CONTENTS

IMMUNOREACTIVITY STATE IN EARLY AGE CHILDREN WITH CELIAC DISEASE IN UZBEK POPULATION

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In 20 children with typical (n = 12) and atypical form (n = 8) of celiac disease aged between 1-3 years old, there were studied parameters of cellular immunity, phenotype of immune-competent cells (CD8, SD25, SD95), cytokines, serum and secretory immunoglobulin A (IgA). Studies showed that celiac disease in children is characterized by immunodeficiency in cellular immunity in all levels, change of apoptosis markers and receptors for IL-2. More significant changes were observed in the typical form of the disease. Also, the abrupt increase in IL-4 levels and less significant changes of TNF-alpha are observed, that testifies to the expression of humoral immunity, especially at the local level, as evidenced by high levels of IgA, especially its secretory form.

Keywords: early age children, celiac disease, immunity, serum and secretory immunoglobulin A, cytokines, interleukin, necrosis factor-α

Celiac disease has been defined as an immune-dependent illness affecting first the gastrointestinal tract that is characterized by nonspecific damage of small intestinal mucosa by gluten, which leads to malabsorption in the intestine. Synonymous with the term «celiac disease» are Gee-Geiter-Geibner's disease, intestinal infantilism, gluten enteropathy, gluten intolerance, idiopathic steatorrhea (Revnova et al., 2000) [9]. Celiac disease is a long-developing chronic sickness of the small intestine caused by abnormal immune response to food protein gliadin, with the formation of antigliadin antibodies. In addition, the development of the immune process associated with disruption of the structure of the extracellular matrix of the mucosa, which leads to the production of antibodies of autoantibodies.

The purpose of research: to study the immunological parameters in early age children with celiac disease.

Materials and methods of research

We examined 20 children with celiac disease aged 1-3 years who had hospitalized to the department of gastroenterology. The diagnosis was verified based on the criteria of the European Association of Pediatric Gastroenterologists (1999). The diagnosis was made taking into account the presence of communication of the disease manifestation with the introduction of gluten-contained products into nutrition, results of histological examination of biopsy samples of the mucous of duodenum bulb-out part, high levels of antigliadin antibodies IgG and IgA, clinical effect of gluten-free diet, improving of absorption and morphology of the small intestine in exclusion of gluten from the diet. Stage of gluten enteropathy established in accordance with the classification of Marsh M. (1995). The severity of the pathological process and the period of the disease were assessed comprehensively including all major clinical symptoms of bowel impairment, frequency and expressiveness of syndromes of extraintestinal manifestations of disease.

20 patients with celiac disease were divided into 2 groups depending on the disease phenotype. 12 (60%) children were making a diagnosis with typical form of celiac disease, the main symptoms of which were abundant, offensive, light or colored, soft, foam or clay, poorly laundered stool three or more times per day, chronic diarrhea, increased abdominal circumference, abdominal pain, decreased appetite, retarded body weight, impaired emotional status (irritability, aggressive behavior, restless sleep). Atypical form of celiac disease diagnosed in 8 (40%) patients. In first line, they develop severe secondary metabolic disorders that masked the symptoms of main disease. Most often, these were disorders of phosphorus-calcium metabolism with the development of severe rachitis-like syndrome, bone deformities, pain in legs, short height, and anemia.

Immunological studies were performed at the Institute of Immunology, Academy of Sciences of the Republic of Uzbekistan. As a control, we used data from the Institute of Immunology obtained by Aripova et al. (2004) [2]. We studied parameters of cellular immunity: the contents of leukocytes, lymphocytes, total amount of T-lymphocytes (CD3), T-helpers/inductors (CD4) and T-suppressors/cytotoxic lymphocytes (CD8), ratio of CD4/CD8 (immune-regulatory index – IRI), B-lymphocytes (CD20), natural killer cells (CD16), and activation markers of lymphocytes bearing a receptor for IL-2 (CD25) and apoptotic factor (CD95). Phenotype of immune-competent cells (CD8, SD25, SD95) was determined using monoclonal antibodies to differentiation markers (product of the Institute of Immunology of Russian Academy of Medical Sciences, Moscow, Russia) in the reaction of indirect rosette-forming by Zalyalieva-Prokhorova's method [11].

In blood serum of patients we also determined the contents of cytokines: interleukin-4 (IL-4), necrosis factor-α (TNF-α) by immune-fermentative method. Test-systems for the determination of the cytokines (made by «Cytokine» Ltd., St. Petersburg, Russia) based on the «sandwich» method of hard-phase immune-fermentative analysis with the usage of horseradish peroxidase as an indicator enzyme. Also, we determined the contents of serum and secretory immunoglobulin A (IgA). Secretory one (sIgA) was identified in the saliva used dilution 1/2000. For his purpose we used set of A-8668 IgA-secretory test-system (IFA-BEST «Vector-Best» Ltd).

Digital material is processed by variational statistics.

Results of research and their discussion

Results of Immunological Studies

The data are shown in the table. As the table shows, the number of leukocytes in children

with typical and atypical forms of celiac disease was significantly reduced in 1,2-1,3 times ($p < 0,01$), whereas the relative and absolute numbers of lymphocytes in peripheral blood were not significantly changed.

It is known that the levels of $CD3^+$ lymphocytes represent a population of «mature» differentiated lymphocytes, capable of taking part in the implementation of the immune response. Thus, estimation of the number of T-lymphocytes did not reveal the presence of significant changes to the control. The absolute number of T-lymphocytes in children with typical and atypical forms of celiac disease decreased significantly in 1,3 and 1,56 times, apparently due to reduction in the total pool of leukocytes. The content of T-helper cells also progressively decreased as the disease progresses: authentically in typical and atypical forms 1,44 and 1,94 times, respectively, in comparison with the control group. Identified more expressed changes in children with atypical form of celiac disease suggest to the formation of immunodeficiency in cellular immunity.

The indexes of immune status in early age children with celiac disease in Uzbek population

Indexes	Control group	Typical form, $n = 12$	Atypical form, $n = 8$	*P*	*P*1	*P*2
Leukocytes, mcl	6,4 ± 0,31	5,24 ± 0,12	5,06 ± 0,08	< 0,01	< 0,01	< 0,01
Lymphocytes, mcl	2415,1 ± 204,3	2389,0 ± 72,9	2046,8 ± 114,2	>0,05	>0,05	>0,05
T-lymphocytes (CD3), mcl	1393,5 ± 110,5	1067,9 ± 76,0	887,6 ± 43,9	< 0,01	< 0,001	< 0,05
T-helpers (CD4), mcl	809,4 ± 70,0	560,8 ± 34,6	416,9 ± 30,7	< 0,01	< 0,01	< 0,05
T-cytotoxic lymphocytes (CD8), mcl	531,6 ± 35,7	539,4 ± 44,3	484,5 ± 21,9	>0,05	>0,05	>0,05
Immune-regulatory index (CD4/CD8)	1,52 ± 0,11	1,17 ± 0,09	1,01 ± 0,10	< 0,01	< 0,01	>0,05
Natural killers (CD16), %	15,1 ± 0,8	21,58 ± 0,77	18,63 ± 0,43	< 0,01	< 0,01	< 0,05
B-lymphocytes (CD20), mcl	583,5 ± 49,7	644,7 ± 18,39	556,1 ± 29,3	>0,05	>0,05	>0,05
CD25+, %	27,9 ± 1,2	23,25 ± 1,29	25,50 ± 0,90	>0,05	>0,05	>0,05
CD95+, %	26,7 ± 1,4	22,75 ± 1,48	22,00 ± 1,03	>0,05	>0,05	>0,05
IL4, ng/ml	7,7 ± 5,86	40,84 ± 1,51	43,53 ± 2,46	< 0,001	< 0,001	>0,05
TNF-α, ng/ml	25,2 ± 5,55	29,11 ± 1,40	22,44 ± 0,65	>0,05	>0,05	>0,05
IgA (secretory), mg/ml	380,0 ± 12,0	872,1 ± 18,9	891,3 ± 18,0	< 0,001	< 0,001	>0,05
IgA (serum), mg/ml	90,1 ± 6,6	121,2 ± 9,8	134,6 ± 12,3	< 0,05	< 0,05	>0,05

N o t e : P – the significant differences between control and typical celiac disease; P1 – the significant differences between control and atypical celiac disease; P2 – the significant differences between typical and atypical forms of celiac disease.

Recent studies conducted by Tribole et al. (2002) demonstrate the connection between the weak T-cell response and the undulating course of celiac disease, the predominant cytokine production of T-helper type-2 and the development of long-term chronic disease course [10].

In our studies, analysis of immunophenotype of blood lymphocytes of children with celiac disease showed a significant reduction in the absolute number of $CD3^+$ cells. Decrease in the total pool of T-lymphocytes observed mainly by reducing the number of lymphocytes expressing a marker of lymphocytes $CD4^+$. $CD4^+$ T-cell response to antigens is known from several works (e.g., Oleynik et al., 2004; Parfenov et al., 2003) to be an important mechanism to protect microorganism, as $CD4^+$ cells stimulate antibody production by B-lymphocytes [6, 7].

T-cytotoxic lymphocytes play a central role in the immune response. They are able to secrete proinflammatory cytokines – interferon-alpha, TNF-alpha et al. (Potapnev, 2002; Allahverdiyeva; 2004) [1, 8]. In groups of children with typical and atypical forms of celiac disease, the number of $CD8^+$ cytotoxic T-lymphocytes in a typical course of the disease did not change, whereas in the atypical form it had a tendency to decrease, indicating to the presence of the autoimmune process. This is proved by reduction of IRI, which was in children with typical and atypical forms of celiac disease 1,17 ± 0,09 and 1,01 ± 0,10, respectively, vs. the control group – 1,52 ± 0,11 ($p < 0,01$). In a typical form of the disease content of $CD16^+$ lymphocytes increased more significantly (in 1,42 times, $p < 0,01$) than in

an atypical one. Study showed that the content of B-lymphocytes had a tendency to increase in children with typical form of celiac disease, that testify to their active participation in the immune response, whereas in an atypical form it trended to decrease, probably, due to slowing of synthetic processes.

It is important to study activation markers of lymphocytes in autoimmune diseases, especially in celiac disease. According to the literature, in the activation of T-lymphocyte, cytokine IL-2 and its receptors play a key role in the development, maturation, and regulation of the immune response, supporting the proliferation of activated T- and B-lymphocytes. IL-2 is a non-specific germ factor of T-cells, which causes functional activation of T-lymphocytes. The main cell producers of IL-2 are T-lymphocytes with a phenotype of T-helper cells, which have functional features of T-helpers type-I. IL-2 also stimulates the proliferation of $CD8^+$ cytotoxic T-lymphocytes and natural killers ($CD16^+$). Soluble receptor of IL-2 may serve as a marker of activation of lymphocytes and the immune system in toto. Moreover, the level of expression of membrane form of this receptor correlates with the concentration of soluble receptor [3, 4, 5]. IL-2 acts only on cells bearing high-affinity receptors for IL-2. Based on this evidence, we investigated $CD25^+$ (cells that contain receptors for IL-2). Analysis of the expression of $CD25^+$ on T- and B-lymphocytes showed a trend to decrease, which seems to indicate activation of $CD16^+$ cells by the other mechanism. Determination of $CD95^+$ cells bearing markers of apoptosis in early age children with celiac disease showed their tendency to decrease, and no difference in the groups studied.

Thus, the study of the basic parameters of cellular immunity in children with typical and atypical celiac disease revealed changes that were manifested by suppression of the expression of marker receptor $CD3^+$, $CD4^+$, immune-regulatory index, some suppression of the absolute number of $CD8^+$, increasing of the relative number of $CD16^+$.

Results of Immune-Fermentative Studies

In previous studies by Boychuk et al. (2001) and Mamurov et al. (2003) is reported that the membrane molecule Fas ($CD95^+$) is specialized signal receptor to the induction of apoptosis, and belongs to the family of receptors for TNF-α and nerve growth factor [3, 4]. Natural ligand for Fas-receptor is a ligand FasL (a homologue of TNF-α), which is expressed on some cells under the influence of activation, in this case on lymphocytes. Binding of CD95 with Fas-ligand induces apoptosis of cells expressing CD95.

Based on the data above, we analyzed the levels of TNF-α in peripheral blood serum of children with typical and atypical celiac disease. Our findings showed that TNF-α in children with typical celiac disease tends to increase in comparison with the control, whereas in children with atypical clinical course it tends to decrease. The differences in the contents of TNF-α between two groups of children with celiac disease, probably, due to abnormal development of immune-pathological processes in these forms of the disease. By the spectrum of target cells and biological effects, the TNF-α is congenial to IL-1 and IL-6. Nevertheless, monocytes/macrophages, T-, B- and NK-cells, hematopoietic, fat, cartilage, bone cells react to TNF-α. With its ability to induce apoptosis, TNF-α also causes the generation of active oxygen forms, superoxide-radicals, as well as nitric oxide in the cell membrane. TNF-α is capable of lysing not only the tumor, but the virus-infected or parasites-invasion cells. Cytotoxic effect of TNF-α plays a role in the development of alternative signs of inflammation. In vivo TNF-α enhances antibody production (only thymus-dependent), suppresses delayed-type of hypersensitivity, and interferes to the formation of immunological tolerance.

Study showed that IL-4 in blood serum of children with typical and atypical forms of celiac disease significantly increased in 5,3 and 5,6 times in comparison with the control group. It was established that IL-4 is involved in differentiation of T-helper cells: Th-0 to Th-1 and Th-2. IL-4 acts on B-lymphocytes function in the synthesis of immunoglobulins. IL-4 controls the regulation of TNF-α, IL-1β, IL-5, IL-6, and IL-8 production.

Our studies suggest that in children with celiac disease the pronounced expression of IL-4 can lead to activation of B-cell component of the immune system, increase of immunoglobulins secretion, especially at the local level. Apparently, a significant increase of IL-4 in peripheral blood serum on the background of a slight increase of TNF-alpha, which is a pro-inflammatory cytokine, indicates the important role of immune factors in the development and course of celiac disease. This is confirmed by a more pronounced increase of secretory IgA in 2,29 and 2,34 times, whereas serum IgA increased only 1,34 and 1,49 times, respectively, for typical and atypical forms of celiac disease. Therefore, in children with celiac disease is observed activation of humoral immunity against a background of depression of cellular immunity.

Conclusions

According to available data and our own experience, we can do the following conclusions:

1. In children with celiac disease, is observed the suppression of cellular immunity

in all levels against humoral activation, which testifies to formation of immunodeficiency in cellular immunity.

2. Change of apoptosis markers and receptors for IL-2 depend on the form of celiac disease. More significant changes are specific for the typical form of celiac disease.

3. The abrupt rise in levels of IL-4 on the background of less significant changes of TNF-alpha testifies to the expression of humoral immunity, especially at the local level, as evidenced by high levels of IgA, especially its secretory form.

References

1. Allahverdiyeva L.I. State of immune status in children and adolescents with allergic rhinitis // J. Immunology. – 2004. – №5. – P. 284-286.

2. Aripova T.U., Umarova A.A. et al. Normal indexes of basic parameters of the immune system in children in the age aspect // Methodical recommendations. – Tashkent, 2004. – 16 p.

3. Boychuk N.N., Mustafin I.G. Fas-receptor and its role in atopic diseases // J. Immunology. – 2001. – №3. – P. 24-28.

4. Mamurov G.H., Uzakov N.R. The immune system in children with chronic enterocolitis // Journal of theoretical and clinical medicine. – 2003. – №3. – P. 89-93.

5. Nikonova M.F., Litvina M.M., Varfolomeeva M.I. et al. The immune system in children // J. Immunology. – 1999. – №2. – P. 20-23.

6. Oleynik E.K., Shibaev M.I., Oleynik V.M. Immunological status of patients with tumors of the gastrointestinal tract in Karelia // J. Immunology. – 2004. – №2. – P. 100-103.

7. Parfenov A.I., Crooms L.M. The modern concept of celiac disease // Rus. Med. Journal. – 2003. – Vol. 5 (2). – P. 24-30.

8. Potapnev M.P. Apoptosis of immune system cells and its regulation by cytokines // J. Immunology. – 2002. – №4. – P. 237-242.

9. Revnova O.M., Lyle H.B. Clinical aspects of celiac disease in children // J. Pediatrics. – 2000. – №5. – P. 107-109.

10. Tribole E., Kupper C., Pietzak M. Celiac sprue // N Engl. J. Med. – 2002. – Vol. 347 (6). – P. 446-48.

11. Zalyalieva M.V., Prokhorova R.S. Methods for determining lymphocyte subpopulations // №1 DP 20000774 D/P MPK 6601 №33/48 from 26.02.2001.

PROTECTIVE EFFECT OF ADAPTOGENS IN OXIDIZING STRESS

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As the title implies the article describes an experimental investigation of vegetable adaptogenes influence of Euphorbia Fisher extract and tincture on hemostasis, endothelium dysfunction, lipid peroxidation and antioxidant protection activity, the investigation of lymphocytic thrombocytic adhesion in normobarric hypercapnic hypoxia, normoxia and experimental hypernomocysteinemia. The experiment included 200 while laboratoris rast (mean weight 16 ± 20 gr.) engaged in the trial were divided into 9 groups. Medicines were injected intraperitoneally during 7 days, half of enimals were subjected to hypoxia influence. The data obtained testify a marked antioxidant properties of medications under discussion from Fischeriana root. Euphorbia Fischer root medications inhibit lymphocytic thrombocytic adhesion and therefore they regulate aggregative thrombocytic properties. In hypernomocysteinemia and hypoxia the most significant effect was observer in Euphorbia Fischeriana elixir intervention and it was more than 2 times higher than in Euphorbia Fischeriana tincture.

Keywords: adaptogens, Euphorbia Fischer, hemostasis, endothelium dysfunction, lipid peroxidation, antioxidant protection activity, the investigation of lymphocytic thrombocytic adhesion, normobarric hypoxia, hypernomocysteinemia

One of the most significant mechanisms promoting ischemic heart diseases is endothelium dysfunction playing a causal role [9]. In modern cardiology oxidizing stress is a key process included in intracellular accumulation of free radicals strictly affecting endotheliocytes integrity and function [15]. Thrombocytes play a key role in inflammatory reactions, immunity and atherosclerosis development [6]. This process is realized by releasing proinflammatory mediators and expressing surface molecules that may contact with other blood cells and endothelium. Substances secreted and expressed by thrombocytes have a wide range factors effecting intercellular adhesion, cells migration through vessels endothelium and are known to play an important role of specific signals for target cells [11, 14]. Adhesion interaction between thrombocytes and leucocytes ensures leucocytes discharge to foci of inflammatory and immune reactions. Different factors may initiate these processes including hyperhomocysteinemia and hypoxia [4].

Despite numerous studies in this field general principals of endothelium dysfunction correction were not defined and medications removing the results of oxidizing stress were not found [2, 3, 8]. An increasing demand for these medicinal plants and herbs is mainly associated with the fact that chemical nature of these plants and herbs is close to the human organism and they are easily included into biochemical processes of a human being acting gently and safely continuously regulating all vital processes of a man.

The aim of our study was to find out perspective medications from plants and herbs to corrct endothelium dysfunction in experimental normobarric hypoxia and experimental hyperhomocysteinemia. In our experimental work we carried out complex evaluation of their effect on hemostasis level, lipid peroxidation processes and antioxidant protection, endothelium function the investigation of lymphocytic thrombocytic adhesion in normoxia, hypoxia and experimental hyperhomocysteinemia. From all vegetable plants we selected remedies on the basis of Euphorbia Fischeriana Stend. of Zabaikalia. Euphorbia Fischeriana is used in the treatment of oncological diseases, tuberculosis, furunculosis, burn disease, chronic lung diseases, impotency, prostate adenoma, anemia of any genesis [1].

Materials and methods of research

Euphorbia Fischeriana elixir and tincture were obtained from preliminary purified raw material from resin. Euphorbia Fischeriana elixir was obtained by a 4 stepwise manner of heat chloroform spirit elimination treatment (Krivosheeva E.M. et all., 2009). Euphorbia Fischeriana tincture was obtained by spirit elimination from vegetable raw material without heating and extract removal according to state Pharmacopoeia IX (1990).

200 white experimental rats (mean weight 167 ± 20 gr.) ingaged in the trial were divided into 9 groups to evaluate hemostasis, endothelium dysfunction, lipid peroxidation and antioxidant protection activity in normal state, in hypercapnic hypoxia and experimental hyperhomocysteinemia. The experimental hyperhomocysteinemia was obtained by intraperitoneal injection of hemocystein solution of 0,001 mg/ml that is 0,1 ml of the total blood circulating volume. Hyperhomocysteinemia was confirmed by highly effective liquid chromatography. All experimental animals received the medications under study for 7 days. The doses of euphorbia Pallasi elixir and tincture were preliminary defined by acute toxicity and comprised 0,1 ml/100 gr of body weight intraperitoneally. The control animals were given the same quantity of isotonic sodium chloride solution. Hypercapnic normoborric hypoxia was designed by Kovalyev G.V., (1990) in pressurized camera [5].

The following techniques were used in this trial: theobarbituric acid test by Andreeva L.I., et al., (1988); chemiluminescence reaction by Vladimirov Yu.A. (1972); serum NO by Golikov V.V., (2004). Hemostasis activity was evaluated by unified techniques: – partly activated thrombin time [Larrien M.J., Weilard C., 1977]; prothrombin time [quick A., 1943]; thrombin time [Syrmai E., 1957]. Lymphocytic thrombocytic adhesion was determined in the following way: fresh heparinized blood

of the experimental animals formed layers on gradient urogtaphin-phycol (density – 1,077) and discharged lymphocytes, was washed by phospsate buffer pH – 7,4), then calculated the number of lymphocytic thrombocytic coaggregators by 100 cells in Goryaeva camera in microscopy.

Statistical calculation of the data obtained was performed by Fisher-Student method using Statistica 5.5.

Results of research and their discussion

Change in NO concentration is one of the markers of endothelium damage. NO level was evaluated by NO_3 quantity [2] as NO is chemically unstable compound existing only some seconds. In rats all substances under study caused the elevated NO3 level in normoxia, the Euphorbia Fischeriana tincture raised NO level by 57%.

In hypoxia NO marked reduction was observed and was confirmed by 7 times decrease of NO_3 concentration. Euphorbia Fischeriana tincture in hypoxia demonstrated 13 times elevation of NO discharge. Euphorbia Fischeriana elixir did not effect endothelium function in hypoxia.

In hypohomocysteinemia there was 3,4 times NO elevation. In hypohomocysteinemia in normoxia condition Euphorbia Fischeriana tincture and elixir had a modulatory effect which resulted in NO reduction to the initial levels.

When evaluating hemostasis Euphorbia Fischeriana tincture and elixir were established to cause the extension of prothrombinaze formation in intact rats. In hypoxia and experimental hypohomocysteinemia we observed the development of hypercoagulation. Under these conditions Euphorbia Fischeriana elixir returned all results of coagulogram to normal state but Euphorbia Fischeriana tincture statistically elevated thrombin time and partly activated thrombin time but they were not comparable to their norm.

