modeling represents a construction of mathematical model. It requires a strong idea on a purpose of function of a studied economic system and possession of information on limitations that define a range of available values of the managed variables. Analysis of the model should lead to definition of the best managing impact upon an object of management that provides for meeting all set limitations. Complexity of real systems can significantly complex visualization of objectives and limitations in an analytic view. Regardless of an extremely large number of variables and limitations that, fronm the first sight, should be considered while analyzing real situations, only a small part of them proves to be significant in describing the studied systems. Therefore, while modeling systems, we should identify dominant variables, parameters, and limitations.

The essence of strategic planning of agriculture is in explaining objectives of its development and defining a system of measures that are necessary for its realization in future. At state and regional level the following objectives are defined: provision of food safety, increase in provision of food to population, achieving parity of prices and buying ability and its support, protection of the environment, etc. At the level of an enterprise the strategic objective is receiving maximum income with minimum costs due to realization of products, defining a direction of specialization, priorities in development of production branches, increase in sale volumes, rational distribution of resources.

One of the problems that is difficult to solve without specific methodical approaches, is develop-

ing a strategy of a stable development of an enterprise. Such strategy should provide for a possibility of an attended, internally-balanced function of basic productive resources of the enterprise and its economic-physical parameters.

Multiple interrelated and mutually-defined indexes that should be considered while defining rational structure of production, have defined the necessity of developing optimization models. Thus, they can be used in forming strategy of development and making final managing decisions.

Nowadays there are many approved economicmathematical models that allow one to solve diverse problems that are linked to the development of agrarian enterprises. Leaders of these organizations should define recommended direction in order to increase economic efficiency of the production. However, receiving a certain effect is possible only under optimal combination of of basic production resources.

Thus, alteration and correction of production elements according to calculations of an optimization model can have a positive effect over an economic efficiency of production the agrarian sector. It will provide for a creating of conditions for improvements in specialization and concentration of production over regions and categories of enterprises, increase in efficiency of production sectors, and economical distribution of the possessed resources.

Modeling allows one to significantly increase the quality of strategic, tactic, operative planning, and also consider their impact over parameters of the development of the predicted changes in terms of economic activity.

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THE BEHAVIOR OF ENTERPRISES IN THE CONDITIONS OF RISK

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Risk is a combination of the probability of occurrence of a particular event. Perhaps, as so many situations and types of risk can be identified.

The degree of risk is increased when there are in the country changes in the legislation and reforms in the political sphere. Non-standard situations in business shows that it is necessary to economists-financiers and managers familiar with the basic concepts and methods of control for all types of business risks.

Find different types of risk is closely connected with the development of combinatorics and probability theory. In the Middle ages the development of mathematics was determined, in particular, the direct interest of the gambling – slot cards, dominoes (bony plates), the «loaded» the bones. The most lively began to study theoretical and methodological aspects of risk at the end of the XIX – beginning of XX century.

Risk management is the process of working out a compromise, the situation, which would satisfy all, aimed at achieving a balance between the benefits of risk reduction and necessary for this expenditure, as well as decisions about what actions to be taken.

If earlier for the command-and-planned economy the problem of risk simply ignored, that in the modern world more and more enterprises should be to create in its organizational structure of the unit as the risk management Department, which would be quite natural addition to the traditionally independent functional units.

Risk assessment is a set of analytical activities, allowing to predict the possibility of additional entrepreneurial income or a certain amount of the damage arising from the risk situation and the late adoption of measures to prevent risk.

To assess the degree of risk the risk management Department may apply both objective and subjective methods of risk assessment. The results can be presented graphically using the curve of probability of occurrence of a certain level of losses. To avoid business risks and the losses that may arise enterprises may opt out of the most risky operations on the market. When the «crusade of the risk of» we need to find reserves and sources of funds to cover potential losses. It may be the means of the enterprise or the attracted credit resources.

Each participant of the business has its own tastes and preferences, directed associated with the risk or receipt of compensation, and shall identify the risks, which is exposed to decide which of the risks are acceptable to him and, finally, to find ways and means how to avoid unwanted risks, as well as to be able to evaluate, in which the financial costs of this will go and does this have any meaning.

The system of risk management primarily involves their assessment, the results of which allow in the future to choose the optimal way of reducing risk.

One of the possible ways to reduce risks is to hedge, which means insurance business risks, the protection of property interests of enterprises in the implementation of dubious reliability of operations due to educated funds of funds by making insurance premiums.

The enterprises of the agricultural complex, are subject to risk themselves should create directly in the business entity insurance funds, to reduce the financial losses associated with the influence of economic, social, climatic, technological and other factors. This will allow to promptly in the shortest possible time to overcome the difficulties. Definition of the structure of the provision for unforeseen expenditure is recommended to carry out on the basis of the identification of unforeseen expenditures by type of expenditure, for example, on wages in mind the downtime brigades, the additional costs of conversion in the case of a sharp change of the structure of freight traffic, subcontracts. Such differentiation will determine the degree of risk associated with each category of costs, which can then be extended to the individual phases of the production.

Effective way of neutralizing the risk – diversification, including the use of alternative opportunities and sources differ from each other, generating revenue at different levels of risk.

The most optimal way of risk management is their transfer to other persons by contract of factoring or guarantee. In these cases are concluded a contract with commercial banks, the credit organisations or third parties allowing to compensate for the resulting financial losses.

Success in the business world critically depends on the correctness and validity of the chosen strategy of economic and business activities and with the obligatory account should be taken of the probability of occurrence of critical situations.

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FACILITAING MODIFIED RATE OF COMPLEX PERCENT AS AN INDEX OF ECONOMIC EFFICIENCY OF INVESTMENTS INTO INNOVATIVE PROJECTS

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In this article the authors reason facilitation of modified rate of complex percent as an index of efficiency of investments into innovative projects, as it allow one to compare a level of economic efficiency of innovative projects with market income rates of other investment tools.

According to modern popular indexes of economic efficiency of investments into innovative projects that have spread widely (clean money flow, recoupment period, and clean concluded income), it is impossible to define an expediency of investing into a project. None of these indexes has the totality of features that are typical for a universal index of economic efficiency of investments into innovative projects, particularly:

1) consideration of time factor;

2) comparing income rate of projects with different realization period; 3) comparing income rate of projects of different scales;

4) comparing income indexes with market tools of investment.

In this case we find it reasonable of use modified rate of complex percent (MRCP) as an index of economic efficiency of investments into innovative projects:

$$MRCP = \begin{cases} \left| \sqrt[n]{NCF} \\ I_0 \\ - \left| \sqrt[n]{2 - \frac{NCF}{I_0}} \right| - 1, \quad NCF \ge I_0; \end{cases}$$
(1)

The function has the range of definition $(-\infty; +\infty)$ and is odd. Table 1 provides systematized possible variations of an innovative project results according to using the index of MCPR as a criterion of economic efficiency of investments into an innovative project.

Using modified rate of complex percent as an index of economic efficiency of investments into innovative projects allow us to solve the problem of comparing income rate of projects with different periods of realization and of different scales. Besides, a received value of average annual income rate of owned capital can be compared to other tools of investments (bank deposit, investments into shares or obligations, etc.), as it demonstrates average annual growth of an investor's capital.

Table 1

Scenarios of economic a	activity of investments
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NCF	Income rate	Final result
$NCF > I_0$	$MRCP > r_0$	Income over the required level
$NCF > I_0$	$0 < MRCP < r_0$	Income below the required level
$0 < NCF < I_0$	MRCP < 0	Losses in terms of investments
NCF < 0	$MRCP < 1 - \sqrt[n]{2},$ <i>n</i> is a period of a project realization	Project bankruptcy

In order to solve the problem of defining economic efficiency of investments into an innovative project, we use innovative-investment project JSC «Geomash». Schigrovskoye JSC «Geomash» specializes in projecting and producing commercial drilling machines. The company produces a wide range of mobile drilling facilities and equipment for drilling hydrogeological slits, engineering searches, static probation of soils, drilling for constructions of all types of piles in building, spying for firm raw minerals, seismic measurements of oil and gas on continents and shelf sea, and also aggregates for deepening vent screw anchors while fixing standing ropes of drilling towers.

Table 2 represents comparison of some plan and expected values of basic efficiency indexes of investing into the project JSC «Geomash», considering risk factors [1].

Table 2

Index	Unit of measure-	Plan	Expected value,	Range of oscillation $(p = 95\%)$		
	ment		considering risks	Bottom limit	Top limit	
NCF	Millions rubles	297,2	177,1	-101,1	417,4	
NPV _{r = 10%}	Millions rubles	146,5	73,3	-96,1	216,3	
Period of expediency	years	4	4,5	—	3,5	
MRCP	%	18,2	11,6	-7,8	22,3	

Basic indexes of economic efficiency of innovative-investment project JSC «Geomash»

As calculations show, expected values of investment's economic efficiency considering risk factors are significantly lower than planned values are.