The study of activity changes in system lipid peroxidation – antioxidant defense showed that Euphorbia Fischeriana tincture and elixir statistically decreased theobarbituric acid active products level in serum in normoxia. More manifested efficacy of the medications under discussion was determined in hypoxia. Thus, Euphorbia Fischeriana tincture reduced theobarbituric acid active products concentration by 86%, elixir by 71% compared with control. The decrease of theobarbituric acid active products hyperhomocysteinemia correlated with elevated antioxidant defense activity. So, according to chemiluminogram antioxidant activity elevated by 89% when injected Euphorbia Fischeriana tincture, elixir by 67% compared with control. And in a group of rats with hyperhomocysteinemia by 4-th day theobarbituric acid active products level in erythrocytes statistically elevated (5 times increase) compared with control ($8,7 \pm 0,6$ mkmol/mg lipids) and became $43,5 \pm 0,6$mkmol/mg l ($p = 0,001$) but by 6-th day reduced to $6,7 \pm 1,3$ mkmol/mg l. When investigating theobarbituric acid active products blood serum the similar situation was noticed: by the 4-th day of experimental hyperhomocysteinemia their concentration significantly elevated to $4,0 \pm 0,4$ mkmol/mg l ($p = 0,034$) but by 6-th day reduced to control and composed $1,7 \pm 0,4$ mkmol/mg l. But rate of serum elevation in theobabituric acid active products is less emphasized compared with elevation of theobarbituric acid active products in erytrhrocytes. When analyzing active oxidant protection the following results were obtained. General antioxidizing serum activity by the 4-th day is statistically elivated to $77,0 \pm 2,7\%$ ($p = 0,038$) and by the 6-th day remains the same elevated level of $78,3 \pm 1,0\%$ ($p = 0,001$). In hyperhomocysteinemia elixir effect was more significant. Euphorbia Fischeriana tincture did not greatly change this level. Lymphocytic thrombocytic adhesion intensity in healthy intact rats was 11,2%. In 2 days of hemocystein injections in experimental hyperhomocysteinemia lymphocytic thrombocytic adhesion index statistically lowered to 9,33%, on the5-th day of it elevated to 78%, on the 7-th day it reached 93,5%. In hypercapnic normobarric hypoxia mean increase of lymphocytic thrombocytic adhesion index was by 10%. Drugs of Euphorbia Fisher roots effected unidirectionally both in intact rats and in hyperhomocysteinemia. The most significant effect was shown by Euphorbia Fisher extract. Thus, it lowered rosella formation by 46,5% (Euphorbia Fisher tincture reduced lymphocytic thrombocytic adhesion level by 26,5%), in hypoxia by 56,8% (tincture by 32,7%), in experimental hyperhomocysteinemia by71% (tincture by 52%).

Reduced lymphocytic thrombocytic adhesion activity in normobarric hypercapnic hypoxia may be caused by decreased NO concentration which is known to inhibit lymphocytic thrombocytic adhesion [2]. Earlier we established that in normobarric hypercapnic hypoxia NO reduction takes place but in hypoxia under the influence of Euphorbia Fisher extract and tincture NO concentration has15-13 increase respectively.

T-helpers and natural killers are known to form rosella with thrombocytes therefore the maximum lymphocytic thrombocytic adhesion intensivity may be not more than 60% but in modulating hyperhomocysteinemia we received higher numbers. It might be explained by damaged homocystein effect on cells or nonspecific receptors expression for

thrombocytes by another lymphocytes subpopulation.

Thus, the data obtained testify a marked antioxidant properties of medications under discussion from Euphorbia Fischeriana root. Euphorbia Fisher root medications inhibit lymphocytic thrombocytic adhesion and therefore they regulate aggregative thrombocytes properties. In hyperhomocysteinemia and hypoxia the most significant effect was observed in Euphorbia Fischeriana elixir intervention and it was more than 2 times higher than in Euphorbia Fischeriana tincture.

All the medications studied blocked lipid peroxidation processes and activated antioxidant protection. The medications from Euphorbia Fischeriana root appear to have antioxidant properties due to a high level of antioxidants. Thus, according to Teleatjev V.V., Euphorbia Fischeriana roots contain flavonoids, saponins, glycosides, selkenium, traces of anthracenederived substances, ascorbic acid [1, 7]. Our studies suppose antioxidant mechanism of flavonoids to be bases on ability to defense capillary walls from radicals damage by neutralization of oxygen active forms and break of free radicals reaction chains according to [13]. Besides flavonoids selenium effects significantly antioxidant activity and is a constituent element of selenium dependent glutationperoxidase inactivating oxygen active forms. Hence, hemostasis and endothelium function reduction in hypoxia and hyperhomocysteinemia by medications under study may account for decrease of damaged effect of oxidizing stress on endotheliocytes [10, 12, 15]. Euphorbia Fischeriana roots have the most significant protective efficacy.

References

1. Curative treasures of Central Siberia / V.V. Teleatjev. – Irkutsk. 2000.

2. Devies M.G. Clinical biology of nitric oxide / M.G. Devis, G.J. Fulton, P. Hagen // Brit. J. Surg. – 1995. – Vol. 82. – P. 1598-1610.

3. Golikov P.P. Nitric oxide in emergency diseases // P.H. Medpraktika. – M., 2004. – 180 p.

4. Homocysteine in man pathology / N.N. Tsybikov, N.M. Tsybikova //Advances in modern biology. – 2007. – V. 127, № 5. – P. 471 – 482.

5. Kovalyev G.V. Nootropical drugs – Volgogrud, 1990 –355 p.

6. Kuznik B.I. Adhesion molecules and leukocyte-platelet interaction / B.I. Kuznik., J.A. Witkowski, A.V. Solpov // Journal of Hematology. – 2006. – T. II, № 2. – P. 42–55.

7. Medicinal plants of Zabaikalie: methodological recommendations / B.I. Dulepova et al. – Chita, 1991.

8. Moncada S. Nitric oxide: Physiology, pathophysiology, and pharmacology / S. Moncada, R.M.J. Palmer, E.A. Higgs // Pharmacol. Rev. – 1991. – Vol. 43. – P. 109-142.

9. Nagy J. Endothelial dysfunction / J. Nagy, B. Csiky, T. Kovacs // Orv. Hetil. – 2001. – Vol. 142, №31. – P. 1667-1672.

10. Proinflammatory action of Euphorbia Fischeriana Stend. roots tincture / S.I. Shashkov, L.B. Bureeva, A.V. Tsyrenzhapova et al. // Man and Medication. – M., 2001. – P. 96.

11. Siegel-Axel D.I. Platelets and endothelial cells / D.I Siegel-Axel, M. Gawaz // Semin Thromb Hemost. – 2007. – Vol. 33. – P. 128-135.

12. Shashkov S.I., Buraeva L.B., Starostenko F.M. Influence of Euphorbia Fischeriana Stend. roots tincture upon coagulation link in inflammatory process // Man and medication. – M., 2001. – P. 85.

13. Surata Y., Takahama U., Kimura M. // Biochim. et biophys. Acta. – 1984. – Vol. 799. – P. 313-317.

14. Witkowski J.A. Pathogenetic significance of lymphocyte-platelet adhesion / J.A. Witkowski, B.I. Kuznik, A.V. Solpov // Med. Immunology. – 2006. – Vol. 8, № 5–6. – P. 745–753.

15. Zenkov N.K. Oxidizing stress / N.K. Zenkov, V.Z. Lankin, E.B. Menchshikova. – Maik: Science. – Interperiodika, 2001. – 344 p.

FEATURES OF CLINICAL COURSE AND EFFICACY OF TREATMENT FOR HYPOTHYROID GOITER DEPENDING ON STRENGTH OF EXCITATION IN THE CENTRAL NERVOUS SYSTEM

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In this paper are presented results of the study of features of clinical course and efficacy of the administration of caffeine to thyroxine replacement therapy for hypothyroidism, depending on the strength degree of excitation in the CNS. Study is based on results of dynamic management and treatment of 86 patients with manifesting (symptomatic) form of hypothyroidism aged from 17 to 60 years old. There were used «Temping test» to investigate the strength degree of excitation in the CNS, immunoenzimatic method to study hormonal state (thyrotropin, T3 and T4), reflexometric method to expand Achilles reflex time. Study showed that symptoms of the CNS changed most significantly, depending on the strength of excitatory processes in the CNS. Along with this, changes in levels of T3 and T4 did not depend on the degree of excitation processes in the CNS, both before and during the treatment of patients.

Keywords: hypothyroidism, excitation processes, central nervous system, treatment

Based on the guideline of Russian pathophysiologists Gorizontov et al., published in 1966, we know that the clinical course of many diseases, as well as the effectiveness of their therapy, ultimately depends on character of individual reactivity and nonspecific resistance, which are conditioned by constitutional features of an organism and, foremost, the nervous system [5].

Several studies, conducted by Yepisheva (1992), Artyomov (1993), and Khodjaeva (1999), have found that individuals with strong manifestation of excitation process of the nervous system (strong, balanced and mobile processes in the central nervous system (CNS)) have much easier and faster course of disease and high efficiency of therapy due to higher stress tolerance and productivity of immune response, compared with representatives with less significant excitation processes in the CNS (weak and unbalanced neurological processes) [2, 7, 11].

According to Little (2006), the thyroid disorders affect many body systems, which lead to a serious disturbance of the majority of homeostatic parameters [8]. Subsequently, both in terms of prognostication of hypothyroid goiter and improve the effectiveness of treatment, it would gain the undoubted importance the study of dependence of clinical course of hypothyroid goiter on the basic properties of the CNS as power of excitation, on which individual reactivity depends.

Recently published evidence-based studies by Kaplan et al. (2003), Escobar-Morreale et al. (2005), and Santini et al. (2005) reported efficacy of long-term administration of thyroxine in the treatment of hypothyroid states. As a rule, the success of therapy is based on the correct selection of doses, and depends on many factors such as age, pregnancy, nutritional factors, comorbidity et al. [3, 6, 10]. Meier et al (1993) noted that the most important of them is individual sensitivity of organism [9], which is still not well studied.

In this occasion, the aim of our research was to study features of clinical course and efficacy of treatment for hypothyroidism, depending on the strength degree of excitation in the CNS.

Materials and methods of research

Our study is based on results of dynamic management and treatment of 86 patients with manifesting (symptomatic) form of hypothyroidism aged from 17 to 60 years old. Duration of the disease varied between 1-7 years.

Using the «Temping test» by Ilyin E.P. (2004), we determined the strength degree of excitation in the CNS. This test consists in counting the number of pushes on the button for several 5-second intervals, followed by forming graphics, where on the horizontal axis marked time intervals, and on the vertical one – the number of pushes in each interval. The test was carried out multiple times as on the primary admission of patients to the hospital, and after they achieve euthyroid state. The test results were taken into account, when they coincided in no less than 75 %. For further research, we selected two marginal variants of expression of excitation processes (EEP) in the CNS: «strong», which is characterized by a convex or rising type of curve, and «weak» with a descending type of graphics.

The study of hormonal background (thyrotropin, total triiodothyronine (T3) and total thyroxine (T4)) was performed by immunoenzimatic method using sets of firm «Human». Achilles reflex time was expanded by reflexometer «Achill-01».

To determine the functional state of the thyroid gland, we have proposed a table consisting of 5 groups of symptoms related to specific body systems. The appropriate number of points assesses the presence or absence and severity of each symptom. In this case, similarly are estimated the quantitative measures of pulse and blood pressure. In general, the value of total score can range from 0 to 105 points and indicates to hyperthyroid state at values above 65 points, euthyroid status – in the range 35-65 points, and hypothyroid – when values are less than 35 points (table).

Severity of thyroid symptoms, in points (scores)

	№	Symptoms	Absence (score)	Availability (score)			
				Reduced	Aver-age	Strengthened	Extremely strengthened
CNS	1	Personality (reac-tion to environ-ment)	Apathy (0)	Inhibited conscious-ness (1)	Norm (2)	Irritation (4)	Nervousness (6)
	2	Sleep	Drowsiness (0)	Daytime sleepiness (2)	Norm (4)	Restless (5)	Insomnia (6)
	3	Motor reactions (action)	Very slowly (0)	Slow (1)	Norm (2)	Fussiness (3)	Excessive fussi-ness (4)
	4	Speech	-	Slow (0)	Norm (1)	Fast (2)	-
	5	Tremor	No (0)	-	-	In the hands (3)	In whole body (6)
	6	Sweating	-	Not marked (0)	Norm (3)	Excessive (6)	-
	7	Feeling the heat	-	Feeling cold (0)	Norm (2)	Feeling hot (3)	-
SKIN	8	Skin color	Icteric (0)	Pale (2)	Norm (4)	Hyperemia (6)	-
	9	Skin moisture	Flaked off (0)	Dry (2)	Norm (4)	Moist (6)	-
	10	Skin thickness	-	Thick (0)	Norm (3)	Thin (6)	-
CVS	11	Pulse (times per min	< 50 (0)	50-69 (3)	70-80 (6)	81-100 (9)	> 101 (14)
	12	Systolic blood pressure (mm Hg)	<89 (0)	90-109 (1)	110-120 (2)	121-140 (4)	> 141 (6)
	13	Diastolic blood pressure (mm Hg)	-	< 70 (0)	70-80 (1)	81-100 (2)	>101 (3)
	14	Heart sounds	-	Muffled (0)	Clear (2)	Sonorous (4)	-
Gastrointestinal tract	15	Appetite	-	Decreased (0)	Norm (1)	Increased (3)	-
	16	Stool disorders	Constipa-tion (0)	Tendency to constipation (2)	Norm (4)	Unstable, < 3 per day (6)	Unstable, > 3 per day (8)
	17	Body weight	Increased by obesity and edema (0)	Increased due to obe-sity (2)	Norm (4)	Decreased <20% of initial for 3 months (6)	Decreased >20% for 3 months (8)
Eyes	18	Glance	-	Dim (0)	Norm (2)	Eye-shine (5)	-
	19	Exophthalmus	-	-	No (0)	-	Exists (2)

For the treatment of manifesting hypothyroidism, we used thyroid preparations (L-thyroxine, euthyrox) from initial dosage of 1,6 mg/kg body weight to normalize thyrotropin levels with a further selection of individual maintenance dose.

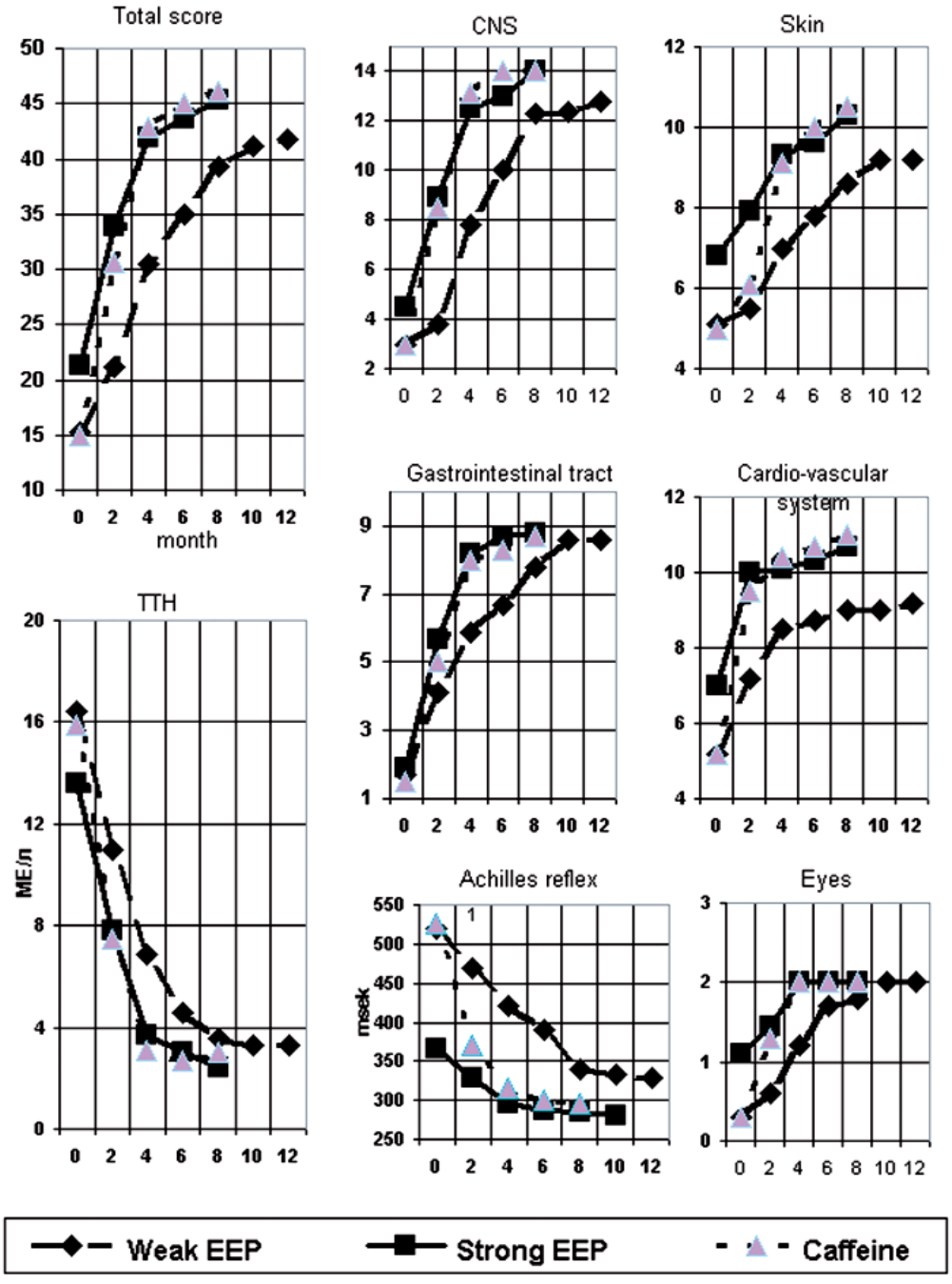
Results of research and their discussion

Figure shows that pattern of clinical symptoms in patients varied depending on the strength degree of excitation in initial condition.

Examination of patients before treatment showed that the hypothyroid state is accompanied by a significant decrease in total score of clinical symptoms. It was found that if patients with strong EEP had total score reached up to 21,3 units, then in those with weak EEP it was up to 15,3 units.

During the first 2 months of treatment with thyroxine, significant positive dynamics of

clinical symptoms (total increase of more than 12 points) was observed in patients with strong excitation processes in the CNS, whereas in the other group this index was 2 times less. However, over the next 2-month course of hormonal therapy, dynamics of clinical symptoms become manifest in both groups to the same extent (increase by 8-9 points). Moreover, if patients with expressed manifestation of excitation process in the CNS reached the lower limit of euthyroid state (35 points) after 2 months of therapy, then patients with weak EEP obtained this result only after 6 months. Later, after 4 months for patients with strong EEP and 8 months for those with weak EEP, the values of total score of clinical symptoms start to stabilize. However, even while the groups achieved their respective maximum values, the differences between them on this index was at least 4 points.



Changes in clinicalsigns during the treatment of patients with hypothyroidism with different expression of excitation processes (EEP)

Initial differences in the total score in accordance with EEP in the CNS caused by the manifestation of clinical signs mainly of the cardiovascular system (CVS), CNS and skin (2 points), as well ocular symptoms, but to a lesser extent. Treatment of patients with strong EEP resulted in sharp increase in the number of points with achievement of euthyroid state limits in 2 months for the CVS and 4 months for other symptoms. Patients with weak EEP were characterized by some delay during the first 2 months followed by further intensive increase in the number of points of clinical signs of the CNS and skin symptoms, which similar to above group. Furthermore, when patients with strong EEP achieved the euthyroid state, it was observed some predominance of the number of points in all clinical signs, save for ocular.

Thus, symptoms of the CNS are observed to change most significantly, depending on the strength of excitatory processes in the CNS. To determine possible links between them, we also studied indicators of Achilles reflex duration, which reflects manifestation of excitation processes in somatic nerves.

Figure 1 demonstrates that clear difference in reflex duration between the groups of patients with different EEP was identified already in initial state. In representatives with weak EEP, its average value exceeds 500 milliseconds, whereas in those with strong EEP it was almost a third less ($P < 0,001$). Up to 4-month period of treatment reduction rate in reflex duration was the similar in both groups, but by that time, in those with strong EEP, this parameter reached the normal parameters (below 300 milliseconds) and further were observed no significant changes. Minimum values in this index in patients with weak EEP were gained only after 8 months of treatment, and subsequently did not decrease below 325 milliseconds (on average by 50 milliseconds greater than for the persons with strong EEP).

In hypothyroid states, change in the level of thyrotropin is known to have the important diagnostic value. In general, before treatment in patients with weak excitation processes this parameter was an average of 3 nmol/L higher than in compared group ($P < 0,05$), and amounted 16,5 ± 1,4 nmol/L (Figure). During the 4-month treatment, thyrotropin levels in all patients decreased to the same extent, and initial differences between the groups remained. However, this parameter in patients with strong EEP by this time settled in the normal range, and achieved normal levels only after 8 months of hormonal therapy. Although, further levels of thyrotropin in both groups were no significantly changed, however the differences between them remained within a mean of 1,2 nmol/L.

Along with this, changes in levels of T3 and T4 did not depend on the degree of excitation processes in the CNS, both before and during the treatment of patients.

In general, more severe clinical symptoms of hypothyroidism *ab initio* and less effective treatment are observed in patients with weak EEP. If it is indeed associated with the peculiarity of the CNS functioning, so the strengthening of excitation by any medications should have a significant effect on the disease course. We suppose that for this purpose the most suitable may be caffeine, which has the ability to increase the excitation processes in the CNS and is widely consumed in the tea and coffee. Assuming that the consumption of caffeine in the drinks will not be enough to achieve the approximate indicators of nervous system functioning in individuals with weak EEP to that in those with strong EEP, we introduced into complex treatment of patients with hypothyroidism caffeine in a daily dose of 1,5 grams.

According to change in total score of clinical symptoms, this drug significantly reduced the time required to achieve the euthyroid state (from 8 to 4 months) (Figure). This was due to the rapid and complete disappearance of clinical neurological symptoms, when after 2 months of treatment with caffeine the parameters in patients with weak EEP almost did not differ from patients with strong EEP. The similar tendencies were observed in CVS, gastrointestinal and eye symptoms. Only on the dynamics of cutaneous symptoms such pattern was somewhat later – after 4 month. Such changes were observed for indicators of the Achilles reflex, but after a two-month period, the differences between patients with strong and weak EEP under the influence of the drug lost statistical significance.

For the full evaluation of results it should be clarified whether identifying clinical changes caused by increased levels of thyroid hormones or by tissues sensitivity to them. Studies showed that the administration of caffeine to thyroxine replacement therapy had no significant effect on T3 and T4 levels. At same time, the drug reduced the timeframe for achieving euthyroid state in thyrotropin level almost in 2 times, and its dynamics from the second month did not differ from the indexes of patients with strong EEP (Figure).