Results of modeling investment process show us a significant underestimation of possible risks that can occur while constructing a basic plan of money flow. Implementation of the suggested approach towards carrying out the process of modeling multiple scenarios of realizing an investment project helps us to form a complete evaluation of economic efficiency of an innovative project. Besides, information on probabilistic characteristics of investment results create a basis for a high-quality estimation of a project's investment risk.

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EXPLAINING THE NECESSITY TO ORGANISE A PROCESS OF MANAGING RISKS AT ENTERPRISES IN MODERM CONDITIONS

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The process of managing and estimating risks while making decisions in an innovative activity of enterprises has a great significance, as it allows one to estimate possible losses, plan some procedures for their possible decrease, and also define an economic effect of managing risks.

In terms of market economy each economic subject that is directed towards economic growth, always develop a strategy of an innovative activity as a necessary condition of achieving a long-term objective. It is absolutely reasonable, as a development level of a single enterprise and a country's economy as a whole are mostly characterized by volumes and forms of realizing investment programmes. At the same time, a success of enterprises that carry out innovative activity depends on the way a system of selecting innovative projects is organized. First of all, a leadership faces a problem of selecting criterions of projects' efficiency. Besides, it is necessary to use not only methods of quantitative estimation (calculation of future money flows, project expenditure period, and other indexes), but also consider factors of qualitative nature.

While carrying out the process of managing risks of an investment project, one should consider a definite sequence of actions.

First of all, it is necessary to fix risks, in other words, limit a number of existing risks according to the principle of «reasonable sufficiency». Interviewing and questioning specialists is carried out in order to meet this recommendation as well as any experience of introduction of similar projects. Elements that define a risk situation are: possibility of not achieving the set objective, uncertainty of achieving the set objective, possibility of negative events under realization some actions in terms of uncertainty, material or other costs, expectation of danger under realization of a selected alternative.

Secondly, it is necessary to carry out quantitative estimation of the revealed risks that can be expressed by a relative or absolute level of costs and is evaluated by a possibility of risk and a degree of its possible impact.

Depending on a risk level we define a method of its processing: moderation, acceptation, evasion, or transfer.

After carrying out measures of procession, we should calculate indexes that describe risks, define financial indexes, and results of their management.

Consequence of creation and development of a system of risk management in an innovative activity of food industry enterprises provides for an increase in results of risk-management throughout the area of production.

Thus, we can see the obvious necessity of studying theoretic and methodical basics of managing risks in an innovative activity of food industry enterprises, development of practical recommendations on developing an efficient, scientificallygrounded system of risk-management.

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Materials of Conferences

ABOUT FUNDAMENTAL STUDIES ON LOCAL CULTURAL TRADITIONS OF GANJA

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In one of the ancient Zoroastrian's sources there was important information about, that Ganja was founded three thousand years ago. Thus, the first and important information about, that Ganja was founded 3000-4000 years ago by the one of the ancient Turkish tribes -Sacks- one of aboriginal population of the Caucasus, was reflected in a geographical treatise «Shahrestanihai Eran» (Iranian cities)that concerned to the 6th century. This geographical treatise was written in pahlavi language. There was said, that Ganja was founded by famous Turkish commander Afrasiab 3000 years ago. Afrasiab is a historical person and he was the head of sacks - tours, which lived in Azerbaijan (In the ancient sources Turks were named as tours). Ganjabasar is one of the richest areas from archaeological point of view. As a result of archaeological investigations here were found samples of material culture that concerned to the stages of different history period. Today most of them are kept in various museums of the world.

The flint tools, that found in Gillikdag workshop and camp around Ganja, ladle, that were found by a prominent Azerbaijani archaeologist Isaac Jafarzade, give the reason to say, that people, who lived in this area in VII–VI millenniums BC were the founders of the Late Stone Age culture. Archaeological investigations prove that in this period the main population of this region had sedentary lifestyle and were engaged with farming. In V millennium BC in Ganja region all known to us domestic animals were domesticated. This fact is approved with osteology remainders that were found during archaeological excavations [1].

Most of the historical monuments, that show, that national wealth of our nation Ganja city has a 3000-year history, today in great museums expositions of the world have unique place. Ganja, that has changed its location at least 4 times since its establishment, is located in a favorable position from the strategic point of view. As a result of scientific researches by the well-known arabist and scientist on Nizami's work Bertels have been proved, that during the terrible earthquake in Ganja in 1139,3 thousand people died. This fact is reflecting the city's power and greatness again. For comparison, it is also appropriate to note that, in the middle of the XIII century, in the great European city in Paris, lived nearly 100 thousand and in London nearly 40–50 thousand people .Ganja city ,that gave to the world such great thinkers and word masters as Nizami Ganjavi, Abul-Ula Ganjavi, Mehseti Ganjavi, Raziyya Ganjavi, Mirza Shafi Vazeh, in XII–XIII centuries restorated its high status and became one of the great cities, that kept alive the whole science, culture and state traditional system of the East [2].

Sheikh Nizami also has got both of the primary and secondary, and scientific education in his favorite city in Ganja. He had two main reasons ,why he didn't go to Baghdad and other centers of science.He loved his native city, land, was charmed of it, and also he knew, that Ganja had the high scientific potential .So the great thinker has never left his homeland and thought about it. Historically, Ganja city has been managed by government agencies, along with the elders. Folklore materials, collected from Ganja and historical information are confirming sayings. Generation «Akhillik», which covered in VIII-XIII centuries Iran and Central Asia, widespread the and played an important role in public life of Ganja. Comard Gassab's tomb in the territory of ancient Ganja belongs to the member of this generous Comard Gassab. Also there is supposed, that the great Azerbaijani poet Nizami was a member of the «akhi».

Until the middle of the twentieth century, the city was ruled by elders, elders played a role of bridge between the people and official government agencies. The most important of customs and traditions is forgiveness. During transaction people give each other forgiveness. If the patient going to die also people give him forgiveness and receive from him forgiveness. So they say: «without forgiveness will not be blessed». Neighborly relations are kept and preserved strictly in Ganja. People don't buy a house, before they interesting in neighbor's character. They say: «Don't buy house, buy neighbor»; «the nearest neighbor to distant relation». In Ganja relationship ties are very strong. It is the tradition of Ganja people to often visit relatives, and to share their sadness and happiness. «If also relative will eat each other's meat, they won't dispose each other's bone», - they said. In Ganja people mostly pay attention to real-generation, family. If someone wants to marriage his son or daughter, he interests with generation and family of the opposite side. Sometimes, when families can't pliable with each other, they say: «Our bone connected with their bone». When they speak about bone, they mean father's line, about milk they mean mother's line. In this way Ganja people were able to kept and preserved pureness of generation [3].

Ganja people are very strong in friendship. Also they can die for friend .Friend will pay all the needs of friend, will be his back-support. The equality in friendship is very important: «Show me your friend, and I will say you who you are». Ganja is famous for its hospitality. Most traditions of meeting guest are followed today. For guest in Ganja, as a rule, separated a special room – sitting room. This room is decorated with expensive carpets, put delicate dishes, silk bedding for the guest. For breakfast of guest put cream with honey. For dinner and supper are prepared delicious foods. Among them a plov seasoning with meat and lamb meat kebab are take a special place.

Ganja people put all kinds of table-blessing for guest. In addition they tell to guest kind words, and take to interesting places, worth visiting and pilgrimages. They never ask, when the guest will return. This act shall be considered as disrespect. «The guest is God's guest», - say Ganja people and meet the guest with honor, various gifts and send with respect. One of the more preserved customs and traditions of Ganja, that has deep historical roots, is the tradition of the wedding. Wedding, that full of rites and ceremonies is a whole holiday of elin. In this case, the close people, relatives and kin are more active. In the past there were various games, competitions and races in Ganja weddings. Now, some of these wedding's traditions arev forgotten. Ganja didn't have girl's wedding. Instead of it, there was «Parchakesdi» («piece cutting») ceremony. «Parchakesdi» was replaced girl's wedding .And now the tradition of cutting the girl's wedding piece is also preserved. Such traditions as «khinayakhdi», «uchashi», «evgordu» are live on nowadays [4].

As all the parts of the world, mournful funeral ceremonies in Ganja hold very sadly. Relatives of dead man put on black clothes, don't go to parties for a while, and don't listen to music. The first day of man's dead, third day, seventh day, 40th day and «adna» days (Thursdays) funeral ceremonie is continue. Ganja's funeral ceremonies can't be without rose water. Good smell of rose water eliminate man's pain. When people live funeral ceremony, they give condolences to the owner of mourning. Khidir Nabi and Novruz holiday in Ganja are celebrated ceremonial .In holiday of Khidir Nabi people roast wheat, and set Khidir's table. Then the flour of roasted wheat people put to secret room. Khidir Nabi comes at night, and put on finger to flour of roasted wheat. In house, which Khidir entered, there will be abundance.