Summary

According to results obtained, clinical manifestations of hypothyroidism depend on the EEP strength: CNS, CVS, skin and eye clinical symptoms were more expressed at weak excitation processes in the CNS. At same time, the absence of differences in reduction of thyroid hormones levels indicates a

lower sensitivity of tissues and organs to hormonal deficiency in patients with strong EEP. We think that this is confirmed to some extent by the lower values in thyrotropin level and duration of Achilles reflex in these patients. Correction the deficit of thyroid hormones through hormone replacement therapy resulted in reduction of clinical symptoms and achievement of euthyroid state, which was almost 2 times slower and somewhat less expressed in weak EEP, despite similar changes in the levels of thyroid hormones (T3 and T4) in blood of all patients. We consider that the data obtained, probably, can be explained by the lower need of organism with strong EEP in thyroid hormones for the maintenance its stable euthyroid state, as well as by less sensitivity to their deficit, accordingly.

Thus, to answer the question «is it has a direct relation to intensity of excitation processes in the CNS or is it only connected with any other factors», we additionally stimulated the CNS of patients with weak EEP by caffeine. In this case, strengthening of excitation processes contributed to manifestation of changes in studied parameters similarly to patients with strong EEP. According to the literature[1] and our own study, this testifies to an inverse relationship of excitation intensity in the CNS, and tissue need for thyroid hormones.

References

1. Akmaev I.G. Interaction between nervous, endocrine and immune mechanisms of brain // Journal of Neurology and Psychiatry. – 1998. – №3. – P. 54-56.

2. Artyomov A.P. The value of typological and biochemical characteristics of an organism of the patients with drug and toxin abuse for the determination of risk factors and clinical course of the disease, Abstract of the thesis for PhD. – Tashkent (Uzbekistan), 1993. – 18 p.

3. Escobar-Morreale H.F., Botella-Carretero J.I., Gomez-Bueno M. et al. Thyroid hormone replacement therapy in primary hypothyroidism: a randomized trial comparing L-thyroxine plus liothyronine with L-thyroxine alone // Journal of Ann. Intern. Med. – 2005. – Vol. 142. – P. 412-424.

4. Gorizontov P.D., Mayzelis M.Y. Importance of constitution for the development of diseases, Multivolume guide on Pathophysiology. – M.: Medicine, 1966. – P. 286-319.

5. Kaplan M.M., Sarne D.H., Schneider A.B. In search of the impossible dream? Thyroid hormone replacement therapy that treats all symptoms in all hypothyroid patients // Journal of Clin. Endocrinol. Metab. – 2003. – Vol. 88. – P. 4540-4542.

6. Khodjaeva R.Sh.. Individualization of treatment of patients with hypertonic disease, depending on the type of nervous system, hemodynamics and pharmacologic metabolizing characteristics of an organism, Abstract of the thesis for PhD. – Tashkent (Uzbekistan), 1999. – 19 p.

7. Little J.W. Thyroid disorders. Part II: hypothyroidism and thyroiditis // Journal of Oral Surg. Oral Med. Oral Pathol. Oral Radiol. Endod. – 2006. – Vol. 102. – P. 148-153.

8. Meier C.A., Maisey M.N., Lowry A. et al. Interindividual differences in the pituitary-thyroid axis influence the interpretation of thyroid function tests // Journal of Clin. Endocrinol. Metab. – 1993. – Vol. 39. – P. 101-107.

9. Santini F., Pinchera A., Marsili A., et al. Lean body mass is a major determinant of levothyroxine dosage in the treatment of thyroid diseases, Journal of Clin. Endocrinol. Metab. – 2005. – Vol. 90. – P. 124-127.

10. Yepisheva L.V. Pathogenetic therapy of atopic dermatitis in children: the importance of features of typology of nervous system, autonomic reactivity, phenotype of acetylation and monooxygenases activity, Abstract of the thesis for PhD. – M., 1992. – 17 p.

DYNAMICS OF SOME IMMUNOLOGICAL PARAMETERS IN CHILDREN WITH ASSOCIATED TRAUMA OF THE LOCOMOTOR SYSTEM DEPENDING ON THE PERIODS OF OSTEOSYNTHESIS

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During the period 2005-2009, there were operated 71 children with associated trauma of pelvis and extremities aged from 4 to 15 years. The patients were divided into 2 groups: early osteosynthesis (up to 3 days) was carried out in 52 (73,2%) and late osteosynthesis (from 3 to 7 days) in 19 (26,8%) suffered children. Immunological studies (determination of IL-1β, IL-2 and TNFα) were performed in both groups in the first hours after trauma and at the 1, 3 and 7 days. In trauma patients was observed a significant increase in the level of IL-1β, IL-2 and TNFα to control group. After late osteosynthesis, the levels of proinflammatory cytokines were elevated relative to the data in the first hours after injury, whereas in patients with early osteosynthesis their levels were significantly reduced on the 3rd day. Thus, early osteosynthesis showed positive dynamics of immune response mediators.

Keywords: associated trauma, pediatric polytrauma, osteosynthesis, immunity, cytokines

In recent years, morbidity and mortality rates in all developed countries has increased due to lethality from traumatism. In this case, there were changes in the character of trauma. Pozharisky (1989), Yermolov et al. (2003) noted the increased percentage of severe traumas, complicated by shock and hemorrhages, more often incidences of severe associated injuries or polytrauma, which is characterized by long-term rehabilitation and social adaptation, high disability and mortality (30% and 16-20%, accordingly) [11, 17].

Polytrauma is not just the sum of damages. Its treatment should include not only the control and correction of physiological damages, but the pathophysiological responses to them. Sokolov (2005), Yermolov et al. (2003) defined polytrauma as a systemic disease that causes the release of many inflammatory mediators. Systemic response to trauma can cause a lethal triad – hypothermia, acidosis, and coagulopathy, with particular acute course in children [14, 17].

All the body's response to trauma is difficult to explain only by shock. Therefore, it was introduced the concept of "»traumatic disease», which is a collection of local and general changes in the body due to severe mechanical trauma and determining its vitality and adaptive capabilities.

Traumatic disease occurs as a response to predominantly associated trauma, accompanied by acute disturbances of vital functions such as traumatic coma, spinal shock, traumatic shock or acute respiratory failure. Its pathogenesis was well studied by Klochkov, Yeryuhin et al. in 1989. According to authors, the first week after injury represents one of the key stages of traumatic disease when there is a gradual transition from the first phase with its mechanisms leading to the second one, which ensures the inclusion of long-term adaptation. If this stage is already completed (approximately by the end of 2-3 days), then any new extreme impact, including surgical intervention, causes failure, which is most often manifested in severe local and general surgical infections [7, 8, 18].

The main pathogenetic links of response to trauma defined by several studies are as follows: hemorrhagic shock, hemodynamic instability, respiratory distress syndrome, hypoproteinemia, disseminated intravascular coagulation (DIC) syndrome, low immunity, sepsis, multiorganic failure [2, 4, 7, 8, 12, 19].

Tcherne et al. (1995) distinguishes the following periods in the course of traumatic disease:

1) acute or resuscitation period (1-3 hours);
2) primary or stabilization period (1-72 hours);
3) secondary or regeneration period (3-8 days);
4) tertiary or recovery period (> 8 days) [15].

The risk of infection for any period of treatment of traumatic disease is of particular importance because every injury is accompanied by a depression of humoral and cellular immunity, the intensity of which increases sharply with polytrauma [9]. In addition, each surgical intervention causes a secondary immune deficiency, the severity of which depends on the volume and duration of operation [6]. Immunological parameters could serve as markers of prognosis of polytrauma severity and its outcome. In this occasion, Yagmur et al. (2005) have found a significant increase in the levels of interleukins (IL) 2, 6 and 8 in patients who died of polytrauma, whereas in the survivors with milder course of the disease, the concentration of these IL was significantly lower [16].

Peterson et al. (2004) considers that predictor of infectious complications in pediatric polytrauma is the initial shift of electrolyte balance in the direction of base deficit [10]. Ac-

cording to Galaktionov (2004), children with multiple traumas are also risk group for infections because of the limitations of protective immunological mechanisms, as maturation of the immune system is completed by age 14 [5].

In trauma, osteogenesis is regulated by a complex mix of factors, in which the immune system is also involved [1, 3]. Abakumov et al. (2001) observed irregularities in the synthesis of several cytokines after severe mechanical damage, both proinflammatory and anti-inflammatory [1].

According to Chechyotkin et al (2004), a number of cytokines such as TNFα, TNFβ, IL-6, and IL-17 stimulate the formation of osteoclasts and regulate their resorptive activity, resulting in the destruction of bone tissue. On the contrary, IL-4, IL-10, IL-13, IFNγ, and TGFβ inhibit both formation of new osteoclasts and activity of existing ones, stimulating bone formation [3].

Thus, there is no doubt that the study of cytokine levels in associated trauma in children will appreciate the role of immunological reactions in the body and evaluate their influence on the course of traumatic disease.

The purpose of this research was to study the levels of inflammatory cytokines in children with associated trauma of the locomotor system.

Materials and methods of research

Between 2005 and 2009, 71 children with associated trauma of pelvis and extremities were examined and operated in the department of pediatric traumatology of the Republican Scientific Centre of Emergency Medicine of the Republic of Uzbekistan.

On the periods of surgical treatment on the bones, the patients were divided into 2 groups: early osteosynthesis (up to 3 days) was carried out in 52 (73,2%) and late osteosynthesis (from 3 to 7 days) in 19 (26,8%) suffered children. To conduct immunological studies and for the objective quantitative evaluation of results, we selected 30 patients (each group consisted of 15 patients) with similar trauma severity. The patients' age ranged from 4 to 15 years.

Immunological studies were performed in both groups on the first hours after trauma and at the 1, 3 and 7 days. In blood serum we determined the concentrations of cytokines – IL-1β, IL-2 and TNFα (reactants of «Cytokine Ltd2, St. Petersburg) by immunoenzimatic method. The data obtained were processed using methods of variation statistics.

Results of research and their discussion

The periods and methods options for osteosynthesis at the stage of intensive care are an important task. Primarily, operations on bones must not to be accompanied by large blood loss. Additionally, we need to ensure sufficient stability of the fracture, which does not require plaster bandages, to facilitate care for severe sufferers. Where possible, osteosynthesis should be final and not to provide further reoperations. However, a number of specialists in children with severe associated traumas apply the concept of primary conservative and secondary surgical treatment, external or internal osteosynthesis.

The results of our studies on the concentration of proinflammatory cytokines in trauma patients demonstrated a significant increase in the levels of IL-1β, IL-2 and TNFα ($P<0.001$), compared with those of the control group (table 1).

Table 1

Levels of cytokines in blood serum of trauma patients, pg/ml

Cytokines	Control group	First hours after trauma	P
IL-1β	29,6 ± 2,3	178,7 ± 11,6	<0,001
IL-2	12,3 ± 1,6	49,1 ± 4,5	<0,001
TNFα	27,6 ± 2,5	68,9 ± 4,3	<0,001

Note: P – significant differences between the groups.

IL-1β is proved to be a cytokine of broad-spectrum, which is produced mainly by macrophages. It determines the starting immune response, plays a key role in the development of inflammation, is involved in regulation of hematopoiesis, and is a mediator of interactions between the immune and nervous systems [3].

The main function of IL-2 is to provide a cellular component of adaptive immunity. IL-2 is a factor in the growth and differentiation of T-lymphocytes and NK-cells. In addition to effects on proliferation and differentiation of these cells, IL-2 also participates in the regulation of the coordinated functioning of other factors and mechanisms of innate and acquired immunity.

Tumor necrosis factor (TNFα), produced by macrophages, lymphocytes and other cells, is an activator of endothelium and all types of white blood cells (primarily, their cytotoxic functions), and a stimulator of cell adhesion. It has pyrogenic effect and has been involved in the synthesis of acute phase proteins in liver [3].

The combination of these three cytokines provides a wide range of effects, ranging from the synthesis of acute phase proteins to enhance leukocyte migration and activation at the site of injury [3].

Thus, cytokine response, which starts immediately after injury, allows for a coordinated restructuring of metabolic and physiological functions of several organs and tissues. Excessive functioning of the cytokine response leads to shock-like states.

The results showed that in patients, who underwent conservative treatment and osteosynthesis on the 3rd day, the levels of studied cytokines increased and were significantly higher on the 7th day than on the 1st day (table 2). Table 2 shows that on the 1st day, the level of IL-1β was higher 6,5 times ($P < 0,001$), IL-2 – 3,9 times ($P < 0,001$), and TNFα – 2 times ($P < 0,01$), in comparison with the control group.

Table 2

Cytokine levels in blood serum of patients with late osteosynthesis, pg / ml

Cytokines	First hours after trauma	After first day	After 3 days	After 7 days
IL-1β	178,7 ± 11,6	193,4 ± 6,3	215,05 ± 11,9	273 ± 12,1**
IL-2	49,1 ± 4,5	45,7 ± 4,3	40,9 ± 3,3*	42,1 ± 2,9
TNFα	58,9 ± 4,3	59,9 ± 3,5	61,5 ± 2,9	74,7 ± 2,9**

N o t e : * – values are significant relative to the data in the first hours after trauma
** – values are significant relative to the data through the third day (P < 0,01 – 0,001)

At the 3rd day, the study revealed that there was a trend to increase in the level of IL-1β, while the concentration of IL-2 was significantly decreased ($P < 0,05$). The level of TNFα was steadily increased.

At the 7th day, there were some changes in the levels of studied cytokines. Thus, the levels of IL-1β and TNFα increased in 1,2 times (P < 0,05), in comparison with the data obtained on the 3rd day of investigation.

Thus, after late osteosynthesis the level of proinflammatory cytokines was elevated relative to the data in the first hours after trauma.

The results of monitoring the dynamics of post-traumatic period in patients with early osteosynthesis showed the significant reduction in the level of proinflammatory cytokines on the 3rd day (table 3).

At the 7th day, the study revealed positive dynamics of proinflammatory cytokines in patients with early osteosynthesis.

Thus, trauma belongs to the most common pathologic conditions encountered in humans. Regardless of the location and severity of injury, any trauma is accompanied by more or less deep stress, in which pathogenesis the essential role belongs to the immune system. According to some authors, the dynamics of indicators of immunity after injury correlates with the state of resistance in general adaptation syndrome and fit into the stages of traumatic disease [7, 8, 11].

Table 3

Cytokine levels in blood serum of patients with early osteosynthesis, pg/ml

Cytokines	First hours after trauma	After first day	After 3 days	After 7 days
IL-1β	178,7 ± 11,6	163,4 ± 5,3	151,2 ± 7,9*	98,7 ± 5,5**
IL-2	49,1 ± 4,5	37,2 ± 3,8	30,9 ± 4,1*	29,2 ± 2,5*
TNFα	58,9 ± 4,3	57,2 ± 2,8	51,9 ± 3,1*	49,2 ± 2,5*

N o t e : * – values are significant relative to the data in the first hours after trauma
** – values are significant relative to the data through the third day (P < 0,01 – 0,001)

In this regard, immunological monitoring, including the study of cytokine status in patients with injuries and diseases of bone tissue using the latest medical technology is relevant and possible to develop immunological criteria for predicting complications.

The most common reactions to traumatic exposure include changes in the system of nonspecific defense. Phagocytosis plays an important role in localization of damage, elimination of damaged tissue and destruction of contaminated flora. In parallel with the migration of neutrophils, macrophages and lymphocytes into the zone of damage, complement system is activated, particularly C3 component of complement, which together with transforming growth factor (TGF) induces production of IL-1 and TNFα. In turn, these cytokines promote the synthesis of IL-6. The combination of these three cytokines provides a wide range of effects, ranging from the synthesis of acute phase proteins to enhance leukocyte migration and activation at the site of injury. Systemic action of cytokines is manifested by stimulation of differentiation of bone

marrow precursors of immune cells that trigger the synthesis of acute phase proteins. Along with this, both IL-6 and IL-1 are pyrogenic, and induce febrile reaction [13].

It should be noted that the injury starts a cascade of cytokine responses aimed to limit the damaged area, to eliminate the necrotized tissue and contaminated flora, and, finally, to activate proliferating cells for reparations of damages. There are at least two types of interaction: a direct effect of the whole molecule of cytokines on immunocompetent cells or the effects of individual «key fragments», consisting of a limited number of amino acid residues [3]. Detection of violations in the functioning of individual components of the immune system can control the direction of bone regeneration and increases the clinical relevance of research.

Thus, the application of the concept of primary conservative and secondary surgical treatment did not contribute to changes in elevated levels of proinflammatory cytokines. It is known that in children due to the rapid course of reparative processes in the zone of fracture, immobilization of poor quality leads to fusion of bone fragments in the wrong position, or retards the process of consolidation. In this connection, associated trauma serves a problem in determining of site of operational stabilization of fractures, especially the volume and timing. We carried out early osteosynthesis showed positive dynamics of immune response mediators.

Summary

According to available literature data, every injury is accompanied by a depression of humoral and cellular immunity, the intensity of which increases sharply with severe associated trauma. In addition, each surgical intervention causes a secondary immune deficiency, the severity of which depends on the volume and duration of operation. Children with multiple injuries (polytrauma) are also risk group for infections because of the limitations of protective immunological mechanisms (as maturation of the immune system is completed by age 14). After severe mechanical injure, there are observed irregularities in the synthesis of several cytokines, both proinflammatory and anti-inflammatory.

The results of our studies on the concentration of proinflammatory cytokines in trauma patients demonstrated a significant increase in the levels of IL-1β, IL-2 and TNFα ($P < 0,001$), in comparison with the control group. After late osteosynthesis, the levels of proinflammatory cytokines were elevated relative to the data in the first hours after injury, whereas in patients with early osteosynthesis their levels were significantly reduced on the 3rd day.

Thus, we carried out early osteosynthesis showed positive dynamics of immune response mediators. Hence, early osteosynthesis is more effective in the treatment of associated and multiple traumas in children and should be started as soon as possible.

References

1. Abakumov M.M., Lebedev N.V., Malyarchuk V.I. Objective assessment of injury severity in patients with associated injuries // J. Vestnik Hirurgii im. I.I. Grekova. – 2001. – Vol. 160, № 6. – P. 42-45.

2. Bessey P. Nutritional support in critical illness // Multiple organ failure – Pathophysiology and basic concepts of therapy (ed. E. Deithch). – Thieme-Verlag Stutgart, New York, 1990. – P. 125-149.

3. Chechyotkin A.V., Cibulyak G.N. Immunologic disorders in severe traumas and methods of their correction // Vestnik intensivnoy terapii. – 2004. – № 1. – P. 70–73.

4. Fallon W.F. Trauma systems, shock and resuscitation // Curr. Opin. Gen. Surg. – 1993. – P. 40-45.

5. Galaktionov V.G. Immunology. – Moscow, 2004. – 523 p.

6. Grishina T.I. Clinical significance of immunity disorders in surgical interventions // J. Andrology and genital surgery. – 2000. – № 2. – P. 35-38.

7. Klochkov N.D. Some nosological aspects of traumatic disease // J. Vestnik Hirurgii im. I.I. Grekova. – 1989. – № 2. – P. 57-60.

8. Klochkov N.D., Levshankov A.I. Traumatic disease: questions of nomenclature, classification, semiotics and thanatology // The pathogenesis and treatment of isolated and associated traumas. – Lenigrad (St.Pb), 1989. – P. 16-17.

9. Li J.S., Cheng C., Jiang Y.H. Clinical analysis of 28 children suffering from intracranial hematoma and multiple injuries following traffic accidents // Clin. J. Traumatol. – 2004. – Vol. 7, № 6. – P. 378-379.

10. Peterson D.L., Schinco M.A., Kerwin A.J. et al. Evaluation of initial base deficit as a prognosticator of outcome in the pediatric trauma population // Am. Surf. – 2004. – Vol. 70, № 4. – P. 326-328.

11. Pozharisky V.F. Polytraumas of the locomotor system and their treatment on the stages of medical evacuation. – M., 1989. – 256 p.

12. Redjkin Y.V. Some issues of nosology of traumatic disease // J. Orthopedics & Traumatology. – 1989. – № 1. – P. 67-72.

13. Simbirtsev A.S. Cytokines in the immunopathogenesis and treatment of allergy // Russian J. Allergology. – 2007. – № 1. – P. 5–16.

14. Sokolov V.A. «Damage control» – modern concepts of treatment of sufferers from critical polytrauma // Vestnik travmatologii i ortopedii im. N.N. Priorova. – 2005. – № 1. – P. 81–84.

15. Tcherne H., Regel G. Surgical procedures in the stabilized patient // The Integrated Approach to Trauma Care: The first 24 hours / Eds. – R.J. Goris, O. Trents. – Berlin, 1995. – P. 188-190.

16. Yagmur Y., Ozturk H., Unaldi M., Gedik E. Relation between severity of injury and the early activation of interleukins in multiple-injured patients // Eur. Surg. Res. – 2005. – Vol. 37, № 6. – P. 360-364.

17. Yermolov A.S. et al. General issues of medical care for associated trauma // J. Surgery. – 2003. – № 12. – P. 7-11.

18. Yeryuhin I.A., Gumanenko E.K. Theoretical and practical aspects of the concept of traumatic disease // J. Vestnik Hirurgii im. I.I. Grekova. – 1989. – № 5. – P. 54-68.

19. Zolotokrylina E.S. The pathogenesis and treatment of multiple organ failure in patients with severe associated trauma, massive blood loss in the early post-resuscitation period // J. Anesthesiology & Resuscitation. – 1996. – № 1. – P. 9-13.

LYMPHOTOXIN-PRODUCING POTENTIAL OF SENSIBILIZED LYMPHOCYTES IN INFANTS WITH SEPSIS

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This study presents the results of investigation of specific proinflammatory lymphotoxins in 33 infants with sepsis. Lymphotoxin-producing potential of sensibilized lymphocytes to various microorganisms causing sepsis was determined using author's own method. There were studied lymphotoxins to Staphylococcus aureus, Proteus, E.coli, Clostridium, epidermal Staphylococcus in different forms of sepsis before and after treatment to evaluate its efficacy. The investigations showed that the immune system of infants with various forms of sepsis directly reacts to antigenic irritation forms of cellular immune response that can be reflected in the clinical manifestations of disease. Dynamic studying of specific lymphotoxins levels during treatment showed incomplete correction of the immune disturbances, so in this case it is important to note a principle of an individual approach to the treatment of every patient depending on the character of pathogens revealed, phase and severity of pathological process, as well as immunity state.

Keywords: sepsis, infants, lymphotoxins, cytokines, inflammation, immunology

Purulent-septic diseases cause a special alarm due to high frequency and severity, as well as increased lethality rate (from 30 up to 75%) over the last years (Goldstein et al., 2005; Wolfler et al., 2008) [5, 10]. At present time, even in the countries with high level of medical and social care for population the mean level of lethality from sepsis is 35%, and in patients with septic shock achieves 60-70% (Bon, 1991) [1]. Today the reasons of high lethality from sepsis in children require studying this problem more deeply, taking into account the current positions in the pathogenesis of this disease.