Ganja people is going to celebrate Novruz holiday within a month. They keep in order house a, different kind of sweets are prepared. Among them Ganja's pakhlava take more attention. Pakhlava, which consists of nine layers decorates tables. Eggs are colored, «nazik» (sweet bread) are cooked. Bearing a grudge are reconciled, people visit sick, lonely relatives. People skipped over the bonefire, In whole Ganja's traditions are leading to spiritual pureness, they are collection of the universe laws to perfection, way of nation. In Ganja, which has ancient and rich culture and traditions of the table, still has preserved Azerbaijani national cuisine traditions . Ganja kitchen with its national characteristics is differs from other regions of Azerbaijan. The cooked dishes, prepared sweets, sherbet (sweet drinnk) are differing for their tasty and manufacturing technology. Ganja has a positive impact on national food composition in the human body, is the health service. Ganja harmoniously combines kitchen culture, its history, philosophy, table psychology, traditions, physiology, hygiene, chemistry, equipment, ethics, esthetics, poetry and other aspects of the culture of the table. Most unique culinary samples of Ganja, including plov, kebab, changal, chigirtma, pity, dovga, cream, cheese, oven bread, thin, lavash, pakhlava, zirviyye, sherbet, rose water, lemon tea, different kinds of jam, acids and other meals are extremely delicious. Most of the meals, including to Ganja cuisine are Turkish origin. For example, «dolma» comes from the word «doldurmag» (in translation it means «fill», «basdirma» from «basdirmaq» (means landfill cover), «chigirtma» from «chigirtmaq» (make cry), «bozartma» comes from «bozartmaq» (to boil). Measured at the thousand ages, ancient Ganja's national kitchen culture as a result of old experience of our progenitors, from generation to generation came to the present day. After spreding Islam religion in Azerbaijan, Ganja got a satus of the provincial center of the Arab Caliphate, and in whole Islamic world found fame as a center of science, education and culture. Creation heritageof the great poet and thinker of Azerbaijan Nizami Ganjavi (1141–1209) on the universal importance gave a rich information to the national culture, and also influenced to the development of literature and art .Nizami's characters have become the symbols of the culture of Azerbaijan. Many composers created vocal works, operas and ballets, symphony and other eternal music, that praised Nizami's poetry in music, and enriched world's culture. In traditional production of cloth manufactory trade historically played an important place. This kind of craft, that developed on the basis of local raw materials, was tied with cotton-growing economy. Since the time of the early Middle Ages, Ganja as Tabriz, Ordubad have been the main center of Azerbaijan in production of cotton cloth. In this ancient city printed cotton and calico fabrics have been widely produced. In traditional cloth productions the main place took the urbanmines. In the early 30s of the XIX century in Ganja there were more than 164 people - weaving. The majority of these artists were weaving. In Ganja, which was the most important center of cloth production were produced different kinds of cotton cloth. Only in the 30s of the XIX century in Ganja were presently working 30 cloth bench. During one year this machine were producing 2000 of white cloth, 200 top of red cloth (shile) and nearly 400 benchchalama-

ya (thin cloth) spoke. In general, in Ganja from textile there were made cotton cloth with simple painting, various kinds decorations. In most cases, in the XIX-XX centuries after coars calico coloured in white colors of, it coloured to different colors. There is no any source about glass production in and around Ganja. The majority of archaeologists agreed with the idea, that the homeland of glass production is ancient Egypt, but the famous English archaeologist, Egyptologist Petri Flindris thought, that it could be Mesopotamiya or the Caucasus. Taking into account that cobalt, used in glass coloring wasn t in Egypt, the scientists thought that, it could be in the Caucasus, also in Dashkesan. Samples of glass decorations, of BC, we met in the patterns of Ganjachay, Mingechevir, Xachbulaq and others. In these areas, the first centuries BC were found in samples of the glass plate. The majority of containers and the analysis based on graphical elements of the Roman scholars came to the opinion that the samples of the same scale as the Roman Empire through trade. There are more than 2000 beads in complex materials. Colored beads have prepared of different types products. Mostly distinguish beads, that prepared from blue green and grey paste. A group of beads made of bone and antimony. A part of the hanging beads were prepared from cockleshells «Nassagibbosula» and «Suraeva Moneta». According to experts thoughts, such kind of cockleshell, that widely spred in the Indian and Pacific Ocean, also the Eastern Mediterranean region, were put to Azerbaijan with economic relations.

Among the materials of Borsunlu Complex are differ with number of beats in majority and form.

In III–V centuries, the local craftsmen themselves also became to produce better-designed containers. Among the local clay and glass utensils that found in and around Ganja there were big similarity in the form and also in the decoration.

All the glass dishes found in and around Ganja are similar with the local clays on decoration of that period. Glass dishes were containing of Iron, cobalt, magnesium and other elements, that were specific elements for Ganja and its surroundings. The development history of this sphere of craftsmanship can be determined only through archaeological research. In general, information about the development of this sphere of were found in 1959–1960 years, glass products in and around Ganja were obtained only at the end of the twentieth century.

Results of archaeological excavations in the territory of Azerbaijan and research show that in the preparation of glass utensils were two technical methods: casting method and the method of blowing. The first of these methods is more ancient, but in the Early Middle Ages and Middle Ages were used both of them.

Producted glass alloys were transparent colored. By the addition of dusts of various metals in glass alloys people got colored glasses. We can see also to get her with different tinted green glasses also parts of blue, black and pink colored glass dish in sections of IX–X century in Shatal and Ganja. In IX–X centuries appeared dishes, that had handle and spout.

Glassproducts, obtained in Ganja and Shatal in the IX–X centuries, find their similiarities in in dwelling places of the Middle Ages in Barda, Beylagan, Mingechevir, also in the obtained materials of the neighboring republics of the same period.

Among decorations of that period yellow, white and red beads of round and plain form are met mostly. At the beginning of X–XIII centuries development of production of glass in and around Ganja characterized by improvement from the technology point of view.

Archaeological researchs show, that outside of the cities in the VIII–IX centuries, also big settlements were established. This is often due to density in cities [5–7].

As in many places, production of wool, cotton and silk in and around Ganja made necessary emergence and development of weaving .Becoming weaving one of the ancient spheres of crafts in and around Ganja was connected with the rich raw material base here. Presence of useful plant species for textile, including cotton, high level development of wool area of agriculture- sheep and goat breeding, camel breeding, horse breeding, presence of cotton cropping in Middle Ages and finally, regular expansion of silkworm breeding in this area created a foundation for growth of weaving here. In addition, during the research work in Mingachevir, Kazakh, Shamakhi, Sargah, Pirsaat River Basin monuments there have been found whole and parts of weaving loom and different sizes of clay and bone samples, that consist to weaving.

Moisey Kalankatly notes, that, along the banks of the Kura River... there are a large amount of silk (mulberry tree)... and cotton. Arab author who lived in the X century Al-Istaxri gives big information about, that in Barda in ownerless gardens were cultivated mulberry leaves and silkworm, then mulberry silk sent to Farsistanand Khusistan for sale. His contemporary and fellow townsman Ibn Hovqal gives information about preparation of silk clothing from them.. Also, Al-Istaxri provides detailed information about cutting of textile in Derbend.

The art of Textile materials, that concern to weaving craft, consists of spindle heads and needles. The remnants of dying from the Shamkir, Ganja,Shatal and Khunan proves development of dying here. Plant remains have been widely used in dying [6].

In the territory of Azerbaijan the oldest samples of wood treatment were found in the territory of ancient Ganja. Around Ganja area – in the region of Lake Goy-gol in the IV–III millennium BC have been discovered wooden thicker board, also wooden sugar bowl, that concern to the end of the II millennium BC, found in Mingechevir pitcher grave are material evidences of science thoughts. Along with the works and notes of medieval authors and travelers, a lot of material samples, found in the territory of ancient Ganja, also found in Mingachevir and concern to Middle Ages trough, ladle, wooden threshing board, shows that in Ganja wood treatment and sculptor art have a rich tradition [5–7].

Along with the mosque Juma (Shah Abbas), that constructed in 1606,local samples of trade ornamentalist, that built in Sheikh Javad Khan Street, that have 3 century history and was built in the nineteenth century in building of Sheikh Nizami Ganjavy's (1141–1209) representatives Sheikhzamanlys property and, that was restored in 2011, are attractive especial attention. History and art of Azerbaijan people as rich and colorful as its nature. On decorations of this descriptive art are reflected spiritual world, living style, customs and traditions of our nation. These pearls of art on material preparing and processing techniques are divided into different kinds. Among these types of craft metal treatment is mostly developed and has ancient history.

The craftsmanship of carpet-making is one of the important cultural achievements of the Eastern people in Azerbaijan production of carpets appeared in the I millennium BC. But carpet –making in the first period of middle Ages has turned to the in depend sphere of craft. In Ganja, that has minimum 3000 years history, production of carpets differed with quickly development. In this ancient city, that is native land of great Azerbaijani poet and thinker Sheikh Nizami Ganjavi, were weaved very uncial, inimitable kinds of carpet. In Ganja, that has rich traditions, were prepared carpets with various characteristics. For this reason one of Azerbaijani carpet groups are Ganja carpets or (Ganja–Khazakh carpets) [8].

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Materials of Conferences

PROPERTY COMPLEX AS A SUBJECT OF CIVIL TRAFFIC

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The interest of Russian jurist to the problem of the enterprise as a property complex (right object) is caused by the relatively recent introduction of this concept in the Russian civil law. Meanwhile, this legal construction for decades actively developed in the German legal doctrine and is widely used in the law of foreign countries with developed market economies. How mean enterprise – an object of the German civil law, on the basis of its location and its regulation in the law of Germany, as well as differences from the control in the Russian law can be found in this article.

The concept of the enterprise as an object of law to the greatest extent was developed in the German legal doctrine and in one way or another was seen by many countries with developed market economies. Currently, the concept of enterprise in this meaning is known and Russian law (Article 132 of the Civil Code of the Russian Federation).By now, in this sense refers to individual or collective-owned merchant property complex (legal object) used for business activities (production of goods, works, services) and consists of tangible and intangible elements. The company can pass from one person to another as a matter of various transactions and on other grounds. Debts arising out of the company, a merchant is liable to the extent of his property.

The company refers to a specific object property. The company is not in the general list of immovable property under Art. 130 of the Civil Code. Enterprise as a property complex of separate dedicated art. 132 of the Civil Code, which completes the block of articles on real estate. In addition, the company recognized real estate is not because of his strong ties to the land, and by the decision of the legislator in order to spread it legal regime established for real estate. If the composition of the company will be limited to separate movable items, as well as property rights and obligations, then the company will also be considered real property. However, the attitude of the legislator to the company as a special object of the rule is shown, first, formally, the company is not mentioned in the definition of property in Article 130 of the Civil Code, as introduced in Article 132, which is located after a block of articles about real estate, secondly, parts that make it an object that is so heterogeneous that its adoption of a group of objects can be made only on the basis of its characteristics as a specific property of the complex, but not based on the nature of its constituent elements, many of which, such as the rights, debts, exclusive rights to the property does not belong. Thirdly, the company is an object that falls out of the classification of immovable and movable property, as it thing, even complex, is not.

The company recognizes the property regardless of whether the composition of his immovable property belonging to the owner. This is due to the necessity of subordination deals now a special legal regime of real estate in order to ensure high reliability of such transactions, the protection of the rights of their members and third parties. However, recognizing the real estate company in the future Grazhdanskbq Code does not automatically submits it to all the general rules of property and sets the transactions with companies more formal and strict mode.

Practice has shown that the rule of Art. 132 of the Civil Code, according to which the enterprise as a property complex should be regarded as immovable property (real estate), was not actually implemented. Included in the company premises, buildings, structures, registered as real estate separately, and to register the company as a real property issues, what kind of property is a part of the property. For this reason, the company as a whole practically retired from the market of real estate. Therefore, it becomes necessary, in our view, to exclude from Art. 132 of the Civil Code of the recognition of the enterprise as a whole immovable.

In the State Duma introduced a draft federal law «On Amendments to the Civil Code of the Russian Federation and Certain Legislative Acts of the Russian Federation to establish as the single immovable property complex. For this purpose the article 130 of the Civil Code to read as follows»: Article 130. Immovable and movable property:

«1. To immovable property (real estate, real estate) include land, subsoil, and all that is firmly connected to the ground, that is, objects moved without disproportionate damage to their purpose, including buildings, construction in progress. To immovable things are residential and non-residential construction, built in the established order as separate objects of civil rights. Law to real estate can be attributed other property.

2. As immovable involved in circulation as a single entity, recognized a single property complex – united by a common purpose set of buildings, structures, and other similar facilities integral to physical and technological (including linear features – railways, power lines, pipelines and other) or located in a single area, if the union

of these objects in the same immovable property is reflected in the single state register of rights to real estate.

3. By air and sea vessels, inland vessels, space objects, the rules relating to real things, unless otherwise provided by law and does not follow from the nature of the objects of civil rights.

4. Things that do not relate to real estate, is movable. Registration of rights to movable property is not required, except in cases specified by law».

Chapter 14 of the Civil Code, «The acquisition of the property» to add a new Article 219:

«Ownership of the single property complex arises from the state registration of the right.

The state registration of ownership of a single property complex is permitted without prior state registration of rights belonging to it certain immovable property. Provides for the state registration of ownership of a single property complex as a whole, without prior state registration of rights belonging to it some immovable property, which greatly accelerates the registration infrastructure».

Related amendments to the Federal Law «On State Registration of Rights to Real Estate and Transactions» and the Federal Law «On the State Real Estate Cadastre».

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71

Materials of Conferences

THE DIFFERENTIATION CHALLENGES RESEARCH HISTORICAL AND PEDAGOGICAL PRECONDITIONS IN THE STUDENTS' SOCIAL AND ENVIRONMENTAL EDUCATION SYSTEM

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The complex content of the studying youth social and environmental education is required the special conditions of its assimilation and the further mastering. One of these conditions and its ways, in our view, is supported *the differentiated approach*. So, the differentiation phenomenon is being studied not only at the general theoretical, but also at the specific and scientific level. In the context of this study, the achievements of the scientist – the teachers are presented a certain interest in this challenge. That's why, we'll open the established positions.

It should be noted, that the differentiation is the traditional pedagogical challenge, and it is directly related to the learning process and the process of education. Thus, the learning differentiation is understood, as the learning activity organization form of the middle and the older age students, at which their aptitudes, the interests, and the abilities manifested have already been taken into account. The differentiation use in the learning process does not reduce the general (e.g. basic) level of the students' general training education, as opposed to the furcation [3].

So, this challenge has its long history. Until the middle of the XIX-th century, it has been associated, mainly, with the individual learning; and by the end of this century – with the professional self – determination. However, the challenges studies of the learning individualization under the mass and the regular school conditions have been carried out, and the appropriate variants for the urban and the municipal schools organization, for example the Mannheim training system, have been offered. Later, in the XX-the century, the various types of the differentiation have been tested and approved in the school practice: according their abilities, in their intelligence, in their inabilities [7].

So, the differentiated instruction and training idea has been found its reflection in the regulations, the normative documents, and the application in the school practice of the Russian education system. Thus, still, in the beginning of the XX-th century (e.g. 1918) in «The Basic Principles of the United Labor School» the possibility has been established from the 14 years to be shared by the groups and to be distributed by the fields of the study, which are subjected to the unity of the rights for all in the education receiving. From the 20-es, the various types of the differentiation have been developed in the «Narkompross» pilot – demonstration facilities: by the interests (e.g. the natural sciences and the humanities), the Dalton – plan, the

already chosen profile (e.g. it has been cancelled in the beginning of the 30-es) (e.g. ibid).

In the 30-es, despite of the state course policy obligation of the school uniform, the differentiated instruction and the training idea has been continued to be developed, firstly, by the main areas and the directions of the studied subjects and the disciplines -e.g.the natural sciences and the humanities, secondly, as the condition of the deepening and the expanding of the teaching material content. So, this idea had been gained the relevance and the urgency in the 50-es, when there was the need for the social and the public production development, and the need for the various specialists and the different experts. Hence - the link with the life with the school strengthening, the efficiency improving the students' training to work in the quite various sectors and the different branches of the national economy. Since, the late of 50-es, the differentiation idea has been begun to be taken its roots in the classroom practice in the framework of the elective classes and the facultative employment, the classes of their interests, and the in-deep study of the subject and the discipline. Thus, all these forms, as it had been shown by the experiment, appeared to be the quite effective, and they are still used now. The 60-es years are characterized by their conservation and the further introduction of the new ones: the special classes and the schools with the in-deep study of the subject and the discipline. In the 70-es years of the challenge study, as the bourgeois phenomenon, has been completely discontinued and completely stopped [3; 7].