In recent literature (Bon, 1991; Chernyh et al., 2001; Goldstein et al., 2005; Michalek et al., 2007; Ren et al., 1999), there are new approaches for understanding sepsis pathogenesis, in basis of which underlies systemic inflammatory response syndrome (SIRS) that develops in response to bacterial aggression and is accompanied by emission of a plenty of inflammatory mediators into blood flow [1, 4, 5, 6, 8].

The start of cytokine cascade includes proinflammatory and antinflammatory cytokines. The balance between them is considered by Chernyh et al. (2001) to define the nature of clinical course and outcomes of purulent-septic diseases [4].

Despite several studies on nonspecific mediators of inflammation in the organism due to sepsis (Michalek et al., 2007; Rey et al., 2007), however, specific mediators of inflammation as lymphotoxins in this pathology are not well studied.

This study presents the results of investigation of specific proinflammatory lymphotoxins in early age children with sepsis and comparison of the data obtained with peculiarities of clinical course of disease.

The purpose of research was to study specific proinflammatory lymphotoxins in infants with sepsis.

Materials and methods of research

There were studied 33 infants with septicemic and septicopyemic forms of sepsis. Lymphocytes products – lymphotoxins to various microorganisms inducing sepsis were determined by author's own method (Diagnosis of sepsis and evaluation of treatment efficacy, diploma № DG 400819). We developed a technique of isolation and identification of proinflammatory specific mediators of inflammation – specific lymphotoxins in infants with sepsis. The principle of this method concludes the measurement of specific toxicity to various antigens of liquid above the sediment which was received after cultivation of the patient's lymphocytes with guilty antigens. The cultures of Staphylococcus aureus, E.Coli, clostridium, proteus, epidermic staphylococcus, preliminary isolated from children with sepsis were taken as antigens. To define the level of lymphotoxins isolated from sensibilized lymphocytes their calculation on spectrograph was used.

The diagnosis «sepsis» was made, based on summarized analyses of child's condition, clinical symptoms of disease and laboratory examinations. Sepsis was confirmed by bacteriological study.

The samples from pharynx, blood, pus, urine and feces were investigated for presence of pathogenic flora. All patients received the standard treatments: antibiotics, specific therapy, symptomatic treatment, immunocorrecting therapy, eubiotics, phages.

Mathematic processing of the results obtained were performed with the use of method of variation statistic and calculation of mean arithmetic values (M), their standard errors (m), confidence interval (σ) and reliable differences according to Student's t-criterion.

Results of research and their discussion

The results of this study showed specificity of lymphotoxin synthesis as the products which are activated by T-lymphocyte antigens in infants with sepsis.

There were studied lymphotoxin products to Staphylococcus aureus, E.Coli, clostridia, proteus, epidermal staphylococcus with various forms of sepsis before treatment and in order to estimate the efficiency of the carried out therapy.

Studies showed that the highest values of lymphotoxin to Staphylococcus aureus were produced in septicemic form of sepsis (24,4 ± 0,9 optic units) (o.u.) (Fig. 1).

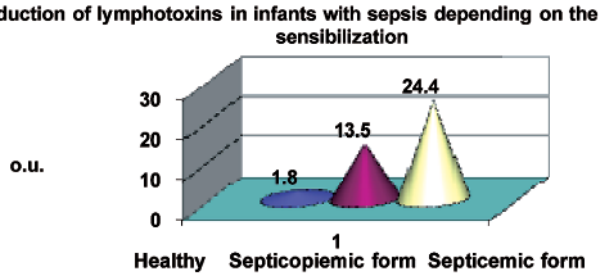

Fig. 1. Lymphotoxins to Staphylococcus aureus

This parameter was 1,7 times higher than values in septicopyemic form of sepsis (13,5 ± 0,8 o.u.) ($p < 0.001$). These parameters in two forms of sepsis were higher than in group of healthy children (1,8 ± 0,1 o.u.). The number of positive cases in septicopyemic form of sepsis accounted for 19 of 33 examined (57,5 %) children.

Lymphotoxin levels in various forms of sepsis correlated with severity of child's condition. In dynamics of the therapy conducted, lymphotoxin levels decreased not in all cases ($p > 0,05$).

Lymphotoxin levels to proteus in septicemic form was 30,2 ± 2,3 o.u., whereas in septicopyemic form its values were lower and amounted 18,9 ± 1,9 o.u., respectively ($p < 0,001$) (Fig. 2). These values were almost in three times higher than parameters of healthy children (6,3 ± 0,8 o.u.; $p < 0,001$). Dynamic study showed insignificant decrease of this parameter ($p > 0,05$).

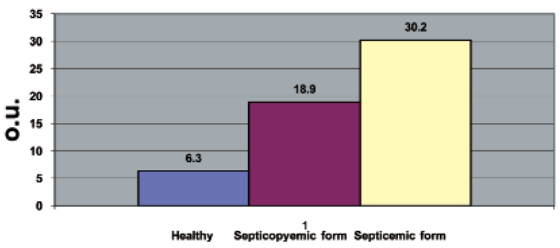

Fig. 2. Lymphotoxins to proteus

Production of lymphotoxins to E. Coli in healthy infants amounted 8,0 ± 1,1 o.u. (Fig. 3). In 7 infants with septicemic form of sepsis the sensibilization of lymphocytes to E. Coli was 54,2 ± 3,7 o.u.; in 10 patients with septicopyemic form it was 29,5 ± 3,5 o.u., respectively. Sensibilization of lymphocytes to E. Coli was noted in 17 patients of all 33 studied and was 51,5 % of cases. After the treatment the sensibilization to E. Coli reduced 1.2 times ($p < 0,05$).

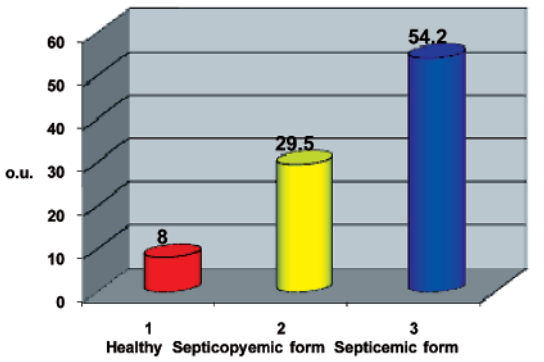

Fig. 3. Lymphotoxins to E.Coli

Production of lymphotoxins to epidermal staphylococcus in healthy infants was 10,4 ± 1,7 o.u. In 17 (56.7 %) of 30 examined patients there was noted sensibilization to epidermal staphylococcus (Fig. 4). The amount of lymphotoxins to epidermal staphylococcus was 30,8 ± 2,1 o.u. This parameter was 3 times higher than values in healthy children ($p < 0,001$). After the therapy performed the parameters of lymphotoxins to epidermal staphylococcus were reduced up to 22,4 ± 1,7 o.u., despite of decreasing the values were not reliable in comparison with parameters before treatment ($p > 0.05$).

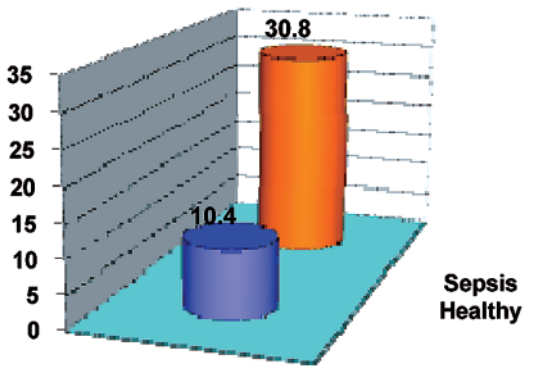

Fig. 4. Lymphotoxins to epidermic staphylococcus

The amount of lymphotoxins to clostridia in various forms of sepsis was 30,1 ± 4,0 o.u. before treatment that was 2 times higher than norm ($p < 0,001$) (Fig. 5). After treatment the values reduced up to the norm ($p > 0,05$).

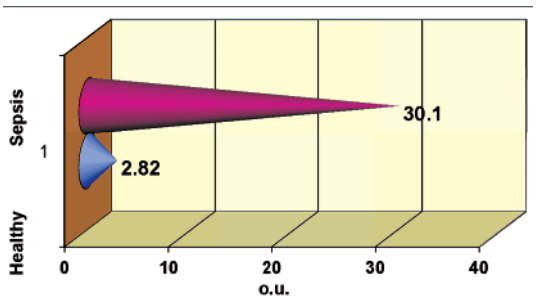

Fig. 5. Lymphotoxins to clostridium

For the patients with unchanged high values of lymphotoxins after therapy performed, we developed the further treatment program (continuing course of antibioticotherapy according to indications, bacteriophages and symptomatic therapy directed to the correction of polyorganic insufficiency) in order to prevent further recurrences of disease.

Production of specific lymphotoxins correlated with the positive bacteriological data confirming sepsis. In the negative values of lymphotoxins, bacteriological studies of blood, urine and feces were sterile in 100 % of cases.

Conclusions

Thus, the immune system of infants with various forms of sepsis directly reacts to antigenic irritation forms of cellular immune response that can be reflected in the clinical manifestations of disease. Dynamic studying of specific lymphotoxins levels during treatment showed incomplete correction of the immune disturbances, so in this case it is important to note a principle of an individual approach to the treatment of every patient depending on the character of pathogens revealed, phase and severity of pathological process, as well as immunity state.

References

1. Bon R.C. The pathogenesis of sepsis // Ann. Int. Med. – 1991. – Vol. 115. – P. 457-469.

2. Caresta E., Pierro A. et al. Oxidation of intravenous lipid in infants and children with systemic inflammatory response syndrome and sepsis // Pediatr. Res. – 2007. – Vol. 61 (2). – P. 228-232.

3. Carvalho P.R., Feldens L. et al. Prevalence of systemic inflammatory syndromes at a tertiary pediatric intensive care unit // J. Pediatr. (Rio J). – 2005. – Vol. 81 (2). – P. 143-148.

4. Chernyh U.R., Leplina O.J., Tikhonova M.A., Paltsev A.V., Ostanin A.B. Cytokine balance in the pathogenesis of systemic inflammatory response: a new target of immunotherapeutic influences for sepsis treatment // J. Med. Immunology, in Russian. –2001. – Vol. 3(3). – P. 415-429.

5. Goldstein B., Giroir B., Randolph A. International pediatric sepsis consensus conference: definitions for sepsis and organ dysfunction in pediatrics // Pediatr. Crit. Care Med. – 2005. – Vol. 6 (1). – P. 2-8.

6. Michalek J., Svetlikova P. et al. Interleukin-6 gene variants and the risk of sepsis development in children // Hum. Immunol. – 2007. – Vol. 68 (9). – P. 756-760.

7. Pavare J., Grope I., Gardovska D. Prevalence of systemic inflammatory response syndrome (SIRS) in hospitalized children: a point prevalence study // BMC Pediatr. – 2009 – №9. – P. 25.

8. Ren C., Liu X., Guo Z. et al. Syndrome of the systemic inflammatory answer in patients at intensive therapy department – analyses of 1292 cases // Zhonghua-Nci-Kc-Za-Zhi. – 1999. – Vol. 38 (1). – P. 40-43.

9. Rey C., Los Arcos M., Concha A., Medina A., Prieto S., Martinez P., Prieto B. Procalcitonin and C-reactive protein as markers of systemic inflammatory response syndrome severity in critically ill children // Intensive Care Med. – 2007. – Vol. 33 (3). – P. 477-484.

10. Wolfler A., Silvani P., Musicco M., Antonelli M., Salvo I. Incidence of and mortality due to sepsis, severe sepsis and septic shock in Italian Pediatric Intensive Care Units: a prospective national survey // Intensive Care Med. – 2008 – Vol. 34 (9). – P. 1690-1697.

IMMUNE REACTIVITY UNDER POLYGNIC CHRONIC TONSILLITIS

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A microflora of pharynx and antimicrobial immunity indexes among 68 patients with chronic tonsillitis and 35 healthy persons were studied. Most frequently representatives of gram-positive flora were registered, dysbiosis of mucous memebranes was established among all inspected patients, sensitivity to cephalexin was high among the majority of S.pneumoniae, S.pyogenes, S.aureu, and Haemophilus sp. strains. A decrease in major indexes of antimicrobial immunity (PAN, PN, PPI) among patients allows us to judge on the expression of pathological process. Raised titles of anti-streptococcus antibodies were registered among 2/3 of patients.

Keywords: tonsillitis, aetiological agents, microflora, phagocytosis, antibodies, resistance, immunity

Acute and chronic tonsillitises are one of the most commonly spread infection diseases [1, 3, 9]. Among adults a disturbance of palatine tonsils is typical, while for children adenoititis – an inflammation of throat tonsil is more common. Chronic diseases of ENT organs can be considered as a particular display of an immunodeficiency that is dependent by a defect in mononuclear phagocytosis system [1, 5].

The main bacterial tonsillitis stimulant is considered β – haemolytic streptococcus of group A, presesnce of which is registered among 31 % of patients [10]. Among other possible stimulants mentioned are streptococcuses of other groups, aurococcus, enterobacterias, haemophilus influenza [2, 6, 8, 9].

In human organism to a penetration of an microorganism from the environment first of all reacts its immune system, particularly phagocytosises and then antimicrobal antibodies are produced [5]. An organism's condition and immune system are directly linked to a presence of infection inflammation in organisms. Among patients with acute and chronic purulent-inflammatory diseases a decrease in their organism's resistancy – non-specific protection factors is registered [7].

In this case the objective of the present research is a complex study of a condition of pharynx microflora and antimicrobial immunity among patients with chronic tonsillitises in a comparative aspect.

Materials and methods of research

68 patients (44 adults and 24 children) with chronic tonsillitis (CT) were under inspection. Children age was between 3 and 15 years, adults – from 16 to 45 years. Control group was formed from 35 healthy persons (20 adults and 15 children) whose sexual and age composition was representative to the main group. Patients' inspection and diagnosis verification was carried out via standard methods that are accepted in the clinic of ENT organs diseases on basis of Khoremzskiy regional multiprofile medical centre of Uzbekistan Republic.

Patients' pharynx microflora and major antimicrobial immunity indicators were studied.

Pharynx and nasopharyngeal mucus microflora was studied according to commonly-accepted bacteriological methods: material collection, sowing into nutritious environments, discharge of clean micro-organisms' culture and its identification. Identification was carried out in accordance with guides and determiners Bergey,s; Manual of Systematic Bacteriology (1997). Microbiological research of nasopharynx and pharunx abstract was carried out before treatment and 3 days after the end of taking antimicrobial preparations.

Phagocytosis activity of neutrophils (PAN) of periphery blood was defined via conventional method, based on their ability to absorb micro-organisms with a calculation of microbes absorption percentage – phagocytosis number (PN) and phagocytisis protection index (PPI). As a testing microbe we used day cultures of E.coli, S.aureus and β-haemolytic streptococcus of group A. PPI criterion was used to ectimate functional activity of phagocytosis. PPI results were estimated in dependence on phagocytisis completeness in 2 groups: PPI < 50 % and PPI > 50 % (PPI degree criterions). The level of anti-streptococcus antibodies in blood serum was revealed with indirect hemagglutination test with a commercial erythrocytic diagnosticum by the conventional method. Statistic processing of the material was carried out in accordance with commonly-accepted methods with usage of applications for medic-biological discilplines.

Results of research and their discussion

The analysis of possible aetiological agents and the attendant microflora among the inspected patients with chronic tonsillitis showed the following. During microbiological study of deep palatine tonsils the following conditionally-pathogenic micro-organisms were registered: S. viridans (5,8 %), S. aureus (39,7 %), S. epidermidis (3,3 %), S.pneumoniae (29,7 %), S. pyogenes (11,6 %), S. saprophyticus (7,3 %), Haemophilus sp. (5,8 %) and E. coli (10,5 %), in 5,0 % of cases flora growth was not registered.

In 8,3 % of cases monoculture of the revealed micro-organisms was obtained, and in 86,7 % of cases – micro-organism associations. Associations generally consisted from two or three micro-organisms (E.coli, S.aureus, S.pyogenes, S.apidermidis, Haemophilus sp.). Sowing ability of a monoculture or micro-organisms association did not depend on a patient's gender and age ($p > 0,05$). Besides, no direct or strong correlation of a culture or micro-organism association sowing ability and a patient's condition during the research (exac-

erbation or remission) was found. Obviously, it is related to a decrease in immune system of an organism, particularly non-specific factors of local immunity that, being «the first line of defence», must eliminate micro-organisms without giving this dependently-pathogenic organisms an opportunity to grow over the limits of norm for a normal pharynx microflora.

During bacteriological research of nasoparynx mucus specific composition of the higher breath tracts was quite diverse in comparison with indexes of microbiological studies of deep tonsil departments ($p > 0,05$). The obtained results of microbiological research of both biotypes among patients with CT allows us to conclude that microbal picture under CT is characterized by the diversity of gram-positive and gram-negative microflora sowing ability and this pathology differs from other nosological units by its bacterial polygenecy.

The obtained results show that a disbiosis of mucous memebranes is registered among all inspected patients: among 86,6% of them a combination of 2 of more dependently-pathogenic and pathogenic micro-organisms' strains, and among 78,3% – a high revealing of dependently-pathogenic micro-organisms and lack of normal microflora strains.

Along with microbiological research we have carried out a study of the main antimicrobial immunity indicators of the CT patient in a comparative aspect.

The results of the CT patients' inspection and the control group have shown a reliable decrease in natural protection factors with a decrease in PAN. The research has found out that among patients a reduction in this indicator is registered, especially with E.coli (43,1 ± 0,6% against 59,4 ± 0,7% in the control), and also with other studied micro-organisms (table 1).

Table 1

Indicators of phagocytosis activity of neutrofils among patients with CT

Indicator	Control	E.coli	S.aureus	β-haemolytic streptococcus of group A
PAN, %	59,4 ± 0,7	43,1 ± 0,6*	45,1 ± 0,9*	49,4 ± 0,7*
PN, units	8,9 ± 0,2	6,1 ± 1,0*	5,7 ± 0,8*	3,7 ± 0,4*

C o m m e n t : * – difference reliability against the control.

The study of microbes' absorption percentage (PN) has shown that PN with E.coli equaled in average 6,1 ± 1,0 units, with S.aureus this index equaled 5,7 ± 0,8 units, and PN with β-haemolytic streptococcus of group A equaled in average 3,7 ± 0,4 units that is reliably lower than the control and other micro-organisms indexes, described above.

Simultaneously with PAN and PN a decrease in PPI against the studied micro-organisms was registered ($p < 0,001$). In has been found out that PPI for E.coli as a testing microbe was lower than 50% among 22,0 ± 1,0% of patients (table 2). While using S.aureus as a testing microbe PPI<50% was registered among 31,0 ± 2,0% of patients. Distinctive indexes were obtained in relation with the first two testing microbes during the study of β-haemolytic streptococcus of group A – PPI<50 among 68,0 ± 2,0% of patients. All PPI indexes were relatively higher than the same indexes of health persons ($p < 0,001$).

Table 2

Index of phagocytosis completeness among patients with CT (%)

Index		E.coli	S.aureus	β-haemolytic streptococcus of group A
Control	< 50%	12,0 ± 2,0	8,0 ± 2,0	12,0 ± 2,0
	> 50%	88,0 ± 6,0	92,0 ± 5,0	88,0 ± 6,0
Patients with CT	< 50%	22,0 ± 1,0	31,0 ± 2,0	68,0 ± 2,0
	> 50%	78,0 ± 3,0	69,0 ± 4,0	32,0 ± 4,0

Comment: * – difference reliability against the control.

Our attention draws the fact that PPI dramatically decreases among patients against the healthy. Probably, it is linked to a decrease in the general immune system, and insolvency of the phagocytosis system is another criterion of a pathological process chronisation under CT.

Usage of an organism's non-specific resistance – PPI and PN as an estimation criterion with different testing microbes among patients with CT allowed us to study their reliable difference in comparison to β-haemolytic streptococcus of group A ($p < 0,05$). The revealed PPI is lower than 50% among 68,0 ± 2,0% of patients and the decrease in PN with β-haemolytic streptococcus of group A in comparison to the control (2,4 times), to E.coli (1,7 times), and S.aureus (1,5 times) shows us an insolvency of phagocytosis activity among adult patients with CT.

To reveal alterations in antimicrobial immunity under CT in relation with age, an analysis of these indexes was carried out according to age groups of adults (under 20, from 20 to 30, from 30 to 45 years old) and children. No reliable difference was established between age groups in their levels of the studied parameters ($p > 0,05$).

A powerful factor that provides for an antimicrobial immunity are antibodies that participate in capturing and elimination of microbal antibodies and their endotoxins. Considering an important place of β-haemolytic streptococcus of group A in pathogenesis and chronisation of processes in tonsillitis we studied a revelation level of anti-streptococcus antibodies among patients with CT of different ages (table 3).

Table 3

Indexes of revelation frequency of anti-streptococcus antibodies among patients with CT in the disease dynamics, %

Patient group	Chronic tonsillitis	
	Exacerbation period	Remission period
Adult patients with CT	63,6 ± 3,0	38,6 ± 2,7*
Children with CT	54,2 ± 2,1	16,7 ± 2,0*
Control group	5,7 ± 1,0	5,7 ± 0,5

C o m m e n t : * – difference reliability.

The revelation frequency of anti-streptococcus antibodies in blood of patients with CT equaled 63,6 ± 3,0% within first days of disease, in 38,6 ± 2,7% of cases within the period of symptoms' subsidence. Raised titles of streptococcus antibodies in comparison to norm are registered among 2/3 of patients.

Conclusion

1. Among patients with CT from biomaterial the most frequently discharge representatives of gram-positive, dependently-pathogenic microflora, a disbalance in the composition of normal mucous memebranes microflora is established among all inspected patients, sensitivity to cephalexin was high among the majority of S.pneumoniae, S.pyogenes, S.aureus, Haemophilus sp. strains.

2. A decrease in major indexes of antimicrobial immunity system (PAN, PN, PPI) under CT among patients allows us to judge on the expression of a pathological process.

3. Usage of non-specific organism resistance index – PPI as an estimation criterion with different microbes among patients with CT allowed us to establish its reliable difference in comparison to β-haemolytic streptococcus of group A.

4. The revealed raised titles of anti-streptococcus antibodies in blood serum of patients with CT in comparison to the control that were registered among 2/3 of the inspected shows us a strain in the immune system of patients.

References

1. Bogomilskiy M.R. Meaning of bacterial immune correction in treatment of ear, throat, and nose diseases among children // Magazine Hard patient. – 2007. – №10.

2. Bukharin O.V. Persistence mechanisms of bacterial pathogens // Messenger of the Russian Academy of Medical Science. – 2000. – №2. – P. 44-49.