The differentiation challenge researches have been continued at the end of the 80-es years, and that, as at the theoretical level, well as at the practical one. Thus, Shchukina G.E., in the approaches list to the learning, highlights the differentiated one, which is based on the consideration of the students' possibilities and their individual characteristics [8]. The Differentiated Instruction Concept has already been developed in the general secondary school (e.g. Skatkin M.N., Shakhmaev N.M., Babansky Y.K.). So, it is emphasized by the scientists and the scholars, that the teaching and educational process, for which it is characterized by the registration of the students' typical and the individual differences, it has been accepted to be called the differentiated one, and the training under this process conditions – the differentiated learning. And, moreover, the specific types of the differentiation are being considered: the internal one and the external one, according to their abilities, by their inabilities, by their projected occupation and the vocation later in the adult life, and also, according to their interests [1; 3].

In the 90-es years, the Russian pedagogical theory and its practice do not exclude the differentiation phenomenon of their own field of the attention. So, the differentiation idea is found its embodiment in the philosophical and pedagogical knowledge development (e.g. Gershunsky B.S.), the educational technologies 72

challenges, some separate aspects: the nature, the structure, the means, and the forms – the external one and the internal one (levites D.G. and et. al. [2; 4]. In general, the Differentiated Instruction Concept in the general educational Institution of the 90-es years (e.g. Monakhov V.M., Orlov V.A. Firsov V.V.) is practical provided the profiled and the contoured training at the senior level, the elective and the optional courses. In addition, the schools and the classes with in – depth study of the separate subjects and the specific disciplines, the specialized general secondary educational Institutions are being functioned: the musical, the dance and choreographic, the sports, the arts ones, and etc. So, this can be met the pre – professional training students challenges in the general high schools, when they are manifested their strong and stable interests to the certain and the particular area of knowledge or to the practical activities [5].

The beginning of the XXI-st century has been marked by the necessity for the further reform of the Russian Educational System, having conditioned to the need of the state in people independently thinking, the creative ones, the initiative ones, the capable ones for the challenges' solving of the post - industrial society development. This, on the other hand, is required the interaction nature rethinking between the teacher and the students, the instructor and the students. In this connection, the central figures of the cognitive process the pupil and the student, any learner have already been become. In other words, according to the scientists and the scholars (e.g. Polat E.S., Bukharkina M.Y., Moiseeva M.V., Petrov A.E.), the personality - centered learning has been become the relevant and the urgent, which, by its essence, is practically provided the differentiated approach to the learning, with a view of the learner's intellectual development level, his training in the particular subject and the discipline, his abilities and the inclinations. So, to be realized it, as the scientists and the scholars believe, the quite new pedagogical technologies will be helped: the cooperative learning, the projects method, the multileveled training, «The Pupil's Portfolio», the individual and the differentiated approaches to the learning, the reflection ability, which are implemented in these above - listed technologies [6].

Thus, the even preliminary analysis of the differentiated approach challenge has already been shown the possibilities presence for the various educational and pedagogical tasks solution, including the system of the studying youth social and environmental education. All these possibilities disclosure – is the main goal of our future research.

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THE DIFFERENTIATION CHALLENGES RESEARCH PSYCHOLOGICAL PRECONDITIONS IN THE STUDENTS' SOCIAL AND ENVIRONMENTAL EDUCATION SYSTEM

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The present paper's aim is to be established the differentiation research challenges bases in the students' social and environmental education system. For all this, the theoretical methods, first of all, the analysis and comparison of the scientists' and scholars' achievement in the field of the psychology; the abstraction, the generalization, and the conclusion formulation have been used by us.

So, the complex content of the social and environmental education, its process peculiarities and the special features are required and the special conditions of its further implementation. One of these conditions and its ways, in our view, is supported the differentiated approach. So, we'll recall, the differentiation in the «Dictionary of Foreign Words» (e.g. in Latin – differentia) is considered, as the division, the dismemberment, the whole bundle on the various parts, the shapes, and the levels. And in «The Russian Thesaurus Dictionary» «to differentiate» is meant to dismember, to distinguish the dissimilar facts, the phenomena at the reviewing or studying something. «The Dictionary of the Russian Language Synonyms» is identified the differentiation with the delimitation, the demarcation, and the division [11; 9; 12].

So, the differentiation phenomenon is practically studied not only at the general theoretical, but also at the concrete and scientific level. In the current research context, the scientists and the scholars – psychologists achievements are practically presented the certain interest on this challenge. We'll discover the entrenched positions in the science of psychology.

The differentiation is, primarily, connected with the psychological differences study not only between the individuals, but and also between the groups of people, the causes and the consequences of all these differences. And the special area of the scientific and the psychological knowledge has already been formed – the differential psychology, which had been launched at the beginning of the XX-th century in the works of V. Stern, F. Galton, A. Binet, A.F. Lazursky (Lewis Carroll) and the other researches. For all this, the diagnostics main
method in the differential psychology has been tested, but main question on the reason for the differences, it did not give the correct answer. Currently, in addition to the testing, the quite new approaches and the methods are being used, though, as the experimental, well as the mathematical ones, having used the new information technologies [4].

From the modern domestic psychologists, this challenge is paid much his attention by Shevandrin N.E., rightly having noted, that at the students' group formation the two fundamental processes have already been observed: the differentiation and the integration. So, the differentiation is practically manifested in the differences occurrence between the children on their individual identity qualities, the prestige, and the status in the group [16]. So, the differentiation phenomenon is practically investigated in the neuroscience and in the psychophysiology; it is usually connected and associated with such phenomenon in the psychology, as the discrimination threshold - the differential threshold, it is included in the diagnostic procedure and the methodology (e.g. so called the differential and diagnostic technique), having proposed by O. Weininger in 1986; it, moreover, is required the further development and its consideration of the psychological and pedagogical principles and their bases in the selection process of the learning profile [1; 8].

So, it is obligatory to be addressed and to be considered the differentiation challenge in the pedagogical and the educational psychology, that the psychological essence of the individual and the differentiated approaches is seen in the teacher's ability to be taken account of the children's individual psychological characteristics, peculiarities, special features, and the differentiated approach to them. Having applied some work's form, as the scientists and the scholars stress, it should be necessary to be taken into consideration a number of the psychological factors: the temperament, the further progress in their studies and the performances, the strengths and the weakness of the learning activities, the student's development level, the nature of the thinking, the interests, the relation to the subject, the outlook, the interpersonal relationships in the classroom [2; 5].

So, the foreign authors (e.g. A. Reber and et. al.) usually operate with such concepts, as: the differential validity, the diagnostics, the psychology, the reaction, the fertility, the conditioning, the reinforcement, the inhibition, the extinction, the counting, the limit, the growth, the stimulus, and etc. [8]. So, the certain interest is presented the differentiation phenomenon, in the context of the challenge research of the integral psychology, having considered by K. Wilber, on the basis of the analysis of the pre-modern, the modern and post-modern sources [14]. The psychology's historical aspects, the man's views, the differences between the people, since the Enlightenment Epoch and to the end of the of the XX-th century, are being examined by the wellknown and the prominent British scientist and the scholar R. Smith. The author is devoted the special place on the presentation origin challenges of the individual differences of the people, the identity challenge in the theory and the practice, the relationship of the individual and the social communication [13]. So, the differentiated approach is being considered and is being applied in the study of the individual's various challenges (e.g. Kjell L., Ziegler J.), the intuition challenges and its significance in the human life (e.g. Myers D.), the differential emotions theory (e.g. Carrol E. Izard) [15; 6; 3].

Thus, even the preliminary psychological analysis of the differentiation challenge condition is practically allowed to be emphasized its basic factors, the lines of study and in the socially and environmental education system of the studying youth. The main factor - are the students' individual differences, having manifested in the different and various aspects, in particular, the anatomy and physiological, the personal, the socially and economic, the pedagogical and educational ones. So, in connection with this, the efficiency of the students' socially and environmental training and its study directions are largely determined, namely, by the selected factor and its constituent parts and the components. Thus, the deeper conclusions - are the further study subject.

Thus, having summed up, we'll note, that the differentiation phenomenon is being continued to be interested by the scientists and the scholars, having allowed to be solved the specific challenges, to be predicted the status of the different and the various studied systems. The psychological science achievements in the differentiation challenge solving, in their turn, will be contributed to the individualization challenge study in the process of the socially and environmental education of the studying youth [17].

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Short Reports

VOCABULARY TRAINING IN THE HIGHER EDUCATIONAL INSTITUTION

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What it is more important when studying language – phonetics, grammar or vocabulary? This question was an object of disputes of linguists and scientific methodologists. Their opinions are different. They argue that the main thing is a sound training of speech, others consider grammatical structures, and the third category recognize a full priority behind lexicon. (Knowing 50 words and only 5 grammatical designs helps to make more offers, than, knowing 5 words and 50 grammatical structures! The child expresses his thoughts quickly, using separate words and without observing grammar rules, and people around understand it).

In communication with foreigners grammatical mistakes don't lead to misunderstanding, there are no words which would meet a certain situation more often.

Vocabulary training questions are very difficult at any level. It is a selection of a lexical material for various extents of training, selection of the active and passive vocabulary, development of the most effective ways of lexical introduction, a way of its fixing and control, system of exercises, etc. The matters, undoubtedly, are actual and for non language higher education institution. Final selection of lexicon for non language higher education institution isn't made yet, neither for a course as a whole, nor for its separate stages. The basic word stock in higher education institutions is defined by those tests more often, which students study in audience and out of it. However attempts to define at least its volume become repeatedly, especially concerning passive lexicon. For example, authors «Bases of the general technique of training to foreign languages» define it for non language higher education institution in 2500-3000 words, and I.M. Berman gives much more - 8000-10000 words (And. M. Berman suggests to begin selection with definition of a school core which first of all is necessary for further training in higher education institution). From 1400 units offered by the school program, it includes in a core only 700-800 words and phrases.

Thematically high school lexicon is divided into some layers:

1) household lexicon;

2) political;

3) general scientific;

4) special.

In the majority of higher education institutions the first term should contain the household and political lexicon, the second term – general scientific and special, the third term – special and political lexicon should be studied. The active lexicon is included into all layers, but the lexicon household and general scientific is subject to special activization. The passive lexicon includes all layers, first of all special vocabulary. Character of an active and passive lexical material depends on a form of its organization and a designated purpose. In the textbook for not language higher education institution it is possible to allocate the following forms of the lexical organization of a training material:

1) lexical exercise to the text;

2) the text (dialogue, a monologue for the oral statement, monologic texts in the form of fragments from newspapers, general scientific special literature for reading or audition);

3) lexical exercises after the text.

Vocabulary training methods

Various school methods in learning vocabulary was acquired differently.

Grammatical – translation method. Words were learned to the text, and then started reading the text.

Textual method. Words were learned in the text. The last was original. Only the contextual word meaning was acquired.

Direct methods. Words are acquired on a thematic sign, without transfer, by means of visual aids, a language guess, synonyms and antonyms.

Conscious and comparative method. Words are acquired both in a context, and without it. Transfer is used as means of disclosure of a word meaning. But other ways are also acceptable – a language guess, word-formation, etc.

The following types of control are applied in these methods:

1) the translation into the native language (the list of words before transfer);

2) context;

3) untranslatable disclosure of a word meaning.

How does it affect in non language higher education institution? Is the vocabulary often used?

The lexicon is acquired in the course of reading educational texts. The question is how it is more expedient to organize lexicon assimilation remains unsolved. Certainly, it is impossible to think up a technique of work on each word. But the analysis of the dictionary shows that many words have similar features and difficulties for assimilation, it is necessary to have uniform system. Many methodologists work on creation of methodical typology of a word. Scientifically reasonable methodical typology of a word helps the teacher to reveal the most effective ways of introduction, fixing and repetition of a certain type of a word.

Means of the vocabulary activization

Let's consider ways of development of lexical skill which represents fast educational action at the choice of a lexical unit, its correct combination to other units of speech and its situations.

What means are necessary for formation of lexical skill? Opinion of methodologists are unanimous – multiple exercises. There are a lot of lexical exercises, but it is necessary to choose better connection between vocabulary and situation. In this regard developing skills of the use of words in a speech situation the communicative exercises developed and entered by E.I. Passov are interesting. It allocates some certain stages in their organization:

1) perception of a word in speech;

2) word meaning understanding;

3) imitation;

4) designation – ability to call a subject in speech situations;

5) combination;

6) the use on the basis of an independent choice.

In lexical material assimilation the work is conducted over a form, value and the word use. In non language higher education institution the lexical material is acquired in two plans, i.e. receptional and reproductive. For this purpose lexical exercises after the text are provided.

What is the purpose of these exercises?

Lexical exercises to the text. Generally a word form is fixed (phonetic and grammatical), a word meaning and phrases are entered. The word meaning is given taking into account the subsequent context, types of exercises which will be used in the text (conditional types, infinitive structures, modal verbs) are used. The pronunciation of the new words which are especially difficult is used. The thematic lexicon in exercises is allocated.

Lexical exercises after the text are directed in training of the use of words and in expansion of a lexical stock. Various work with a lexical material of the text in connection with its contents is conducted, questions and answers, the word use in a new context, synonyms, antonyms, set phrases etc. are used.

The main work on the vocabulary is conducted on the basis of the educational text. Expansion of a lexicon occurs continuously at plentiful reading and performance of exercises which provide repetition of the new lexicon. It is important to see a new vocabulary assimilation to hear a word, i.e. when reading a word aloud and imitates it.

In expansion and obtaining word-stock, i.e. ability of the student to express the thought not one, and a number of forms has a great value. For example, to make of the monologic statement a dialogue and, on the contrary, to retell the text difficult in a form, using own words.

What is important for the student in a word assimilation?

I. For receptive command of the language it is important:

1) to see, find a new word, to define an initial form, to find value, to choose from a dictionary column the necessary value;

2) to determine a word meaning by word-formation signs, without looking in the dictionary;

3) to learn lexical some grammatical forms, es-

pecially rule exceptions, recognize them in the text; 4) to learn the most common verbs and to be able to identify them;

5) to know all syntactic words, especially pretexts, pronouns and the unions;

6) to be guided as a word in the offer.

II. For reproductive possession it is important:

1) to be able to use concrete word meaning in a speech situation which acts here as a context;

2) to know a certain number of words and phrases on subjects;

3) to be able to use grammatical structures, the most commonly used in speech, the lexicon is learned on samples;

4) to be able to raise the question and answer it, using a certain thematic selection of lexicon, questions can be to the filmstrip, the text etc.

5) to be able to give the monologic statement in the text or on the theme, using already acquired lexicon;

6) to be able to do quick translation of all educational texts.

Use of filmstrips

Assimilation of special terminology represents serious difficulty for students who in 3–4 semester (the 2nd year of training) are not enough familiar with the future specialty yet.

Introduction of foreign vocabulary by means of means of training (TSO) is the most rational and effective. Use of series of situational lexical filmstrips in the specialty promotes creation at trainees of professional motivation and attention strengthening. Attention increasing makes essential impact on storing process.

Psychologists consider that the most favorable for learning of foreign language and at the same time the most widespread is the mixed memory combining ability to acquire images by acoustical, visual and motor perception. The essential factor influencing durability of a language material in students' memory is a possibility of numerous (1-2 time) presentations of filmstrips.

The main stages of vocabulary formation skills are: a) a rough and preparatory stage – a stage of words semantization;

б) stage of training and creation of lexical speech skills.

On the first stage the lexicon is shown, comprehended and fixed. On the second – it is trained separately, and in interrelation with other words. On the first stage elements of reporting training prevail, on the second – elements of problem and situational training increase.

As a result of numerous experiments it was proved that time of introduction of lexicon shouldn't

Pedagogical sciences

exceed 20 minutes. The rest of the time of occupation should be used for various ways of its fixing.

Certainly, the most effective and perspective is creation of lexical courses and series of filmstrips to the corresponding communicative grants. When working with a series of situational lexical filmstrips on the same subject students have the ability to compare a word and its image, also intensity and durability of storing increases. In each series of filmstrips a certain repeatability of lexicon, but with expansion of details is observed. At the beginning there is a lexicon introduction from the general to the particular, then its fixing in return sequence. All filmstrips come to an end with situational or descriptive shots. Filmstrips are constructed according to the following scheme:



Educational situational lexical filmstrips should consist of 12–15 situations or the descriptive shots calculated on demonstration within 15–20 minutes. The pause for judgment of a shot as psychologists consider, should be in 2,5 times more pause necessary for pronouncing of the corresponding phrase. So, for example, if the phrase for the description of a situational shot takes 10 seconds, the pause for its judgment makes 25 seconds. When repeating display of the filmstrip rate of demonstration gradually increases. Available frames keys are intended for self-correction that allows to reduce time necessary for correction of mistakes.

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Materials of Conferences

QUARK MASS UNIT

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A numerical value for an additional natural unit of a virial impulse is a hypothetical offer based on physical possibility of quark mass unit.

Quark – it is an elementary particle and a fundamental element of substance. Quarks unite to generate the composite particles named hadrons, steadiest of which protons and neutrons, components of nuclear kernels. The most knowledge about of quarks has been representing from supervision for hadrons directly. There are six types of the quark known as aromas:

All six aromas of a quark have observed since then in accelerator experiments. A quark has various peculiar properties, including a mass, spin, electric charge, and aromas.