3. Zhukhovitskiy V.G. Bacteriological foundation of rational antibacterial therapy in othorhinolaryngology // Othorhinolaryngology messenger. – 2004. – №1. – P. 5-15.

4. Sidorenko S.V., Guchev I.A. Tonsillopharyngitis: questionsof diagnostics and antibacterial therapy // Antibiotics and chemotherapy. – 2004. – V.6, №4. – P.120-126.

5. Khaitov R.M., Pinegin B.V. Modern concepts on an organism protection form infection // Immunology. – 2001. – №1. – P. 61-64.

6. Brook I. Current issues in the management of acute bacterial sinusitis in children // Int J Pediatr Otorhinolaryngol. – 2007. – Nov, 71(11). – P. 1653-61.

7. Chromek M, Tullus K, Lundahl J, Brauner A. Tissue inhibitor of metalloproteinase 1 activates normal human granulocytes, protects them from apoptosis, and blocks their transmigration during inflammation // Infect Immun. – 2004. – Jan; 72(1). – P. 82-8.

8. Murray PR, Barron EJ, Jorenson JH, et al. Manual of Clinical Microbiology. // 8th ed. Washington. – DC: ASM Press; 2003.

9. Nord C.E. The role of anaerobic bacteria in recurrent episodes of sinusitis and tonsillitis // Clin. Infec.t Dis. – 1995. – №20. – P. 1512-1524.

10. Principles of appropriate antibiotic use for acute pharyngitis in adults: Background. – Ann Emerg Med, 2001.

Materials of Conferences

THE FORMATION OF MEDICAL KNOWLEDGE IN THE TRAINING OF TEACHERS IN HIGH SCHOOL DEFECTOLOGISTS

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Considering the strategic importance of education at the present stage of development, the President of Kazakhstan's Republic Nursultan Nazarbayev stressed: «The competitiveness of the nation, primarily determined by the level of education».

Training of highly qualified professionals is updated in the content of the «Concept of Education's Development of Kazakhstan Republic till 2015», which states that the main trend in higher education is reduced to improve the quality of training, development of innovative education, integrated with intensive research activities, close relation of university research with the needs of the social sphere and economy, improve education and information technology» [1, 2].

Professional activities of the teacher-pathologists goes beyond traditional teaching activities, and working closely intertwined with various social, educational, rehabilitative and consultative-diagnostic, psychotherapeutic, proper corrective and other «non-teaching» activities, being directed toward one goal – to promote a person with disabilities in the life of his social adaptation and integration by means of special education. Contemporary teacher education includes a wide range of relevant pedagogical professions: tiflopedagogics; ASL; oligophrenopedagogics, speech therapy, special preschool pedagogy [3].

Remedial work with children with disabilities has specific requirements for the professional preparedness of the teacher-pathologists.

Preparation of teachers is carried out according to the educational standard of higher pedagogical education, which in turn is based on the Law «On education». Standard provided by the various standard period of study, content and purpose of professional education programs. There are qualifications of graduates of pedagogical high school, the requirements for the level of training specialist represented in the educational standard [5].

The main educational program includes the study of common humanitarian and socio-economic, general sciences, and disciplinesof subject training.

The subject unit is the main part of the learning time and is aimed at developing content-specific science, as defectology. Here we consider the medico-biological and psycho-pedagogical cycles. Psychology and education section includes a discipline involving the mastery of pedagogical and psychological foundations of culture, various technologies of communication, management, self-regulation. Its content is aimed at building skills of self-construction of educational processes through the author's school programs, differentiated and individual personal approach to a student.

Medico-biological section includes disciplines such as anatomy, physiology, pathology of hearing, sight and speech fundamentals of neuropathology; basis of pediatrics, the basics of neurophysiology and neuropsychology, genetics, clinical features of children with disabilities of development; psychopathology; age physiology and school hygiene and others.

The system of medical knowledge, being part of the professional culture of teachers, speech pathologists, promotes the fundamental nature of his educational training, which is an important condition for the approximation of national practices of higher education to international standards. Medical expertise serves measure of the effectiveness future teachers-defectologists' training and determined in accordance with state standards, is characterized by formedness of medical knowledge and skills for diagnosis, differentiation, identify the main symptoms and syndromes within defectological activities for making the correction and rehabilitation programs to improve the quality of children's life.

For example, «Clinical features of children with disabilities», along with other disciplines of health – the biological cycle of the course – the scientific basis defectological education and is of particular importance in the preparation of qualified specialists. Students learn the modern interpretation of the doctrine of mental retardation, etiopathogenetic regularities and classification of intellectual disorders; clinical – psychological structure of intellectual deficiency in various forms of mental deficiency. The knowledge of clinical manifestations of mental underdevelopment of children should be in practice of defectologists: to organize a differentiated system of correction – rehabilitation measures with the aim of social – work adaptation of children with disabilities; when deciding on the direction of children with various deviations psychophysical development in special correctional institutions. After studying the discipline, students will be able to apply in practice the knowledge obtained in a study of this discipline; collect history data for the compilation of clinical psychology – teaching performance and to determine the etiopathogenetic mechanism of violations of intelligence and analyze scientific – methodical and professional literature on defectology; taken into account when the clinical forms of mental disorders correctional complex – rehabilitation measures aimed at the social – working adaptation of children with disabilities.

«Age physiology and school hygiene» gives an idea of general patterns and characteristics of growth and development of the child's body, learn to distinguish normal from disease and to use the mechanisms of compensation and adaptation for the correction of abnormal child's development; teach a differentiated approach taking into account the structural features and functions of the child's body. It teaches students of physiology and hygiene through training and educational process, work and rest schedules of students to master the minimum knowledge in hygiene and medicine. «Age physiology and school hygiene» is the basis for the study of psychology and pedagogy, and science with these forms, as an essential link natural science foundation of the entire system of teacher education.

For defectologists, who works in specialized support agencies the knowledge of morphological and functional characteristics of an organism of the child is particularly important, since it is in the making, if not the organization of living conditions, particularly easy to experience various abnormalities in the nervous system, musculoskeletal system, cardiovascular system, etc.

«Age physiology and school hygiene» as a functional-theoretical discipline biomedical training of special preschool and child care centers, provide knowledge of the object of future professionals, promotes the formation of scientific concepts for understanding the structure, form and function of the developing child's body when exposed to different environmental factors, provides a holistic view of the patterns structure the child's body as a whole and its parts, instills the necessary practical skills, and provides a theoretical basis for the successful study of subjects related to practical activities.

Based on the requirements of the qualifying characteristics of the specialty «Defectology» for the course «age physiology and school hygiene» the main tasks of teaching students are:

– to equip students for future defectologists – teachers of special care facilities, the necessary knowledge about their age structure and function of the child's body, the general laws of development and functional state of the child's body for a rational organization of educational work, to study the structure, shape the child's body and its component tissues, organs and systems based on the latest achievements of macro-and microscopic anatomy embryology, anthropology, biomechanics, biophysics, biochemistry, physiology, human physiology; examine patterns of individual organs and systems of mutual respect and taking into account exposure to external environmental factors and mechanisms regulation of the functions of the developing organism and in the process of studying the age of anatomy and physiology to establish and describe the structure, shape, position of organs and systems and their relationship to sex and taking into account individual characteristics of the developing organism, differentiated versions of variability, malformations; develop students' scientific concept of the unity of structure and function of human organs, their variability in the process of phylogeny and ontogeny as a whole under the influence of the changing environment, working conditions, social conditions and physical exercise on the structure and development of the organism to study the physiological mechanisms for such complex mental processes such as sensation, perception, attention, memory, physiological bases of speech and emotional reactions, be able to determine the integral and partial indicators of biological age, the morphological criteria of physical health, to arouse the students' keen interest in the problems arising on the border of teaching and physiological sciences, to develop in future employees working in institutions and teachers defectologists ability to independently seek out and acquire new anatomical and physiological knowledge that is necessary for them to improve the educational work, to learn certain types of emergency assistance.

Discipline «Fundamentals of neurophysiology and neuropsychology» is a necessary step in studying the problems associated with visual, auditory and speech pathology, a violation of attention, memory, thinking, emotional states, voluntary movements, actions and behavior in general. This discipline is particularly important in preparing of defectologists, as reveals features of the neuropsychological processes in individuals with the only restriction capabilities, provides insight into the systemic violations of the mental processes that occur as a result of the defeat of individual sections of the cerebral cortex and subcortex. On the basis of this discipline is possible to build a science-based adequate understanding of the abnormal development of children and adolescents, the construction of correction – the educational process. Teachers – defectologists preparation must equip them with knowledge of regulatory mechanisms of neurophysiological processes, to introduce the neuropsychological mechanisms at work skin – kinestichal, visual, auditory, vestibular analyzers. On employment in the discipline much attention paid to speech, motor and mental disorders due to developmental defects, as well as local lesions of the speech apparatus and its centers, conductor of the CNS. Students are introduced to disturbances of higher mental functions in local brain lesions.

Students learn the neurophysiological and neuropsychological bases of functioning of the brain:

– understand the concept of systemic violations of the physiological and psychological processes associated with individual portions of the cerebral cortex and subcortex;

– to have information about functional asymmetries of the cerebral hemispheres;

– to have representation on the organization of higher mental functions and behavior in general at abnormal development of children;

– to know syndromes and methods of neurophysiological and neuropsychological inspections of patients at local brain lesions;

– should know the bases of neurophysiological and neuropsychological status at abnormal development of children and correlate them to functional and local brain lesions.

The aim of «psychopathology» is preparation of highly skilled experts in the field of correctional pedagogics and the special psychology, using knowledge in professional work and scientific work and ability on psychopathology of children's age.

The psychopathology of children's age opens features of mental activity of the sick child, gives representation to students about an aetiology, pathogeny mental infringements, shows clinical forms and their current, indemnification ways, defines a role and value of the teacher-pathologists in system of medical-pedagogical rehabilitation of sick children.

The course of psychopathology of children's age is included into curricula of all branches of pathologistical faculties and is obligatory in preparation system of pathologists. At studying of lessons such tasks as, acquaintance the students with the general laws of development of psychological diseases and psychopathological syndromes, preventive maintenance and rendering assistance principles are realised; with age levels of psychological reaction and communication with them certain psychological frustration; with the correlative contribution biological and social factors in occurrence of mental illnesses; with value of the critical periods in occurrence and a current of mental illnesses; to integrate the received knowledge of psychopathology of children's age into the basic information received by students at studying of other disciplines of a medical and biologic cycle, being a basis for mastering of disciplines of a psihologo-pedagogical cycle; with a role and a place of the expert- pathologists in the system of medical-psihologo-pedagogical rehabilitation of children with mental deviations.

Thus medical preparation is considered as systematic pedagogical process which is under construction on principles of medical orientation, a humanisation of educational process, strengthening in the curriculum of study disciplines, that provide increase of medical competence of the future correctional teacher [6].

References

1. The concept of formation of Republic Kazakhstan till 2015. – 2004.

2. The Republic Kazakhstan law «On social medical-pedagogical correctional support of children with the limited possibilities». – 2002.

3. Special pedagogics. \\under the editorship of Nazarovovoj N.M. – TH., 2001.

4. GOSO PK 5.04.19-2008. Higher education: a bachelor degree.

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INNOVATIVE TECHNOLOGIES OF TREATMENT OF THE INFECTED RUSSIAN ACADEMIES OF SCIENCES IN EXPERIMENTAL SURGERY

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The aim of the research is to assess efficacy of the two new original ointments and electro-magnetic radiation at nitric oxide (150 HGz) absorption and radiation molecular spectrum frequency in experimental wound infection treatment.

Eight groups of white mice (10 mice in each group) were caused cutaneous back wounds which were infected with Pseudomonas aeruginosa clinical strain.

The first group of mice wasn't treated, the wounds of the second group of animals were treated with the ointment «Laevomecol», the wounds of the third group – with ointment № 1 and the wounds of the fourth group – with ointment № 2 respectively. The wounds of the fifth group were irradiated with electromagnetic radiation of experimental parameters. The sixth, seventh and eighth groups were given joint treatment with electro-magnetic radiation and the ointments «Laevomecol», № 1 and № 2 respectively.

The experimental ointment №1 contained essential oils of fennel and amaranth, the ointment № 2 was different in additional element chloramphenicolum. The number of P. aeruginosa cells in the purulent discharge was studied by measuring of tenfold dilution seeding on meat infusion and by counting the number of colonies on the fourth, eighth and eleventh days of treatment.

It was determined that significant difference in the number of P. aeruginosa cells in the purulent discharge appeared on the eighth day of the treatment: its figures appeared to be lower than those in the control groups of mice treated with the ointments «Laevomecol» and № 2 as well as their combinations with electro-magnetic radiation.

On the twelfth day of treatment such dynamics continued with reliably lower number of microbial cells in the group treated with electro-magnetic radiation with the ointment № 2.

The use of electro-magnetic radiation at nitric oxide absorption and radiation molecular spectrum frequency with ointments containing essential oils of fennel and amaranth either with chloramphenicolum or without it improves efficiency of experimental P. aeruginosa infection treatment.

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THE GLUCOSE-6-PHOSPHATE DEHYDROGENASE ACTIVITY IN THE TESTES AT THE EXERCISE STRESS VARIOUS REGIMES

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The glucose oxidation pentosophosphate pathway has its great vital significance for the exchange processes in the testes. The glucose-6-phosphate dehydrogenase (G6PDH; KF 1.1.1.49) is one from the key enzymes of the given metabolic pathway. So, the main paper's goal – is to be studied the G6PDH in the rats' testes at the exercise stress and the physical activity various regimes.

This experiment has been carried out at the 40 male rats, having had their 240 ± 20 gr. mass. So, the exercise stress and the physical activity influence upon these rats has been studied by the forced their swimming method with the 10% load from the animal's body mass. In the end, all these animals have been divided into the four, equal in number, groups (n = 10). The first group has been made up the intact rats. The second group – the control ones, which swam without any load. The third group – the rats with the exercise stress and the physical activity optimal regime. The fourth group – with the exercise stress and the physical activity excessive regime. So, the total protein content and the G6PDH activity by the $NADP^+$ recovery rate have been defined in the erythrocytes and in the testes. Then, the NADPH concentration increase has been registered at the 340 nm wavelength during the reaction. The obtained data statistical processing has been carried out with the Student's test (t) application. The communication measurement between the variables has been made by means of the correlation analysis by Spierman ®.

All the received data during the experiment are being testified on the fact, that the exercise stress and the physical activity optimal regime is not considerably influenced upon the G6PDH activity, as in the erythrocytes, well as in the testes. So, the exercise stress and the physical activity excessive regime has been resulted in the G6PDH activity decrease in the fourth group rats' erythrocytes for 52% (p = 0,040), for 64% (p < 0,001), and for 49% (p = 0,006), in comparison with the similar index at the first, the second, the third groups' rats, correspondingly. So, the G6PDH activity of the fourth group has been for 44% (p = 0,001), and 43% (p < 0,001) lowered in the rats' testes, as compared with the similar index at the first, the second groups' rats, correspondingly. Thus, the correlation coefficient between the G6PDH activity has been made up r = 0,489 (p = 0,026) at the excessive exercise and the excessive physical activity in the erythrocytes and in the testes.

Thus, it has been found out, that the exercise stress and the physical activity optimal regime is not considerably influenced upon the G6PDH activity in the testes during the carried out study and the research. So, the exercise stress and the physical activity excessive regime has been resulted in the G6PDH activity decrease in the erythrocytes and in the testes, that is being testified to the pentose cycle inhibition under all these conditions. Then, it is quite possible to be viewed and to be determined on the pentose cycle intensity in the testes by the G6PDH activity in the erythrocytes.

The work is submitted to the International Scientific Conference «Basic researches», Croatia, July, 25th – August, 1st, 2011, came to the editorial office on 26.05.2010.

PECULIARITIES OF GYNAECOLOGICAL ENDOCRINE-DETERMINED PATHOLOGY INHERITANCE WITHIN TEENAGE GIRLS

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In recent years a steady increase in endocrine-determined gynaecological pathology within teenage has been registered. A search for new effective approaches to therapy and rehabilitation of girls with described pathology is closely linked to further deepening of our knowledge on disease emergence mechanisms and definition of genetic and environmental factors in its formation.

The goal of our work is to find out the type of gender development delay (GDD), oligomenorrhea (OM), pubertal uterine bleedings (PUB) inheritance type and contribution of genetic and environmental factors in the development of these nosological forms.

Family anamnesis of 356 teenage girls of 13-17 years has been studied. All patients had no less than one sister older than 17 years. In order to test the correspondance of the pathology to the monogenic inheritance segregation frequencies were calculated according to Weinberg formula, correspondence to multi-factoral inheritance was calculated according to correlation coefficients between relatives of the 1 kinship degree in accordance with quasicontinuous and alternative model. Correlation coefficients were used to decompose total phenotypical dispersion on environmental and genetic part.

Based on segregation frequencies calculation and comparison of difference between empiric and theoretical expected frequency of GDD, OM, and PUB inheritance hypothesis of monogenic inheritance was declined. The calculation of quasicontinuous GDD, OM, and PUB inheritance showed us the discrepancy of these models. While examining alternative hypothesis it was defined that for GDD genotypic component equals 0,75 and environmental – 0,25, while for PUB genotypic component

equals 0,3 and environmental – 0,7, for OM – 0,17 and 0,83 correspondingly.

Thus it is determined that GDD, OM, and PMK are multi-factoral diseases, and for OM and PUB an impact of environmental factors turns out to be the most important and for GDD – genetic factor is the determinant one.

The work is submitted to the Scientific International Conference «Modern Problems of Experimental and Clinical Medicine», Thailand, 20-28 February 2011, came to the editorial office on 30.12.2010.

P CHRONIC PIELONEPHRITIS, ARTERIAL HYPERTENSION AND OXIDATIVE MODIFICATION OF THE BLOOD PLASMA PROTEINS

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Oxidative modification of the blood proteins is stress-marker in various types of pathologies.

The aim of this work was study protein oxidative modification (POM) in blood plasma of patients with chronic pyelonephritis (CP) and chronic pielonephritis associated with arterial hypertension (CP+AH).

We examined 71 patients (age 19-59 years) including 40 patients with chronic pyelonephritis and 31 patients with chronic pyelonephritis associated with arterial hypertension. Control group consisted from 25 healthy persons.

There were examined basic and neutral classis of dinitrophenylhydrazons (KDNPG and ADNPG) in blood plasma which are catabolits of protein oxidative modification and its defined by R.L. Levine methods.

Shown data demonstrated same alterations of free-radical oxidations of proteins in blood plasma at patients with chronic pielonephritis and chronic pielonephritis assotiated with arterial hypertension.

According to these data KDNPG level of neutral class at patients with chronic pielonephritis decreased in 2,3 times than in control group and KDNPG level of basic class decreased in 2,5 times.

More significant alterations of POM data were fixed at patient with CP+AH in blood plasma in compare with control. Thus, the level of KDNPG of neutral class was reliably decreased in 3,1 times than in control and the level of KDNPG of basic class was lower in 4 times in compare with control.

ADNPG in blood plasma was decreased in 1,8 times for neutral class at patient with CP than control, but the level of basic class of ADNPG in plasma no significant modified compare control.

There were fixed a deep oxidative products falling both basic and neutral classis of ADNPG in the next patients group with CP+AH. So, the content of neutral class of ADNPG was lower than control in 2,9 times in blood plasma at patient with CP+AH and the content of basic class of ADNPG was lower in 2 times than control.

The POM data (basic and neutral KDNPG) were reliably lower in 1,4 and 1,6 times at patient with CP+AG in compare with CP. The content of neutral and basic classis of ADNPG were reliably higher in 2,5 times in blood plasma at patients with CP than in patient with CP+AH.

As a whole, according to our data it was fixed the developing of deep oxidative stress with one-directed modifications of free radical proteins at patients with chronic pielonephritis and chronic pielonephritis assotiated with arterial hypertension

The decrease of POM level by our opinion was determined by circulation of oxidative proteins in blood plasma which are indifferent to reaction with carbonyl catabolits.

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MORFOLOGICAL BASES OF COMBINED CONTRACTIONS OF NEIGHBOURING LYMPHANGIONS IN THE DOG THORACIC DUCT

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Uninterrupted muscular coat of thoracic duct has different structure on its extent. The local thickenings of the duct muscular coat, muscular cuffs and valvar muscles, are connected between them as within the lymphangion limits (muscular cuff, entrance valve and exhaust-valve), so on extent of the duct – muscular connections of the neighbouring lymphangions. One interlymphangion′s muscular bundles pass through border valves (transvalvar muscular system), another – over valves. Overvalvar bundles connect muscular cuffs of neighbouring lymphangions by the direct way and form structural base of their combined contractions.

Keywords: thoracic duct, lymphangion, valve, muscular bundle

The structural basis for lymph flow has been a subject of numerous studies. Valves divide lymphatic vessels on lymphangions and are considered as passive restrictions of reserve lymph flow, muscular cuffs of lymphangions – as lymphatic pumps [1, 2]. H. Mislin [2], rounding off totals of own and others investigations of lymphangion′s problem during 30 years, whrote about interrupted muscular coat in lymphatic vessel in connection with absent or little few of myocytes about valves. Therefore it is significant that lymphangions make separative, solitary contractions although in the large lymphatic vessels of limbs and in thoracic duct (TD) are discovered cases of combined contractions of 2-4 neighbouring lymphangions. But their morphological bases are not described.

Materials and methods of research

The work was carried out on 12 both sexes dogs of 3-5 years old. TD pick out whithout preliminary injection. Material was fixed in 10% solution of neutral formalin. Part of material was stained in paraffin with following production of serial longitudinal and transverse sections of 5-7 mkm in thickness. Sections were stained by picrofuxine, azane, total preparations – by gallocyanin.

Results of research and their discussion

TD of dog contains 10-12 valves, constantly − in the ending and supraaortic segments, behind oesophagus (3, more often – 1-2), near aortic arch (2) and diaphragm, above cisterna chyli (3-4), least of all (0-1) − in middle thoracic part (interazygoaortic segment). Valves divide TD on intervalvar segments with different length or lymphangions. TD muscular coat consists of deep (circular) and superficial, subadventitial (longitudinal) layers. Circular muscular bundles have lesser thickening (more often – 1-2 rows of the cells), than longitudinal (to 3-4 rows of the cells), but settle down more tightly on the perimeter of TD. In some places muscular layers become one, particularly in muscular cuff of lymphangion and valvar shaft. In such parts are prevailed oblique bundles with oblique transverse or intermediate (40-50°) orientation. Intima and adventitia contain dispersed muscular bundles with mainly oblique longitudinal orientation, they not form continuous layers on extent and perimeter of TD or often in one of TD lymphangion. Quite often intimal and adventitial bundles of myocyties anastomose with muscular layers of media or even become in them. In basis of valve circular layer of media thickens and forms projection into valvar shaft, where its oblique transverse bundles interplace with longitudinal muscular bundles of intima, which can change their direction on radial. Subadventitial muscular bundles pass over basis of valve without interruption, but can stretch and thinen. And muscular bundles of intima in basis of valve in some places continue without interruption in proximal direction. Then on section of TD valvar part are discovered two longitudinal muscular layers, separating layer of connective tissue with possible participation of transverse myocyties – marked muscular connections between muscular cuffs more often of first TD lymphangions (fig. 1-3). These longitudinal muscular layers can draw closer to one another in muscular cuff of proximal lymphangion and joint in one layer of media.