By analogy to the atomic mass unit (AMU), which approximately equal to the atomic mass of easy hydrogen, it is possible to define quark mass unit (QMU) which approximately should equal to the mass of Up quark (1). The atomic mass unit and quark mass unit may be considering as the bases for construction of additional substance amount units. In addition, quark mass unit can matter for structure definition of nuclear substance amount units.

In article [1], the atomic mass unit for construction of a physical mass unit (natural mass etalon) in system of 4 + 1 physical natural units is used.

$$M = 15089 \cdot m = 191 \cdot 79 \cdot m, \tag{2}$$

where m – the mass of electron; M – natural mass etalon.

Thus, physical constants and natural units of temperature and of time [1, 3] define the quantity of natural unit for physical action.

$$H = F \cdot T \cdot S; \quad T = m \cdot c^{2}; \quad t = S/15089;$$
$$J = 94\ 628 \cdot 528 \cdot 304 \pm 62 \cdot S, \tag{3}$$

where c – the velocity of light; H, T, t – natural units of physical action, temperature, and time; S – a wave time of free electron standard; J – the wave time of hydrogen frequency standard (hydrogen

maser); F – form-factor for natural unit of physical action.

Similarly, because of physical possibility of quark mass unit, it is possible to construct a unit of virial impulse, which is to add to hypothetical system of 4 + 2 natural physical units.

$$P = m \cdot c \cdot 79/2, \tag{4}$$

where P - a virial impulse unit.

By analogy with [1], quark mass unit we will define through a virial impulse unit (4).

$$Mk = F_1 \cdot g \cdot m \cdot 79/2; \quad g = e/q; \quad F_1 \approx 1;$$

$$Mk = F_1 (2.438 \ 455.01 \pm 0.05 \ eV),$$
 (5)

where q – the natural unit of an electric charge; e – module of an electron's charge; g – the electric charges ratio; F_1 – uncertain factor; Mk – quark mass unit.

For an estimation of the uncertain factor we will write out for six quarks (1) known values of the masses [3] in estimated natural units ($F_1 = 1$).

$$\{1\} = 2 \pm 0,2; \{2\} = 1 \pm 0,24; \{3\} = 39 \pm 2;$$

$$\{4\} = 523 \pm 11; \{5\} = 1714 \pm 13;$$

$$\{6\} = 71152 \pm 574.$$
 (6)

By analogy to article [1], using physical representations about possibility of introduction of natural mass unit, we receive representations about an additional physical unit of a virial impulse. According to work of [2] quantities of a physical unit of virial are defined by the following values.

$$W = P^2/M = m \cdot c^2 \cdot 79/(4 \cdot 191) = T \cdot 79/(4 \cdot 191), (7)$$

where W, T – the natural units of virial and temperature

It is necessary to notice that the natural virial unit is less than natural temperature unit approximately in \approx 9,67 times. By hypothetical analogy to practical impedance unit [1], we receive representations about practical virial unit.

$$W_j = W \cdot 10^{-j};$$

$$W_3 = 52,838 \cdot 8944 \pm 0,000 \cdot 0012 \cdot \text{eV},$$
 (8)

where j – is integer parameter in sequence of coherent units; j = three – for practical system [1]; Wj – coherent units of virial; W_3 – practical unit of virial.

For example, we will write out for twelve highmelting metals the known approximate quantities of the first ionization potential in estimated practical virial units $(F_1 = 1)$.

$$\{V\} = 0,128; \{Nb\} = 0,130;$$

$${\rm Hf} = 0,132; {\rm Ta} = 0,146;$$
 (9)

$$\{Cr\} = 0,128; \{Mo\} = 0,135;$$

$$\{W\} = 0,151; \{Re\} = 0,149;$$
 (10)

$$\{Ru\} = 0,139; \{Rh\} = 0,141;$$

$${Os} = 0,165; {Ir} = 0,174,$$
 (11)

where {} – is label for ionization energy of next twelve atoms: V, Nb, Hf, Ta, Cr, Mo, W, Re, Ru, Rh, Os, and Ir; here for quantities of the first ionization potential the practical virial unit has been used. The given practical virial unit can matter for definition of an energy dispersion and brightness of a corpuscular bunch in the physics of the charged particles bunches and in corpuscular optics.

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YOUNG TUTOR OF HIGHER EDUCATION INSTITUTIONS AS A SOCIAL GROUP

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This brief report contains definition of the concept of a «young tutor of a higher education institution», sets age limits of this category. It describes a social image of a high school tutor through competence and personal qualities. Processes that characterize young tutors as a social group are also studied. They are: motivation, marginality, professional identity. Measures that provide for an increase in status of a young tutor, are listed.

The report of Coordinate council of affairs of youth in scientific and educational areas by the Council of the President of Russian Federation of science and education «Science, education, and innovations in Russia: a young scientists' overview of problems and prospects» (2012) contains a range of statistic data regarding the position of the scientific youth. According to the document, nowadays about thirty thousands of young high school tutors operate in Russia.

By now there is no a single accepted opinion on age limits of the social group «Young tutors». Let us try to put it within the following limits: from 21 year old (as a possible moment of graduation from an institution of higher education and start of tutorship) to 35 years old (the utmost age of young scientists – candidates of science in state scientific grants and scholarships).

Combination of pedagogic and scientific activity transforms a classic tutor into a one who differs from a tutor of any lower level of education. These two types activities, combined in a creative way, provides for the most efficient professional work of a tutor.

According to these ideas, we will accept the following interpretation of the term «young tutor». A young tutor is an in-staff, off-staff tutor, or a tutor working on hourly salary of 21 to 35 years of age with an unlimited pedagogic experience.

Young tutors form a special age sub-group of the professional group of tutors. Therefore, we should start with a short general analysis of the status «tutors of higher education institutions» as a social group.

According to G.F. Krasozhenovoy, social image of a tutor is formed of three basic components that are linked functionally: general cultural, psychologic-pedagogic, and subject-technical component. General-cultural competence describes a tutor as a carrier of general human and national culture, moral norms and values.

Psychologic-pedagogic competence implies a tutor's realization of himself and others (students, tutors), knowledge of laws of general and professional development of a person within the process of education, abilities to organize inter-personal interaction and communication (communication between participants of the educational process, their individual and joint activity in achieving goals of training, upbringing and development).

Subject-technological compete represents a tutor's level of mastership of a subject contents and efficient pedagogic technologies, his abilities to bring pedagogic innovations, carrying out pedagogic researches and realization of their results on practice [1].

A tutor of an institution of higher education is defined by a unity of intellect, high level of verbal communication, direction and systematic type of thinking.

Activity of a tutor is a type of a complex intellectual work (most frequently – scientific-pedagogic work) that requires high-quality and permanent training. As typical features of scientific-pedagogic work we can outline the following ones: lack of definite time limits (unlike any physical work), direct connection with an organization of collective creative work, etc.

As personal qualities of a tutor we can point out the following ones: humanity, democracy in communication, ability towards objective evaluations and self-evaluations of behavior, high level of mastering contents of the profile subjects, knowledge of contents and special features of the professional activity of training specialists in an institution of higher education, feel for innovations, ability towards pedagogic creativity, high level of general culture, urge for a consequent self-education and self-development [2].

The social group «young tutors of higher education institutions» draws a definite scientific interest.

A young tutor enters the professional space where certain norms, relations, inner processes have already formed. Introduction into a professional society goes along with mastering its culture. It requires consequent reflexive work, forming goals of one's activity according to the created motivation. The highest percent of staff «leakage» takes place among young tutors as well as a decrease in motivation to continue their work in institutions of higher education [3].

The position of a young tutor can be called marginal as the one belongs to two social groups: students and tutors. However, a young student cannot be referred to any of these groups completely. The following characteristics typically describe a marginal person: doubts regarding his personal value, uncertainty of social relations, excess concern regarding the future, loneliness, fear to be rejected, tendency to avoid uncertain situations [4].

For a young tutor it is extremely important to obtain a professional identity (under professional identity here we mean «professional image of ME» that includes professional stereotypes and a uniqueness of one's own «Me»), it is one of the most important results of his professional socialization. A young specialist needs not only to master a professional role, but also demonstrate it to other members of the society in a way so his professional identity is supported by both objective and subjective evaluations.

The system of higher education has some efficient mechanisms that influence the process of forming a professional identity that is a part of social identity of a young tutor. It is an initiation of his part in conferences for young scientists and publication of scientific articles, improvement in his qualification. While playing this professional part, a young man realizes himself as a specialist. In case a young tutor does not show an activity in achieving higher status positions, it points to his low professional identity.

A young specialist who possesses a combination of statuses according to age and professional characteristics, considers the status of tutor as the main one, and this fact defines his behavior that reflects his identity. It is defined by special features of the modern youth that, according to V.V. Semenova «interests of the youth itself are directed not toward self-expression, but towards the search for the quickest and the most adequate way to enter the rightful state of a grown, economically-independent person» [5].

Requirements towards a professional role are formed in a young tutor's mind according to expectations that his colleagues address him. A significance of acknowledging one's professional acts by his colleagues testifies for a presence of professional identity of a young specialist. For him it is important not only to self-identify himself as a tutor, but also confirm his identity objectively.

C.I. Ildarkhanova defines a status of a young tutor by his position in a hierarchic structure of the larger-scale social group – intelligence, part of which they are. We can outline a trend to decrease in social status of this group that serves as both a result and a reason of transition of its great part to power structures, emigration, and partial marginalization. Transition of intelligence from the middle to the basic level that differs from the former by lower material-economic position, limited resources, lower potential of social-innovative activity also implies a decrease in social status of a young tutor [6].

After C.I. Ildarkhanova, let us outline the basic measures that can change the formed position and increase the social state of young tutors [7]:

 creating conditions that provide for a transition of tutors as a group to the middle layer of hierarchic structure of the society;

- solving problems of status disagreement via both increasing their level of income and creating a correspondence between the income and the carried out strain;

- increasing motivation for selecting the profession of tutor among young specialists via creating conditions for a sufficient (acceptable according to market indexes) career and professional growth, conditions for creativity and realization of research ideas.

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THE PERSON'S COMPETENCE FORMATION THEORETICAL PRECONDITIONS IN THE FIELD OF THE SOCIAL AND ENVIRONMENTAL RELATIONS

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The competence challenge, as the individual property, has recently being received the constantly increasing attention. So, this challenge is, practically, presented the certain interest and for the present study. That's why, we'll open some of the scientific prerequisites in its considered context. So, for example, the «competence» category essence is acted one from the fundamental prerequisites. The word «competence» (in Latin – adequate, capacity) is revealed, as «having jurisdiction; knowledgeable, well – versed in the particular area» in «The Dictionary of Foreign Words». Then, the competence – is possession of the competence, the possession of the knowledge, having permitted to be judged on something. The competence (in Latin – belonging

by the right) – is the terms of the reference; the challenges' range, in which the particular person has the knowledge, his gained experience [8]. It, moreover, should to be mentioned, that the scientists and the scholars have considered this category still in the 70-es years of the XX-th century, however, not in the psychological and pedagogical subjects and the disciplines, but only in the political science, That's why, Onikov L.A., and Shishlin N.V. such notion, as «competent» (in Latin – suited, as applicable) reveal then, as, firstly, with knowledge, well versed in the specific area; secondly, the rightful, authorized to be decided, to be done something [5].

In the domestic science, the profound and competence study, as the psychological and pedagogical category, has been begun, since the signing time by Russia, in September, 2003, the Bologna Declaration, having developed the full respect idea for the diversity of the cultures, the languages, the national systems of the education, and the University autonomy [2]. As a whole, today, the graduate model development, wherein at the different educational grades and the levels, is one of the areas, the ideas realization directions of the Bologna process.

So, E.P. Belozertzev, for example, notes, that, under the international organizations influence, at present, the attempts to be constructed such a model are currently being implemented. At the same time, his remark is quite true about the need for the notions distinction between the following: «the vocational qualification», «the key qualifications», «the core competencies». In the first case, they are referred to the knowledge, the abilities and the skills, which are necessary for the employee to be performed the special job. In the second one, the general vocational knowledge, the abilities and the skills, the capacities and the personal qualities, which are needed to be worked in the field of the vocational groups. As for the key competencies, that underneath Belozertzev E.P. understands the cross - cultural and the cross - sectorial knowledge, the skills, the abilities, which are necessary and required for the adaptation and the productive activities in the different groups of the vocations and the vocational communities [1].

So, the competence approach is begun to be used and at the additional education system study. Shamova T.E. Ilyina E.V., Podchalimova G.N., having designed the ADE, and they emphasize the bound definition of the specialist - professional's «core competencies». By their reasonable opinion, the «key competencies» - this is the «hub» notion, having reflected the various and the different constituents of the ADE components content (e.g. the axiological, the motivational, the reflexive, the cognitive, the operational and technological, the ethical one, the social one, and the behavioral one), its ideology «from the result», the learning outcomes (e.g. the increase in the knowledge, the skills and the abilities, the experience of the vocational and personal self - development, the creative activity, and the emotionally and the value relationship), the integrative nature of the content selection source – the various spheres of the culture and the human activity. So, the authors, moreover, emphasize and the basic, the universal character of the key vocational competencies, they single out the character features: the multi-functionality, the over – subject and over – discipline, the interdisciplinary, the intellectual capacity, and also the multi-dimensionality of the mental processes involved [11].

The competence notion is considered also in the domestic psychology. It should to be noted, that the foreign psychologists associate the competence with the ability to be performed some task, to be done something; in the linguistics - the possession of the basic, the abstract rules of the language [6]. So, the Russian scientists - psychologists (e.g. Sukhov A.N., Bodalev A.A., Kazantzev V.N., and etc.) reveal the «social and psychological competence of the individual» concept. It is presented itself the special knowledge on the society, policy, economy, culture and etc. At the same time, the authors note, that the socio – psychological competence, by its content, is resembled the «world outlook» notion, and it is allowed the individual to be orientated in any social situation, to be made the right decisions, and to be achieved the set goals. The antipode, in this case, is acted the incompetence, illiteracy, ignorance, and etc. It has been established by the authors and the social and psychological competence structure, including the following types of the competences: communicative, perceptual, in the area of interaction of the life, empathy, vocational, caste, vocational and criminal, the Government officials and etc. [9].

Sukhov A.N., Bolalev A.A., Kazantzev V.N. pay their special attention to the need to be distinguished the social and psychological competence from the psychological readiness and the vocational skills. If the social and psychological competence essence is consisted in the relevant knowledge, the attitudes and the stereotypes, then the psychological readiness and the vocational skills are included in themselves not only the knowledge, but also the skills, the ability and the other components. This notion, by the scientists' and the scholars' reasonable opinion, is directly related with the «self-concept» theory, in which the mental, psycho – physiological, and socio - psychological ones are distinguished. So, the last one is regulated the conduct and the activities of the individual, it, moreover, is prevented its further deformation, it is made the positive effect upon the reflection adequacy of the actual reality (Ibid).

In the Russian modern pedagogy, many scientists and the scholars are being turned to the challenge and the competence category. Thus, having developed the regulatory – legal support of the education, Fedorova M.Y., practically, introduces the «competence» term and rightly connects it with the specific powers, some educational Institution functions [10]. So, Ivanov D.V. considers the competence, as the result of training. At the same time, he rightly distinguishes the «competence» and «authorities; competencies» concepts: in the first case – the characteristic of the person, in the second – what the person already possesses. These and other competencies are formed the special groups:

1) the skill and the ability, independently, to be defined and to be achieved their significant purpose;

2) the skill and the ability to be worked, efficiently, in the interests of the common goal; and

3) the skill and the ability to be led and managed;

4) the skill and the ability to be equipped, comfortably, their personal life and in the particular social environment [3].

So, the idea of the competence - based approach is being developed as well by Serikov V.V. The competence, V.V. Serikov notes, - is the property of the individual, that is, practically, existed in the quite different and the various forms: as the highest degree of the skill efficiency, as the form of the personal self - realization, as the definite result of the individual's self-realization, as the form of the abilities' manifestation and the others. The competency – this is such a form of the knowledge, the skills and the scholarship existence, in general, which is led to the personal self - realization fulfilment, to the student's determination of his place in the world [7]. So, the research is carried out and the competence challenge, as well in the field of the environmental education. One from its aspects is paid much attention by V.A. Ignatova and S.B. Ignatov, having studied the special features and the peculiarities of the ecological and the legal competence of the students and moreover, having examined it, in the environmental culture context [4].

Thus, the theoretical analysis results have been allowed us, in the general way, to be formulated the working definition of the *«social and ecological competence of the person»* notion. It is, practically, presented by itself the special knowledge on the «nature – society» system, in each of its component, the interaction peculiarities and the special features between them, and the predicative condition. The social and environmental competence, by its content, is, practically, reminded the «world outlook» concept: the scientific knowledge system on the interaction between the society and the nature, the metabolic processes in the «society – nature» system, the nature management, the labor activity, as the interaction way. So, the individual's views and beliefs in relation to the nature, and the behavior regulatory bases in the nature have been included in the SEC structure. This is allowed for the person to be focused on any social and environment situation, and to be made the right decisions on the natural potential use, and to be achieved the set goals.

Thus, today, there are all the opportunities to be explored the new aspect of the personality competency challenge – the social and environmental one the in the science knowledge. In this connection, there is the need to be addressed a number of the research tasks: the nature and the structure clarifying of this kind of competency, its specific structure, the process, and the formation conditions, etc.

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