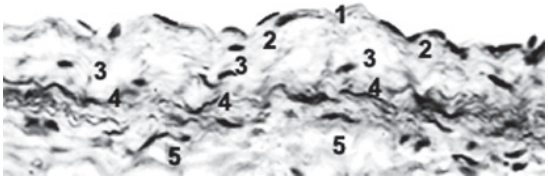

Fig. 1. Thoracic duct of dog, middle part, longitudinal section through muscular cuff:
1 – endothelium (pallid-grey nuclei);
2 – longitudinal myocyties (black nuclei) in intima and internal elastic membrane;
3 – circular myocyties of media;
4 – subadventitial longitudinal myocyties and external elastic membrane;
5 – adventitia and its myocyties.
Picrofuxine. Light microscopy, magnification – 300X

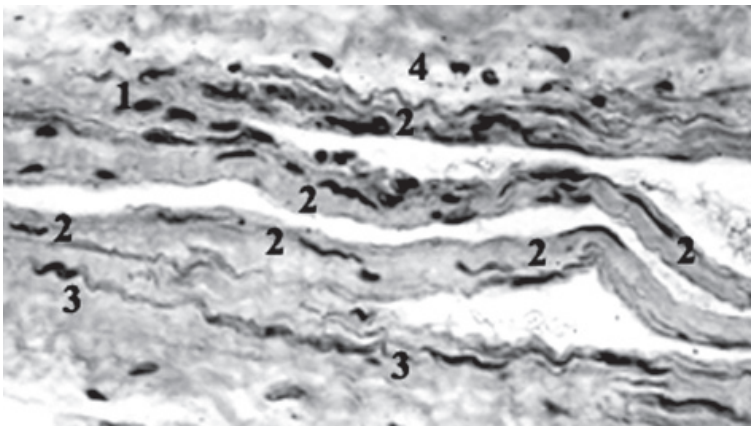

Fig. 2. Thoracic duct of dog, middle part, longitudinal section: 1 – circular myocyties in valvar shaft; 2 – internal elastic membrane and longitudinal muscular bundles of intima, penetrating into valvar cusps and lateral wall of valvar sinus; 3 – subadventitial overvalvar bundle of myocyties and external elastic membrane; 4 – circular muscular layer in lateral wall of valvar sinus. Picrofuxine. Light microscopy, magnification – 300X

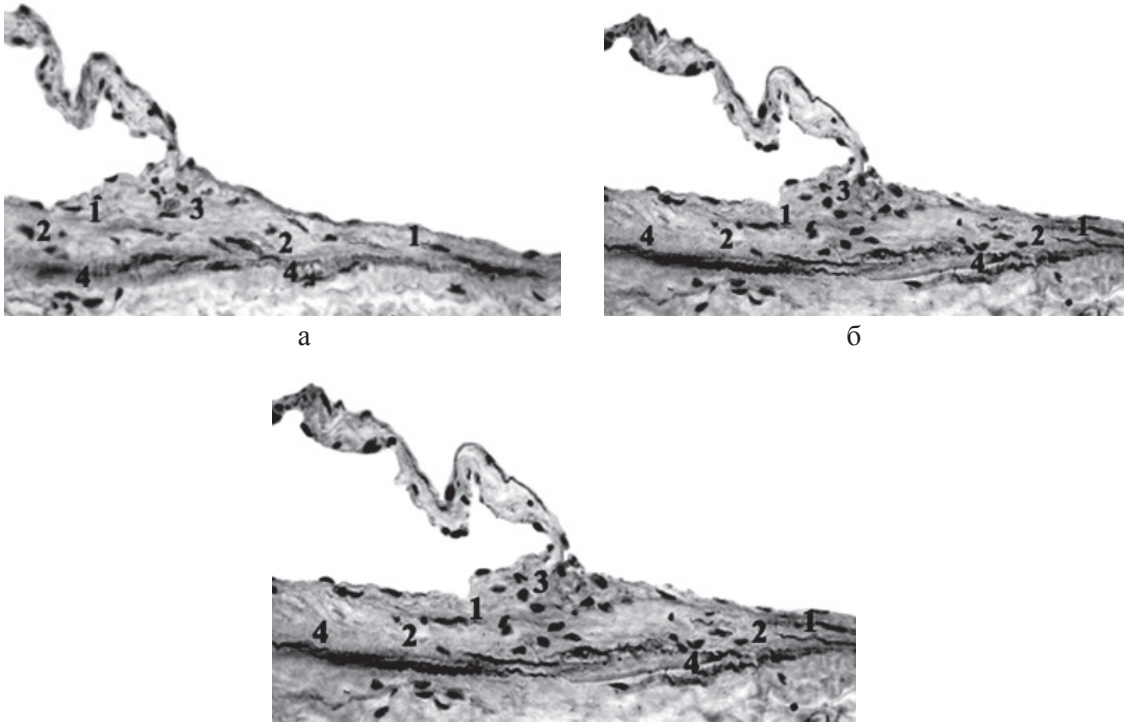

Fig. 3. Thoracic duct of dog, initial part, longitudinal sections: 1 – longitudinal myocyties in intima and internal elastic membrane; 2 – circular myocyties of media; 3 – conjestion of myocyties with different orientations in valvar shaft; 4 – overvalvar (subadventitial) longitudinal muscular bundle and external elastic membrane. Picrofuxine. Light microscopy, magnification – 300X

TD valves are circular folds of its wall, mainly – intima and circular muscular layer. Internal elastic membrane noticeable loses shape in basis of valve: it turns out wall of distal lymphangion in axial sector of valve, become interrupt in parietal sector of valvar shaft (stretching of network of elastic fibres). Between its two layers of intima there is conjestion of myocyties and collagen fibres, which draw closer with parietal intimal layer and thinen in valvar cusp. The most large muscular bundles of intima connect muscular cuff of lymphangion with its entrance valve and lateral walls of valvar sinuses (1) and with

its exhaust-valve and lateral walls of axial sinus (2). Longitudinal valvar bundles of myocyties from distal lymphangion continue through shafts and comissurae of border valve into longitudinal commissural bundles of myocyties of proximal lymphangion, or pass by cusps and through lateral (intershaft) walls of axial sinus and valvar comissurae – transvalvar muscular system of neighbouring lymphangions. It can trace the best on the total preparations of TD.

In initial part of TD circular bundles of myocyties settle down into 2-3 layers, limiting TD dilatation and stretching its walls during large throw out of lymph from cisterna chyli. Muscular bundles branch out, intersect and connect in different degree in basic, circular muscular layer of TD, where myocyties settle down tightly, often as continuous muscular stratum. Intima in initial part of TD contains good-marked longitudinal muscular bundles: intensifying transvalvar muscular system, probably, increases resistence of valves in the part to shock pressure of lymph flow from cisterna chyli. Intima in middle thoracic part of TD contains myocyties smaller, circular bundles of its media settle down more crumbly, but subadventitial longitudinal bundles of myocyties are marked powerfully: it can propose more external pressure on TD wall – influence of respiratory excursions of thorax.

Conclusion

Structure of dog TD similar to structure of human TD with cisterna chyli [3]. Valves divide TD on row of intervalvar segments with different length and myocyties in the walls or lymphangions. Muscular coat of TD is the hole, although uneven formation on its extent. Provisionally it can select two muscles – muscular cuff and valvar muscle, but don′t as separate, independent formations, and as local thickening of the muscular coat. These muscles are connected between them as within the lymphangion limits (its muscular cuff and valves), so on the extent of TD – muscular connections of neighbouring lymphangions, transvalvar and overvalvar. Circular bundles of media and longitudinal bundles of intima from muscular cuff of the lymphangion pass through valvar shafts and cusps, uniting the main components of the lymphangion, and form transvalvar muscular system of neighbouring lymphangions. Longitudinal muscular bundles of adventitia (deep layer) and media (superficial, subadventitial layer) pass without interruption over border valves of neighbouring lymphangions and unite their muscular cuffs into one muscular stripe: overvalvar muscular bundles are structural basis for direct spreading (short way) of wave of muscular excitement and combined contractions of neighbouring lymphangions. Since valve is situated under angle to TD wall, wave of muscular excitement passes in it more long way, then by overvalvar muscular bundles. Therefore the work (**A**) of transvalvar muscular bundles, making (**F**) during their contractions and directing on axial promotion (**s**) of lymph, is smaller effective, according to known formula ($\mathbf{A} = \mathbf{F}\cdot\mathbf{s}\cdot\cos\alpha$). When valve is turned off ($\alpha \to 90°$), the work become zero, in difference from overvalvar bundles ($\alpha \to 0°$, $\cos\alpha \to 1$).

References

1. *Horstmann E.* Uber die funktionelle Struktur der mesenterialen Lymphgefasse // Morphol. Jarb. − 1951. − Bd. 91, № 4. − S. 483-510.

2. *Mislin H.* The Lymphangion // Lymphangiology. – Stuttgart. – New York: Schaffauerverlag, 1983. − P. 165-175.

3. *Petrenko V.M.* Functional morphology of lymphatic vessels (In Russian). Second edition. − SPb, DEAN, 2008. − 400 p.

Materials of Conferences

THE ROLE OF ENVIRONMENTAL MONITORING IN PRESERVING THE HEALTH OF THE POPULATION

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Environmental protection and rational use of its resources in conditions of rapid growth in industrial production has become one of the most pressing problems of today. Environmental Sustainability provides a rational use of natural resources and protect ecological systems upon which the survival and prosperity of mankind. Humanity is faced with serious problems of depletion of many natural resources, the almost universal contamination of the environment, the negative impact of these phenomena on human health. At the present stage of multivariate effects of chemical pollutants it is important to determine their combined effect on the human body, to examine the contribution of individual contaminants, to assess the risk for public health. It became possible through an integrated definition of anthropotechnogenic load on the environment and risk assessment methodology. However, accurately estimate levels of risk are impossible without the creation of modern systems of environment quality control.

Indicators of are the disease burden calculated by WHO experts show the role of environmental factors in forming public health. Of the 102 major diseases and groups of diseases and injuries, causing the level of ill-health of the population, 85 have environmental components.

This situation, as well as countries' international obligations to implement the principles of sustainable development, causes the inclusion of ecological well-being issues in national policy and strategy. They provide programmatic activities to improve the environment, prevention of air pollution, indoor air, water and soil, saving and promotion of health, the creation of appropriate infrastructure. Implementation of public policy for the environmental well-being of the population would prevent the development of environmentally sensitive diseases, reduce the environmental burden of disease and improve quality of life.

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ECOLOGICAL CHARACTERISTICS OF THE ENVIRONMENT OF THE REPUBLIC OF KAZAKHSTAN TO ASSESS THE STATE OF AIR

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One of the most important aspects of the environmental characteristics of the environment is the level of air pollution. The problem of environmental pollution in the Republic of Kazakhstan has attracted increasing attention in connection with the steady growth of the total power of energy, industrial production and transportation – the main sources of emissions. Immediate danger of air pollution in urban areas is associated with adverse effects on human health.

Causes high levels of air pollution are outdated production technology, inefficient sewage treatment plants, poor quality of fuel, poor use of renewable and non-conventional energy sources. The most of the population from industrial centers live in areas of high impact of harmful emissions. In developing projects of maximum permissible emissions design organizations are not considered carcinogenic substances, persistent organic compounds, resulting in difficult work to integrate these chemicals and laboratory monitoring. There has been an increase in emissions of priority pollutants such as sulfur dioxide, nitrogen dioxide, carbon monoxide.

This situation requires immediate adoption of adequate measures to reduce concentrations of harmful substances in the air environment. The Republic of Kazakhstan has developed the concept of ecological safety for 2004-2015 on December 3, 2003 № 1241, which focuses on prevention of critical situation (hazardous) to human health.

In this connection should be equipped with stationary sources of effective treatment systems from nitrogen oxides, carbon, sulfur, modernization of the technological and sanitary measures, the application alternative fuels, improving the functional structure of the city planning and traffic management.

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COMPARATIVE ACTION OF SALTS OF IRON AND COBALT ON THE CYTOGENETIC INDICES IN RAT ERYTHROCYTES AND AGAINST THE BACKGROUND OF CORRECTOR

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Experiments were carried out on laboratory rats ($n = 55$) weighing 200-210 g, who were divided into 5 groups. The first group ($n = 18$) consisted of control animals. The second group ($n = 9$) consisted of rats inoculated per os acutedoses of iron salts (LD_{50} – 100 mg/kg). The third group ($n = 8$) – rats that received acute doses of cobalt salts (LD_{50} – 80 mg/kg). The fourth group ($n = 10$) – animals that received sublethal doses of ferrous sulfate (100 mg/kg), together with herbal preparations «Lady's-mantle» (10 mg/kg). The fifth group ($n = 10$) – animals that received sublethal doses of cobalt sulfate (80 mg/kg) simultaneously with the drug «Lady's-mantle» (10 mg/kg).

To assess the cytogenetic homeostasis of experimental groups of animals used micronucleus test, proposed by Pappenheim. Micronucleus took into account in the peripheral blood erythrocytes in rats. The content of erythrocytes with micronuclears during ironintoxication ($0,43 \pm 0,05$*) increased by 59,2% ($p < 0,05$), when poisoning by cobalt ($0,55 \pm 0,02$***) increased by 103, 7% ($p < 0,001$) compared to the control group ($0,27 \pm 0,04$). On the background of the drug «Lady's-mantle» during intoxication with salts of iron ($0,27 \pm 0,01$*) in the group of animalsthe number of erythrocytes with micronuclears decreased by 37,2% ($p < 0,05$) in contrast to rats inoculated only with iron salts . Rats treated with cobalt salts, together with the drug «Lady's-mantle» ($0,39 \pm 0,02$*) number of erythrocytes with micronuclears decreased by 29,0% ($p < 0,05$) compared with animals receiving only the cobalt salt.

It was found that acute intoxication of animals with heavy metalsincreased the number of cells with micronuclears. There has been a rapid distribution of metals in cells, then tissues and organs, which led to the development of toxic effect on the level of hematopoietic cells, resulting in the development of cytogenetic disorders. In acute intoxication the most damaging effect on the erythrocyteswas observed in the following descending order of heavy metals in the sequence: Co → Fe. The drug «Lady's-mantle» from the group of bioflavonoids reaches a positive therapeutic effect by stabilizing cell membranes, neutralization of toxic free radicals et al. It is arguable that the effect of preparation decreased the toxic effect of heavy metals in the blood cells of laboratory rats.

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LEGISLATIONS OF ART-HISTORICAL EVOLUTION

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Distinct criteria to define such essential chronological measurements of artistic-historical evolution as *stage*, *period*, *epoch* and *era* are given. Evolutional process is investigated in detail within an epoch in regard to some characteristic features of constituent periods, their inevitable changes being proved both by the natural movement from origin to disappearance and by the interaction of the two determinative ways of artistic thinking (*romantism* and *realism*, that respond to the notions of *classicism* and *positivism*). On the basis of the revealed development stages, the conclusions about gradual acceleration of the artistic-historical process and rhythmical interchange of its phases, that can be metaphorically called *light* and *shade*, are made. Hence, possibilities to make predictions are stated; these can be applied to general historical evolution as a whole.

Keywords: essential constituents of the artistic-historical process; its stage development and gradual acceleration

While studying artistic creativity, we commonly use a conception of *epoch*, thus limiting one or another time period with it. Within these time periods phenomenons of a single kind of art or even all its types are united by some commonness, a complex of characteristics that allow us to speak of a unity in ethical-esthetic settings, closeness of artistic manners and techniques.

So far let us not involve such historical dimensions as Ancient world, Antique, and Medieval, as they exceed time limits of a single epoch and consist of a whole number of epochs. The epoch of Medieval was replaced by Renaissance and, perhaps, it gives us the most common and proverbial concept on an art-historical epoch as it is. It is followed by the ear of Baroque, but we should keep in mind that this idea as an epoch, not one of styles of that period (with a corresponding indication with a small letter – baroque), has established relatively recently and not without discussive difficulties.

After it we seem to find more usual definitions: Enlightenment, Romanticism… But here quite serious remarks are required. However, first of all, it is necessary to draw our attention to a disappointing overlapping in definitions. Only in spelling of these two epochs we unquestionably use capital letter: Renaissance and Enlightenment, obviously in order to differ them from usual words, that mean *renaissance* of something and *enlightenment* of someone. Sometimes we can see Antique or Medieval, written with a small letter. It is probably time for the scientific society to come to agreement that even from the position of Russian language norms they are proper names and their status requires writing. Along with that it could to manage a diversification in spelling of an epoch and style that gave it its name because of its defining meaning. For example, as we have just said, we would separate Baroque (the epoch, with capital) and baroque (the style, with small), meaning that along with the style baroque in that epoch also existed classicism, realism, so called «large style», mannerism, rococo.

But let us refer to more significant moments. So, Enlightenment and Romanticism. As usual, we refer them to independent epochs, though even in chronological-quantitative aspect one can be embarrassed their incommensurability with previous epochs: Enlightenment is mainly the second half of the XVIII century, Romanticism is form the XIX century, while Baroque occupies two and a half centuries, and Renaissance includes more than three centuries.

A solution of this antagonism (and not only formal) is in denying of general opposition between Enlightenment and Romanticism. In fact, they were contrast links of the same big chain, and their replacement carries the character of progress, not confrontation or recess (first of all we mean an excessively accented opposition of romantics of the beginning of the XIX century against the ideas of enlightenment). One of specific evidences is the evolution of creativity of such titans as Goethe and Beethoven. Being outstanding representatives of Enlightenment art, they opened the horizons of Romanticism at the outcome of the XIX century.

Besides, an attentive analysis shows that Enlightenment and Romanticism in their turn must be divided into component periods that differ in characteristics (their chronological duration will be discussed later). Within the limits of Enlightenment we can clearly outline two periods than can be called Early Enlightenment (the middle of the XVIII century) and High Enlightenment (second half of the XVIII century and the very beginning of the XIX century). Within the limits of what is usually defined as Romanticism one should distinguish three periods: Romanticism itself (first half of the XIX century), Postromanticism (second half of the XIX century), and the completing period (end of the XIX – begging of the XX century).

The described five segmentations in their historical function are periods, though in their artistic content they can be perceived as whole epochs. However these five periods can become an epoch in direct and exact meaning of this

word only taken together. Let us call this epoch ***Classical*** because of at least two reasons.

First of all, within the period between the middle of the XVIII century to the border of the XX century was created the creative massive of those artistic valuables that we call big artistic classics (it first of all refers to literature and music), crystallized the leading genres (from poem and novel to sonata and symphony), types, concept models and composition-technological principles.

And, secondly, what is especially important to us in this case, staging of artistic-historical process manifested itself in the development of this epoch with all its brightness and obviousness. Particularly, only then clearly affected meaning-forming role of such basic types of artistic thinking as romanticism and realism: the first obtained its name and was finally realized in the first half of the XIX century, the second – in the second half of the century. It was linked to a domination of one of them at the corresponding time limit.

* * *

The said above induces us to start finding out legislations of artistic-historical process exactly with the Classic epoch. Within its evolution naturally emerged significant differences between stages – these differences allow us to divide it into a line of replacing stages. And as it was remarked above, consideration of the most significant differential factors allows us to single out five periods, duration of each of them equaled approximately four decades. To imagine the picture of their movement with a sufficient palpability and at the same time compactly, let us limit ourselves with enumeration of the most important names of composers.

The first period (the middle of the XVII-II century, approximately 1730-ies – 1760-ies) – the zone of interaction of the final Baroque stage (late creativity of Vivaldi, Bach, Gendel) and the opening stage of the Classical epoch; this stage can be called *Early Renaissance* (early creativity of Gluck, Gaidn, Mozart).

The second period (the second half of the XVIII century, 1770-ies – 1800-ies) – the flourishing of the classic Enlightenment times style; in this case suitable is the name High Enlightenment (the main phase of creativity of Gluck, Gaidn, Mozart, Beethoven).

The third period (the first half of the XIX century, 1810-s, 1840-ies) – the advancement of *Romanticism* (let us use such designation, differing here the epoch from romanticism in general); romanticism as the leading style of this period can be called classical as all attributes of this artistic method manifested in those decades with a crystal clearness and completeness (Schubert, Mendelson, Schuman, Berlioz, Chopin, Glinka; early creativity of List, Wagner, Verdi).

The fourth period (the second half of the XIX century, 1850-ies – 1880-ies) often figures as *Postromanticism*, as much in the art was defined by realistic trends (it less refers to music – the main phase in the creativity of List, Wagner, Verdi; Brahms, Bise, Grig, Musorgskiy, Borodin, Rimskiy-Korsakov, Chaikovskiy).

The fifth period (the border and beginning of the XX century, 1890-ies – 1920-ies) – the zone of interaction between the final stage of the Classic epoch that is often defined as late romantic or wider – as late classic (the last phase in creativity of Brahms, Grig, Rimskiy-Korsakov, Chaikovskiy; Mahler, R. Strauss, Debrussi, Puccini, Taneyev, Glazunov, Rakhmaninov, Skriabin), and the beginning stage of the current epoch (Ravel, Schenberg, Berg, Vebern, early phase in creativity of Onegger, Chindemit, Bartock, Stravinskiy, Prokofiev, Miaskovskiy, Shoctaokvich).

Immediately we should add that the described periods relatively clear divide into sub*stages* that last for about two decades. The first period: 1730-ies, 1740-ies, 1750-ies, 1760-ies. The second period: 1770-ies, 1780-ies, 1790-ies, 1800-ies. The third period: 1810-s, 1820-ies, 1830-ies, 1840-ies. The fourth period: 1850-ies, 1860-ies, 1870-ies, 1880-ies. The fifth period: 1890-ies, 1900-ies, and 1910-s, 1920-ies. Besides, in extreme periods we find the same dynamics of epoch development: as in 1730-ies -1740-ies *still* prevailed the late baroque style, so in 1890-ies – 1900-ies *already* the defining significance of early-classic style, and in 1910-s – 1920-ies *already* the most significant role played the early-modern style.

The majority of difficulties for the study of Classic epoch lay exactly in these extreme (begging and finalizing) periods – because of their transitive character, in other words because of complex bindings of gradually disappearing traditions of the previous epoch and new trends that in their totality form the image of the following epoch.

While studying the period of the middle of the XVIII century we have to consider the fact that in works on the history of literature and plastic arts the XVII century is still outlined as something independent, as e result, the artistic process of the first decades of the XVIII century is automatically «dragged» into Enlightenment, while its real development started in 1730-ies, though single breakthroughs of new can be observed in the previous decades.

Regarding the period of the border and beginning of the XX century one can observe another careen: frequently too much is farmed out to the XX century to the detriment of objective evaluation of productive processes of

the previous century. However, we should admit that much within this stage «worked» one way or another in favor of the prospects of that epoch, which it would be most proper to call *Modern* (here very demonstrative would be such phenomenon that discharges out of classic, as *style modern*).

The letter of the mentioned ideas regards to any period that finds itself at the joint of two art-historical epochs, when inevitably lay over each other phenomenons of the epoch that «passes from the picture» (its last, late, finalizing period) and emerging next epoch (its first, early, opening period). And, of course, these phenomenons does not only lay over one another, but they co-exist, interact, bind, and oppose. Besides, their combination can sometimes flow into so complete image and style synthesises and symbioses that to outline the previous from the following, the past from the future in them is possible only theoretically.

Let us immediately add that for any period in general and for a period at the joint of epochs in particular always arises a dilemma: where to start the countdown – from the initial grains-sprouts of the new, or from time when all this new begins to «flow»? Besides we should consider the circle of inevitable overtaking and falling behind phenomenons.

If, as an example, we take the period of the border and the end of the XX century with the chronology that has been described above – 1890-ies – 1920-ies, then it will seem that in the field of figurative arts some transitive traditions preserved on Russian territory even in the beginning of 1930-ies, and on the other hand – the horizons of the XX century mentality already started in the middle of the 1880-ies not only with Van Gough and Vrubel, but also with late Roden.

Or here is a comparison from the field of music: Stravinskiy in the opera-oratorio «Czar Edip» (1927) and Ravel in his «Bolero» (1928) made a breakthrough to the aesthetics of the period of 1930-ies – 1950-ies, while early Shostakovich in 1933 created his Preludes or. 34 and the First piano concert that completely refer to 1920-ies.

Therefore, borders of any time period are quite approximate, fuzzy, and relative and it is almost impossible to carry out a clear «watershed». Nevertheless, it is necessary to point out at least conditional landmarks even from the position of convenience of orientation in historical space. It is most natural to point them out at the basis of generalizing backbones that forms the main objective of the art-historical science.

Let us outline one of such backbones on the foundation of the previous reasonings. If we suppose that the five described above approximately equal I their duration periods of the Classic epoch can also be found in chronological structure of any other epoch, then it would be logical to take an analogy with stages of any alive organism development and, first of all, human. Then, like a circle of a human life, an epoch trajectory can be imagined as follows: the first period – birth and childhood, the second – adolescence and youth, the third – youth and the first maturity, the fourth – the second maturity and declining years, – the fifth – old age and death. Definitions the first maturity and the second maturity are quite conditional, but within the hierarchy of a human life stages such periods, of course, exist.

We should also remark that in artistic creativity in an immeasurably stronger way than in organic life each evolution phase demonstrates not only its peculiarities, but also abilities and advantages that are characteristic only for it. It completely regards to the late period of an epoch, when it seems that comes its stage of oldness and death, and to this time of the art life it is impossible to refer common saying «If the youth could, if the oldness was able».

Another important parallel refers to the wave principle. Really, in linear «graphic» of an epoch it is impossible not to detect a historical rhythm that reminds us of a wave movement: splash – recoil, tide – ebb. Without effort we can register «splashes» of the first and the third period and «recoils» of the second and the fourth period. In the most general perspective, «splashes-tides» of the first and the third period are the stages of fermentation, active renewal that sometimes carries radical, innovative-explosive character. «Recoils-ebbs» of the second and the fourth period are marked by a decrease in ethical and aesthetical settings, trends to steadiness, stabilization, return to stable traditional values and artistic standards. Peculiarities of the fifth period will be studied separately.

The impact of the second principle is closely related to an interaction of the mentioned above two fundamental methods of artistic thinking – romanticism and realism, with alternating prevalence of one of another. A periodicity of their advancement directly forms the configuration of an epoch that raises a necessity to explain the essence in apprehension of each of these artistic creativity periods.

* * *

Let us start with romanticism. «The past and the future of romanticism» – so Y. Kremlev titled one of his works, thus rightfully underlining an illegality of coupling this phenomenon only with a time areal of the XIX century (exactly – with its first half). One of the most sensible judgements on a constant presence of the corresponding mentality belongs to

A. Block who claimed that romanticism of the first half of the mentioned century is only «one of the stages of the movement that emerges in all epochs of a human existence. We can rightfully speak of the world romanticism as one of the main engines of life and art».

In context of such approach arises a strong necessity to initiate a search for a universal definition of romanticism. Universality means one that overcomes all particular and partial definitions of this phenomenon that discharge from its perception in localized chronological coordinates.

In the formation of such, integrating definition of romanticism a concept of *extremum* becomes the key. Romanticism as a type of mentality and as a method of artistic creativity is, first of all, ethics and aesthetics of extreme, maximum, inspired by a desire for absolute. Maximalism of criterions, radicalism of goals encourage romantics for a categorical revision of their value settings, for intensive creative search that particularly displays in special form of various innovations and experiments and often results into a «discharge» of absolutely new ideas and concepts that reflect qualitative broadening of life and art limits.

Such historical stages are characterized by an atmosphere of rumbling and unsteadiness, rough, explosive, impulsive-spasmodic type of development, sometimes even expansive-militaristic forms (including mutinous-rebellious frames that can transform into an emotion of total destruction). Romantic temper is often linked to such characteristics as outlined acuteness of expression, pompousness, affectation, exstatic nature. A thirst for an extreme displays itself also through a passion to special, unusual, exclusive, unique that can partially explain the inclination to hyperbole, paradox, fantastic, alogism, absurdity.

The derivative and consequence of extreme becomes the *principle of antithesis* that emerge as a result of joining polarized values of extremum: «left» and «right», «top» and «bottom», maximum and minimum, etc. (one of variants of such opposition A. Skriabin regarding his own music fixed with a formula «higher grandiosity and higher finesse»). So forms the specific romanticism system of binary oppositions.

One of them can be defined by a comparison *subjectivism – objectivism*: subjectivism as a common norm of romantic mentality can transform into underlined forms, leading to subjectivism in its extreme condition; the opposite aspiration (maximum possible removal from personal origin, total affirmation of sum and mass) leads to objectivism.

Another pair of romantic antinomies *emotionalism – rationalism* can be described as follows: an amplitude of romantic emotionalism broadens from trembling excitement of lyrical expression to confession and uncontrollable passions; romantic rationalism, quite opposite, veils manifestations of feelings, cultivates the prevalence of intellect, sober calculation, strict pragmatics, abstract logic.

Prerogative of a romantic are also the following antithesises: unlimited enthusiasm for reconstruction, «a desire to life a life ten times» (A. Block) – apathy and melancholy, acute psychological reaction to the smallest rippling of inner and outer life – intentional indifference to them; a feeling of glaring disorderliness and unreasonableness of the environment – its idealized perception; a cult of fiction, free imagination play – naturalistic mould of reality, its protocol registration, etc.

In historical aspect we can affirm that romanticism as a type of mentality and artistic thinking emerged together with a formation of *homo sapiens* and the origin of art. It is an initial category, existence of which in its «anthropological» version is generated right up to eschatological disaster, if such is predicted. But while it doesn't happen romantic mentality stays a necessary constant of being, the most important spring of its immanent development.

An alternative to romanticism is most frequently indicated by the term *realism*, though on character of its intentions it could also be called by the word *positivism*, and regarding separate periods appropriate would be a concept of *classicism*. Ethics and aesthetics of realism – positivism most clearly corresponds to the idea of *optimum*. Here we mean a bent for modepochtion, even temper of manifestations, stable forms of existence with their measured and gradual evolution type of development. It is both a desire to objectively reconstruct life «as it is», a wish to apprehend to explain the world, proceeding from it that defines the goal for unconditional reliability and careful motivation.

And if romanticism «runs» towards poles (centrifugal trends that lead to exclusive multiplicity of verges and resources), realism tends to prefer principles of «sense» and a «golden middle» (centripetal trends that provide for sufficient balance of unity). And, finally, realists experience primary interest to «terrestrial» everyday conditions and feelings, so paraphrasing F. Engels, we can speak of «usual characters in usual conditions».

Dualism of romanticism and realism is remarkable as it is, and even more important because in their alternating prevalence is formed a circle of epoch. As we could already understand, its second and fourth period is developed under the aegis of realism, and on its initial, central, and finalizing stage romanticism

comes into its own. Besides, on each stage it behaves in a quite variable way.

Romanticism of the first period that forms the «programme» of the epoch is marked with an excess of strength and ability, signs of rough enthusiasm and original freshness. Romanticism of the third period gives a new strong impulse for the ear movement, thus usually accenting individual-personal motives.

Romanticism of the fifth period, as a rule, is linked to a considerable decrease in activity, spreading into two contrast channels: «the golden sunset» and «black twilight». Once again we should underline that in fact late romanticism and early romanticism (or romanticism of the fifth and first period) are combined in time, they co-exist and oppose, thus realizing the dialectical process of dying of the previous epoch (its final phase) and the birth of the following epoch (its initial phase).

Of course, it is only a general scheme, invariant paradigm that each time is filled with a specific historical content. Therefore, we only speak of a generalizing trend, a strict legislation of which can be affected by an impact of spontaneous historical conditions and emergence of various anomalies.

Besides, «sterile» romanticism and realism can be modeled only in terms of theoretical abstraction – in real practice these types of mentality and artistic thinking are present in various tinges and combinations; within the period of prevalence of one of them, another one does not disappear, it just moves into shade and is present as a supplement.

However, along with all that, the very interaction between romanticism and realism (positivism, classicism), their rhythmical pulsation and alternation is the «directing» factor, moving principle in the deployment of being and historical evolution that translates its discreet-stage character to the historical process.

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All the described above mainly regarded the structure stage model, and trajectory of a separate epoch and was illustrated with an example of Classical epoch. Now we can come out of its limits in order to describe another legislation of art-historical process – an inevitable acceleration, gradual compression of time frames.

This compression also takes place within an evolution of each epoch, but on the whole it is not as noticeable, so we can disregard it for simplicity and clearness of an image. The only thing we have to unquestionably consider is a time zone at a joint of epochs, where initial period of the following epoch equals in duration the finalizing period of the previous epoch. It kind of balances between the past and the future and so, in the provided calculations turns out to be about a decade longer than periods that replace it.

So, it has been established that each of five periods of the Classical epoch lasted for about four decades that formed a chronological areal for the epoch of two centuries or a little more, if we start our calculation with 1720-ies, not with 1730-ies.

It was preceded by the epoch of Baroque with its periods of about half-century (except the first one, to which we add «another» ten years): 1510-s -1560-ies, 1570-ies – 1610-ies, 1820-ies – 1660-ies, 1670-ies – 1710-s, 1720-ies – 1760-ies. Let us remind that within the period

1510-ies – 1560-ies Late Renaissance is combined with Early Baroque, and within the phase 1720-ies – 1760-ies Late Baroque – with Early Enlightenment. In total we come up with the duration of two and a half centuries.

A periodization of Enlightenment epoch requires six decades as a «measure unit» (again excluding the first period): 1260-ies – 1320-ies, 1330-ies – 1380-ies, 1390-ies – 1440-es, 1450-ies – 1500-s, 1510-s – 1560-ies. An exclusion was made for the zone of joint between the finalizing phase of Late Medieval and that initial period of Enlightenment that is known as *Postrenaissance.* In total – more than three centuries.

Let us stop the movement into the depth of centuries and refer to the current time that replaced Classical epoch. The suggest name for it – *Modern* with all its conditionality registers the fact that processes that started on the border of the XX century, last nowadays, in the beginning of the XXI century. Their chronology is: 1890-ies – 1920-ies, 1930-ies – 1950-ies, 1960-ies – 1980-ies, and, if we look into the closest future, 1990-ies – 2010-s, 2020-ies – 2040-ies. In other words, three-decades sections, excluding four decades of joint between Classic and Modern) that give in total about one and a half century.

Let us compare numbers, moving from present into past: Modern – approximately 1,5 centuries, Classical epoch – 2 centuries, Baroque – 2,5 centuries, Renaissance – 3 centuries. Unlikely there are doubts that before Renaissance art-historical epochs were even more extensive, and after Modern they will become even shorter.

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After such statement it is reasonable to complete the construction of integral art-historical periodization. As we have already said, an epoch consists of five periods, and each of them can be divided into two stages, and further we can imagine even more detailed

differentiation. Thus we move towards subdivision that implies a possibility to move the opposite way – along the line of extension: from *micro* (stage) through period and epoch to *macro* that is era.

Historical science also knows so called *New time* and in its projection onto art-historical space it embraces three epochs – Renaissance, Baroque, and Classical epoch. Perhaps future search will prove that the same way more distant eras consist of three epochs: Medieval, Antique (obviously, it is more difficult to solve this problem regarding the Ancient world). But today we can already state the same compression of chronological dimensions at the level of eras.

Going out to such unlimited time space that is an era brings us closer to another legislation of art-historical evolution. We mean a kind of «relay race» that passes from the previous time to the following time. Of course, it happens on their joint and thus, an *outcome* of one becomes an *origin* of the other.

With most obviousness registered legislation reflects in a rhythmic variation of that what can metaphorically indicated through ideas of light and shade if the fist one implies relative harmony and stability, and the second – shifts and breaks that sometimes transform into a catastrophe. And it turns out that lightening or darkening at the end of the corresponding time «programs» the dominant tinge of the upcoming time.

In fact, lightening of the late period of the Ancient world anticipated the light of the Antique, darkening of Late Antique – the shade of Medieval, lightening of Late Medieval – light of Renaissance, darkening of Late Enlightenment – shade of Baroque, lightening of Late Baroque – light of the Classical epoch, darkening of Late Classics – shade of Modern.

And further on, we can rightfully expect that Late Modern with its lightening must provide for the light of the following epoch. And if this next epoch that begins in the middle of the current century (the described period of 2020-ies – 2040-ies), will really turn out more or less organic, then there is hope that regardless all the somber prophecies the humanity and its art will last at least till the middle of the XXII century. And the next «darkening» might lead to the last «shade», in other words, to a complete «end of the world»…

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As a resume we should underline the following. There is no reason to argue with quite an established postulate: the art is immanent only within certain limits, and its self-development can only be imagined in them. And eventually it becomes obvious that creators of art on a definite stage are people who directly belong to their time. It explains their adequate confederacy with all modern unlimited amplitude of world apprehension positions and mentalities. Here is the origin of consonance in aspirations, motivations, and reaction types.

Here also starts a sufficient uniformity of artistic protocols and various approaching that we technologically grouped into such concepts as *epoch style, artistic trend, school, unity, group*, etc. In other words, all the most significant in life of art is defined by the movement of general processes that characterize a man's and humanity's life at the corresponding historical phase.

We speak of it all now only in order to lead a reader to the idea: what has been fixed in the production of artistic creativity of one or another historical period with different degrees of approximation and adequacy reflects real events of the corresponding historical period. Therefore, the said above on legislations of art-historical evolution with a reasonable foundation can be turned into the plane of general historical process.

Thus, conclusions that are addressed to the world of art can be applied to the manifestations of being as a whole and summaries that have been done above regarding art-historical evolution can successfully be spread over any other areas of ontological order and used for prognosis of the closest and more distant prospects of earth civilization existence.

SOCIAL-ECONOMIC PREMISES OF THE COOPERATIVE TRADE DEVELOPMENT

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The main social-economical prospects of the cooperative trade development are discussed in the article. The distinctive characteristics of the consumer cooperation trade on the modern development stage are formulated. The major characteristics of cooperative trade such as self-organization, system, circularity, adaptation, and localization are explained.

Keywords: trade, cooperation, mission, system, entrepreneurship, societies, cooperator, consumer

The main action directions of the organization of consumer cooperation in order to secure a stable advancing progress of the consuming cooperation and the activity broadening and intensification, as well as gaining influence at socially-oriented food and non-food goods , the increase in authority and participating in the solution of social-economic problems and providing the country's safety in the area of food supplies are formulated by the concept of the consumer cooperation development in Russian Federation up to 2015.

The mission of consumer cooperation in Russia is to participate in the development of social infrastructure, first of all in the country, proving for a stable development of the country's consumer market by meeting the needs and proving social protection, the increase in the occupancy of the population that is involved into the activity and is served by the consumer cooperation, fortifying Russian safety in the area of food supplies[1].

Trade is one of the main and traditional directions of the consumer cooperation activity. And consumer cooperation has experience of trading not only in Russia, but also in external trade.

Cooperative trade in former Soviet Union used to have monopoly state in the country. Thus by 1988 consumer cooperation united 60 million kolkhoz members, workers and village intellectuals. Even in the conditions of planned economy in the years of Soviet authority cooperators introduced additional markups, for example «guzhmarkup», and gained additional profit at these expenses[2].

A typical peculiarity of the consumer cooperation and trade cooperation activity is the combination of economic and social functions. Dual social-economic nature of cooperation is its deep, main inner contradiction that leaves an imprint on its economic activity, social essence, and the possibility of its stable development.

Entrepreneurship in trade cooperation has its own peculiarities. First of all – entrepreneurship is a collective activity as it is carried out in the interest of shareholders, though not individually by them, but in the limits of cooperative structures.

The second peculiarity is that entrepreneurial activity is undergone mainly in the areas of circulation and consummation, and only partially in the production area.

The third one is that the main goal of the consumer cooperative entrepreneurship is not gaining profit.

However, this statement does not mean, that consumer cooperative does not care of its gaining. Quite the contrary, nowadays the cooperative orientation on profit as a market subject is the basis of its healthy competition. For consumer cooperative the profit is transformed into some overall economic benefit that is gained by its participants. That is why cooperative business profit is mainly used for the economic fortifying of consumer cooperation and has an expressed social direction. According to this we can outline the following characteristics of the consumer cooperation organization forms as socially-oriented economic subjects: the freedom of consumer's economic choice (open and accessible membership); fair distribution of the income which means that the profit gained by the cooperative are distributed in proportion to the level of cooperative services usage by its members-shareholders; special and original economic role of the production factors. Capitals, owned by cooperatives are actually accessory means, as the person of labour and meeting the people's needs take the prior place[3].

Thus consumer and trade cooperation is one of the market economy's stabilizers. It support social balance and serves as a basis of organization-structure reformation of agrarian production. That is why the necessity of the trade cooperation in the development of the agrarian area is that first of all, it is, in fact, the alternative form of the agrarian economic area organization in interest of both producers and consumers and that can be used by both enterprises and households. Secondly, trade cooperation carries out some of the government's functions – social protection and therefore can expect governmental support in its social-economic activity. Thirdly, trade cooperation is a form of population's self-organisation, mutual support, collective nature, and straight unity of household and economic life areas. We can say that cooperative form best of all corresponds with the mentality of a villager, formed economic ways and traditions. Fourthly, the system of consumer cooperation is a formed structure and reliable partner for a real collaboration with agricultural complex in the area of various problems solution, among which the most prosperous are the development and national and local markets, first of all – village market. Consumer cooperation can actively integrate into the process of denaturalization

[1] The concept of the consumer cooperation development up to 2015.-

[2] Fain L.E. Domestic cooperation. Historical experience. – Ivanovo: Ivanovo State University, 2002. – 276 p.

[3] Belowusov V.I. The basics of applied economy and etrepreneurship: Textbook, Voronezh, Voronezh State University, 1998, 472 p.

of country population income through procurement system, opposite goods sale, commission sale, raw materials processing on giving basics.

Nowadays Russia legislation characterize trade cooperation as a system of consumer societies and their unions that were created in order to meet material or other nneds of their participants. Therefore, it includes the following organization forms:

– Agricultural trade cooperatives that are involved into the area of buying, processing, and selling the agricultural production;

– Specialized trade cooperatives that build houses, garages, subsidiary enterprises, capital buildings, provide credits, household, consultative, agricultural, and other services for their participants;

– Consumer societies that carry out trade, procurement, productive, and other activity, including social nutrition;

– Consumer unions (region consumer union, provincial, republic, central unions);

– Economic unions, comradeship on trust, medical, education, and other institutions, as well as consumer societies that can participate in economy, cooperatives, comradeships.

Up to date the quality of the cooperative work is determined by the following indexes: self-organization, system, adaptation, cyclicity and localization. A characteristic of a self-organization is the main way to create cooperative formations of any kind. One's own initiative and funds that are voluntary combined between each other to solve their urgent problems are in the basis of self-organization. It is self-organization that allow us to mobilize and include non-used recourses into the economic turnover at the territorial, regional, and national level for the quickest solution of the economic and social problems of the shareholders and non-cooperative population. A.V. Chayanov, a popular theoretic and practitioner of Russian cooperation said that consumer cooperation begins with self-organization in the 1920-ies. He said that the main demands of the cooperative unions work are the necessary activity of the masses and the flexibility of their work organization, their ability to adapt and outstanding sensitiveness.

The characteristic of the consumer and trade cooperation system foresees that its organization forms (consumer societies and their unions) are linked to each other in a certain way, first of all, thanks to preservation of vertical authority and governance levels, communication channels and the mechanisms of the decision-making that gives us the opportunity to analyze the work of various consumer cooperation structure elements, for example, in the area of the goods production and service providing, total labour, realization of single development strategy etc.

The adaptation characteristic of the consumer and trade cooperation forms reflects the main trends in the cooperation development that provide for its stable functioning with a definite interaction of its inner and outer existence conditions. And the key significance here is the study of its adaptive mechanism in relation with various conditions of economic activity. It is, first of all, in various organization forms that differently respond to the market situation. The question of the cooperative enterprises forms selection arose any time when the social-political environment changed. For example, in years of Great Patriotic War that was usage of different house-production forms (production of bread in peasant's ovens, fruit drying); in the period of command-administrative economy consumer cooperation bought agricultural production for contractual prices; nowadays such directions as cooperative production diversification and the restoration of forgotten goods delivery forms such as movable shops, the development of procurement activity, goods production mainly from local raw materials draw our attention. Secondly, the adaptation mechanism is a kind of «protective process» that can assimilate rational structures and elements of other market enterprises organization forms. Thirdly, independence and creativity of the cooperators, constant search for new solutions, variants of the enterprise profitability and effectiveness, their national and international solidarity, experience exchange and mutual support can provide for survival and reliability of consumer cooperativeness organization forms.

The circularity characteristic means that the consumer cooperation system is in general a locked trade-industrial circle. This circle provides for the turnover of goods and information flows within a single regional formation. It includes: procurement-processing-sale; production-processing-accompanying to the consumer.

The essence of the localization characteristic is that trade cooperation nowadays has a prior role of a local centre in supplying the village population. This circumstance provides for the solution of both consumers and producers economical, social, and other types of problems. Secondly, in contrary to the consumer goods market, the market of services, provided by consumer cooperation is characterized by a certain local borders of realization within a specific human settlement. And this also allows consumer cooperative structure to specify targets and goals of its trade-industrial circle development, puts it closer to the direct customer on a certain territory, and reveal social-economical peculiarities and abilities of the region.

References

1. Civil Code of the Russian Federation.

2. Tax Code of the Russian Federation.

3. Concept of the consumer cooperation development up to 2015.

4. Fain L.E. Domestic cooperation. Historical experience. – Ivanovo: Ed. Ivanovo State University, 2002. – 276 p.

5. Belowusov V.I. The basics of applied economy and entrepreneurship: Textbook. – Voronezh: Ed. Voronezh State University, 1998. – 472 p.

THE INSTITUTIONALIZATION OF ACCOUNT POLICY

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In the article from the position of institutional conception of forming of accounting policy there was revealed the essence of the concept of institutionalization. In connection with this there appeared the necessity of examination of modern mechanism of institutionalization of accounting policy by the way of introduction of institutional norms into the vital functions of economic subjects. At the base of institutional structure of accounting policy there was based the use of such directions of economical science as transaction costs, rights of property, contract relations.

Keywords: institutionalization, accounting policy, transaction costs, rights of property, contact relations, institutional mechanism

Nowadays there is tracked the strengthening of positions of institutional economic theory at the macro- and microeconomic level. Obedience or expressed by the individuals agreement to obey the determined limits promote the realization of institutional requirements at the conomic activity of subjects[1].

«The rule, which was institutionalized, is identified with the institute»[2], – there state J.-E. Lain and S. Ersson. Consequently, every economic subject has peculiar inside functional and cultural microinstitution, as the account policy. The complex of special chosen normative-legal rules, organizationally-technical norms, traditions, including traditions of relations and coordinations of account activity of its personnel, concerning them legitimacy, are unique for the economic subject.

From the position of institutional conception the forming of account policy as the system of inside normative documents, which regulate bookkeeping (financial, tax, administrative) account, promotes more effective use of possibilities of every system, which fits into conditions of active institutional sphere. The priority meaning for institutionalization of account policy of economic subject has the government (the influence is carried out through the normative acts by the questions of accounting and taxation), which should provide full correspondence of accounting and taxation to the action of market mechanism and creation for it the adequate conditions.

The institutionalization of account policy of economic subject means:

– the process of creation of the immanent organizationally-methodological institute, which provide the ordered functional structure with the hierarchy of power and rules of behavior while the presence of the stable differentiation of labour;

– the formation of defined rules and norms of methodology of account;

– the development and explanation of effective ways and methods, which are not foreseen by the legislation.

The necessity of research of modern mechanism of institutionalization of account policy is conditioned by the needs of opening of organizational account system by the way of introduction of institutional norms into the vital functions of economic subjects. In compliance with such approach there is presented as the possible to single out the blocks of institutionalization of account policy, which are represented at the Figure: forming of norms and rules; interiorization of formal legal norms and rules of the «game»; realization of account policy and control of observance of the stated norms and rules; correction of norms and rules.

Forming of account policy (norms and rules). At the base of principles, rules and norms into the building of system of account of economic subject there are established the limits, which there is necessary to obey while the choice of the account ways, procedures and regulation of the account process. The account policy of organization for the aims of accounting should answer to the principle of integrity of the accounting and include following aspects: organizational; technical; methodological.

Interiorization of formal legal norms and rules of the «game». «Interiorization (passage from without to inside) is the process, the base task of which is introduction of new institutions into the routine activity of different subjects»[3]. The introduction of such microinstitution as the account policy requires the creation of defined standards of behavior of account personnel. Inside acceptance of the generally used professional principles means the making of

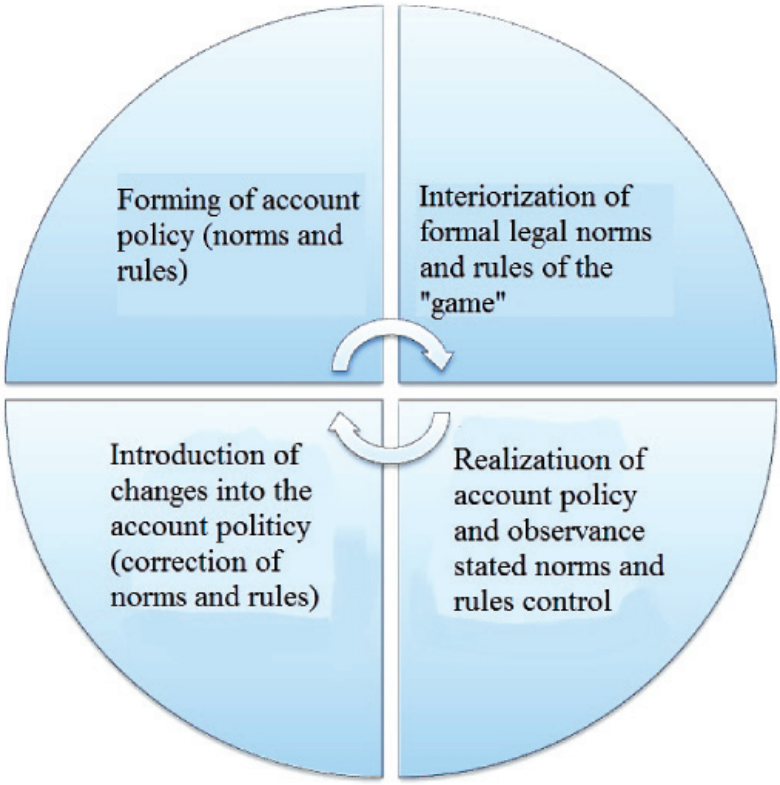
[1] Williamson O.I. Economic institutions of capitalism: Companies, markets, «relational» contracting / Scientific redaction and introductory article V. S. Katkalo. St. Petersburg: Lenizdat: CEV Press, 1996. P. 100-101.

[2] Lane J-E., Ersson S. The new institutional politics: Performance and outcomes. – L.-N.Y.: Routledge, 2000. P.3.

[3] Istomin S.V. The peculiarities of institutional mechanisms at the transformed economy// The herald of Chelyabinsk state university. – 2010. – N6. – P. 54.

the correspondent personality qualities of specialists, which are necessary for the regulation of behavior while reaching the decision, when choice is necessary. The standing of account policy promotes the consolidation of personnel of bookkeeping service of economic subject for the solving of problems of account from the view of carrying out of their professional activity in compliance with requirements, which are brought by government institutions.

Realization of the account policy and observance of stated norms and rules control The realization of the formed account policy is connected with the practical realization of bookkeeping and tax account, conclusion of the treaties. Established totality of norms and rules at the account policy while its realization should provide maximal result from the accounting dependending on the stated aims, to lower the bookkeeping and tax risks.



The mechanism of institutionalization of account policy

The organization of inside control, which is regulated by the standings of the account policy, with taking into consideration of accumulated experience and formed traditions provides the observance of the legislation at the sphere of accounting and taxation, requirements of account policy, including contractual.

Introduction of changes into the account policy (correction of norms and rules). The changes of account policy are carried out in cases: of change of legislation of RF or normative acts by the accounting; developments by the economic subject of new ways of carrying out of accounting (more reliable presentation of the facts of economic life or less laboriousness of account process without lowering of the degree of reliability of information); essential changes of activity conditions.

Corresponding to the p. 9 RAS 1/2008 «Account policy of organization» new rules should be used from the beginning of the year, because their different use should lead to the incommensurability of the facts of accountability. While the choice or development of the new ways of accounting, which were not earlier carried out by the economic subjects, they should be examined as addition, but not change of account policy. Then such ways of accounting should be used from the moment of their affirmation, but not from the further year.

The decision of introduction of changes into the account policy for the aims of taxation while the change of used methods of accounting is accepted from the beginning of the new tax period, and while the change of legislation of taxes and collection not earlier than from

the moment of the carrying into of changes of norms of stated legislation[4].

Thereby, the institutional mechanism of account policy as the instrument provides the functioning of account system in compliance with stated norms and rules, and guarantees the reproduction of the stated (formed) institution of the account policy.

Modern paradigm of basic directions at the studying of the in-house institutionalizm od account policy is based on:

– degree of motivation of institutionalization of account policy from the view point of transaction costs;

– effectiveness of distribution of laws of property;

– effectiveness of contrast relations.

A.E. Shastitko gives following definition of the transaction costs: «Transation costs are the costs of resources (means, time, labour etc) for planning, adaptation and control of the carrying out of the taken by individual obligations at the process of alienation and appropriation of rights of property and freedom, which are accepted in the society»[5]. At the normative regulative by the accounting and in the taxing of RF there is no concept «transaction costs». By its essence the transaction costs are close to the costs of circulation, which were singled out by K. Marks. With the costs of production he also analyzed «the costs, which are necessary for that to turn costs from the commodity form into money one»[6]. While the examination of the process of forming of account policy there should be revealed the costs of reaching of decisions, which serve for reaching the optimum, to the bookkeeping, taxation, at the choice of type of concluded treaties and their defined conditions, which by their essence can be positioned as inside transaction costs.

One of the assumption, at the base of which there is based the account policy of economic subject, is property isolation. This assumption postulates the right of property of economic subject of the belongings. According to the paragraph 1 of the article 209 CC RGF to the owner there belongs the right of owing and order of their property. Financially-economic activity of economic subjects means not only distribution of the rights of property on the belongings but also rise of ration direction responsibility, forming and effective use of financial resources.

The results of financially-economic activity reflect the effectiveness of distribution of the rights of property, at the result of which any act of exchange by competence is carried out in the limits of concluded contracts (treaty policy). It gives a possibility to approach to the institutionalization of the account policy from the position of treaty regulating of the processes of exchange of rights and realization of economic interests.

At the most complicated system of property the contract relations are inalienable, the most important component. The admission of alternative of contract interaction of economic subjects results from the structure of property rights. At the frames of contract the economic interests of subjects of management there take a form of legally meaningful rights and obligations in compliance with treaty policy.

The creation of institution of account policy is the consequence of the process of institutionalization. Which characterize new qualitative level of standardization of account at the economic subject.

[4] Indentation 6 article 313 TC RF.

[5] Shastitko A.E. Institutional economy: theory and methodology: The dissertation of doctor of economic sciences . – Moscow: publishing office MGU, 1999, p.119.

[6] Arks K. The critic of political economy. V. 2. B. 2, The process of circulation of capital – M.: Politizdat, 1988, P. 151.

References

1. Civil code of RF.

2. Tax code of RF.

3. Order of Minister of Finance of RF 6 of October 2008y. N 106n «About statement of the Standing by the accounting «Accounting policy of organization» RAS 1/2008.

4. Istomin S.V. The peculiarities of institutional mechanisms at the transformed economy// The herald of Chelyabinsk state university. – 2010. – №6. – P. 52-56.

5. Lebedeva N.N. Institutional mechanism: contents, structure, functions. // Economic magazine. – 2002. –№4. – P. 47-56.

6. Marks K. The critic of political economy. V. 2. B. 2, The process of circulation of capital – M.: Politizdat, 1988.

7. Williamson O.I. Economic institutions of capitalism: Companies, markets, «relational» contracting / Scientific redaction and introductory article V. S. Katkalo. – St. Petersburg: Lenizdat: CEV Press, 1996.

8. Shastitko A.E. Institutional economy: theory and methodology: The dissertation of doctor of economic sciences . – M.: publishing office MGU, 1999.

9. Lane J-E., Ersson S. The new institutional politics: Performance and outcomes. – L.-N.Y.: Routledge, 2000.

INSTITUTIONAL CONTROL STATE AND ITS ROLE IN THE EFFECTIVENESS OF THE FINANCIAL-ECONOMIC ACTIVITY INCREASE

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The problems of both individualized property and the system of the economic subject behavior control are studied in this article. The main elements of the control system are described. The control permissions groups of the controlling subject are outlined and, so are the corresponding control-processing rights, duties and the responsibilities of the controlled subject.

Keywords: control, property institute, control elements, institutional, control system, power authorities, control expenses

The activity of any economic subject is possible only within the limits of institutionally-formed laws of property. Therefore, property as an economic institute (a tool of free property laws turnover between different economic subjects) defines sanctioned and authorized control rules and mechanisms within a society. And as it was registered in the Lim declaration of ruling control principles by the ninth Congress of international higher control bodies declaration in 1997: «The control organization is a necessary element of controlling social financial funds, as such control leads to a responsibility before the society» [3, p. 56].

The concept of institutional direction within which the neoinstitutional property laws economic theory emerged stays meaningful for a nowaday control problems evolution. Control is an element of superstructure above the system and is always developed along with the development of the social relations. The content of the control mechanisms is not permanent. Nowadays the difficulty of the economic property control mechanisms consists in the globalization of the economy, an integration into the world economic space. One of the main reasons of the control mechanisms difficulties is the creation of the offshore areas. «The opacity of the offshore companies property can stimulate an opportunistic behavior of those who control business in other countries through the offshores» [2, p.73].

The nowadays concept of the several property provides for the implementation of the direct or indirect control through the institutes that were specially created and those activity is regulated by the corresponding rules and regulations, by the owner. Thus, the economic authority and control are obliged to be commensurably combined within one or another property law system that exists within an economic subject.

An economic subject within modern Russian economy is an institute of the production organization, within which one of the institutionalization directions is actualized – the regulation and control. Institutional relations within the system of economic relations consists in the activity of the rules, order, limits output that limit the economic activity of the subjects in order to increase their activity results effectiveness. The control in this case can be studied as a complicated institutionally-orientated on microlevel system that is one of important structure components of the bigger system – the system of an economic subject control.

From the position of science the control is studied as a form of a feedback by which the controlling system gain the necessary information on the actual controlled object condition and the degree of the controlling relations realization (laws, acts, programmes, regulations, standards, rules, orders etc.).

It is reasonable to study the control content from two methodological positions:

1) control is a complex function and an inalienable part of the administration activity;

2) control is an independent administration process and an integral system.

Control in an economic subject administration is a totality of actions and operations aimed for an inspection of various economic subject activity sides and the administration with implementation of specific organization and forms and methods. A control specificity as a kind of administrative activity allows us to actively influence the effectiveness of the enterprise economic activity.

One of the main reasons of the control implementation necessity consists in the fact that any organization, no doubt, is obliged to opportunely register its mistakes and correct them before they affect their goal achievement. The control does not only allow us to reveal the problems and correspond to them in order to achieve our goals, but also helps us to decide if we should introduce some radical alterations into our previous decisions.

The control essence is in the increase in the economic activity effectiveness.

The control goal is to provide the result achievement at the administrative system level. A literate control goals formulating defines the accomplishment of the administration targets.

An undergoing of any administrative activity assumes a presence of its implementation control system as a totality of various elements that are linked to each other and form a definite integrity, unity. The system presence is required to achieve the control goals.

It is reasonable to divide the control system as a complex of the following elements:

1) the control subject;
2) the control object;
3) the matter of control;
4) means of control;
5) control field;
6) temporal field.

The control system is a check environment within which subjects, objects, matter and means of control interact within a certain temporary limits.

Control field is the place of the control elements interaction where mutual relations, awareness, and the actions of the control subjects are aimed for an establishing of the correspondence between the achieved goals and accepted decisions degree and the evaluation of the control object condition according to the comparison between the set goal and the actual conditions, regulative means and corrective influences output.

The control subject is represented by agencies, organizations, subdivisions, and persons that carry out control functions and are the bearers of practical activity on the control implementation, rights and obligation s of which are regulated by normative-law acts.

Each control subject is provided with the corresponding power authorities that are necessary for the achievement of goal set before the administration. The multiplicity of bodies that carry out control activity allows us to outline the criterions of their systematization: according to the character of power authorities; organization-law forms of the control implementation; the direction of the control activity; the character of the connection between jurisdictional and organizational means of influence; jurisdictional consequences of the control; the control from governmental, municipal bodies and non-governmental bodies; the control from the law enforcement bodies [4, p.154].

The control implementation activity is always linked to the realization of the duties of the control subject. Therefore it is reasonable to outline the following groups of the control authorities of a control subject and ,accordingly, the corresponding control-process rights, duties, and responsibility of the controlled subjects: permissions for the control implementation on their own initiative unimpededly, any time within the limits of their authority; permissions to give obligatory guidances on the removal of the revealed violations and their consequences to the corresponding bodies and official persons in case of necessity; the permissions of the impleading of the guilty official persons; the permissions of the preventive recommendations output [1, p117].

The control object is an object on which the impact is aimed. Since the administration object coincide with the control object in the administrative area, the control object can be represented both as an economic system in whole, separated areas, regions, organizations and the processes that take place within these objects or separate elements that are linked to the control objects.

The subjects represent the generative component of the legal relationship, and the objects characterize its essential side.

The condition and the behavior of the control object, the activity of the organizations and administration bodies in whole, in separate areas, or in different operations are the matter of control. The control matter is a definite condition of the control object at a certain moment or in a certain period.

The means of control are represented by the methods, ways, and procedures that allow one to reveal and anticipate the emerging of the discrepancies with the actual legislation and accepted administration decisions in the condition of the control objects and matters.

Necessary elements of the control system are the temporary limits that define the borders of the control system for all its participants.

Control acts as a inalienable part of the processes of all the human existence areas, and the anticipation of the possible mistakes, violations, alterations as well as the providing of the influence and suppression inevitability proportionally to the revealed alteration character are among its major goals.

The control process is the realization of tactical and strategic control goals and includes the following stages:

1) establishment of the reached level, standards, criterions and the condition of the objective accomplishment;

2) evaluation of the deviations from the set goals and the definition of the possible deviation degree;

3) definition of the deviations reasons and implementation of the necessary corrective actions.

Along with that a whole complex of measures is realized at each stage.

A control is considered to be effective if it has strategic character, is aimed for reaching goals, well-timed, operative, exact, profitable,

and effective. Therefore, it has to be solid and have real, not formal character.

A control must objectively evaluate that what is really important. Well-timing of a control consists in the time interval between the evaluation that sufficiently correspond to the controlled object. In order to be effective, a control should correspond to needs and abilities of people who interact with the control system and realize it.

According to the institutional theory of the firm an economic subject carries out an activity under conditions of two expenses types: the transaction expenses, that define the lower limit of the economic subject, or its minimal size and the control expenses that define its maximum size, or upper limit. Therefore, within the complex of the in-house costs, there are costs that are linked to the organization and functioning of the inner control system.

References

1. Alekchin A.P., Karmolickiy A.A., Kozlov Y.M. Administrative law of the Russian Federation. – M.: Mirror, 1996. – 359 p.

2. Volchick V.V. Behavior economic and modern trends of the property institute evolution // Terra economicus. – 2010. – ch.8, №2. – P. 71-78.

3. Lima declaration of the governing control principles // Controlling. – 1991. – №1. – P. 53-65.

4. Financial control: Textbook. E.Y. Gracheva, G.P. Tolstopiatenko, E.A. Rizhova. – M.: Ed. «Cameron», 2004. – 375 p.

THE MAIN TENDENCIES AND DIRECTIONS OF DEVELOPMENT THE ADVERTIZING-PUBLISHING SERVICES MARKET IN 2011-2012

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The tendencies of development the advertizing-publishing services market in Russia in 2011-2011 are described in the article. The positive and negative factors are analyzed which influence on the development of enterprises.

Keywords: advertizing-publishing services, market, directions of development

The tendencies of social and economic development of megacities in Russia testify that the growth of expenses for advertising for 2010–2012 (table 1) takes place. The market of advertizing are restoring after financial crisis of 2008-2009. The statistical data and forecasts from different associations and advertizing agencies for the advertizing market are differ rather essentially. The difference in values of parameters arises because of distinctions in techniques of calculation, inclusion the parameters of values for new and nonconventional vehicles for advertizing in the perspective and retrospective data (contextual Internet advertizing, indoor-advertizing, advertizing on a cable television etc.).

Table 1

The Volume of Russian Media Advertizing Market in 2008 – 2012 (2011–2012 – forecast)

Market segment	Years				
	2008	2009	2010	2011	2012
	In million US dollars			In percentage concerning previous year	
Television	5 507	4 949	5 784	7 298	8 372
Radio	573	466	487	541	538
Press	2 330	1 996	2 217	2 652	2 876
Outdoor advertizing	1 817	1 584	1 793	2 190	2 429
Internet	611	624	902	1 429	1 890
IN TOTAL	10 979	9 871	11 534	14 555	16 698

The note. Table 1 is made on the basis of the data and forecast Credit Suisse estimates, Zenith Optimedia [1].

The table shows, that in connection with financial crisis there was a decrease in volumes of the advertizing market in 2009 on 10,1% in comparison with 2008. Decrease in 2009 has mentioned all media carriers except the Internet advertizing which growth has made 2% in 2009 in comparison with 2008 and 44,6% in 2010 in comparison with 2009. Since 2010 growth of publicity expenses on 17% was observed in all media carriers. The pure gain of the market of a print advertizing in Russia will take place under the forecast in 2011 19,6% in comparison with 2010, in 2012 8,4% in comparison with 2011.

The reduction of sales in press editions have occurred in 2009 in the Russian's megacities (first of all, in editions of a high price category). It is possible to ascertain that there is a change of consumer preferences in sphere of advertizing-publishing services. So, following tendencies are observed:

– displacement of the demand in favor to more cheap editions;

– growth of the demand for editions with the operative information (business, information-analytical, advertizing-information);

– growth of interest to the entertaining periodical press (TV-program, crossword puzzles);

– growth of interest to editions with the practical specialized information (cookery, gardening and so forth);

– recession of the demand for elite, glossy magazines, editions of a high price category.

The data from table 1 shows, that the rates of increase of advertising market will be slowed down from 26,2% in 2011 to 14,7%

in 2012. Such tendencies take place because the advertising market, having restored after financial crisis of 2008-2009, will continue to extend lower rates. The most dynamical is the Internet advertising market which rates of increase will be in 2011 58,5% and in 2012 – 32,2%. The slowest rates of increase are at the radio advertising market (11,2% in 2011 and decrease in rates – 0,7% in 2012).

The increase in publicity expenses in 2011–2012 will depend on increase of the consumer ability of russian population, increase in quantity of enterprises on the market, and more strength market-competition. The rate of prices increase for advertizing services in a press will decrease a little because the enterprises will prefer to place advertizing in electronic versions of press-editions and in Internet as a whole (in search engines, on web-sites with similar subjects). Thus, expenses for Internet advertizing will reach 12% from all publicity expenses by 2012.

As a whole the dynamics of the market of advertizing in Russia reflects world tendencies of the development of the advertizing markets. Because of the financial crisis there was the decrease of publicity expenses in 2009 in the world as a whole. The growth of the world market of advertizing services in 2011-2012 will occur of the expense the markets in developing countries. The data about expenses for advertizing on different regions in the world is presented in table 2.

Table 2

Advertizing Expenses (the basic media) in the Different World Regions in Million US Dollars, (2011–2012 the forecast)

Region	Years					
	2007	2008	2009	2010	2011	2012
North America	188 300	179 763	156 973	153 277	155 814	160 383
Western Europe	120 177	121 039	106 774	106 193	109 117	112 748
Asia, Pacific region	99 583	107 332	103 956	107 897	113 644	120 543
The central and east Europe	31 634	35 166	27 528	28 158	30 393	33 267
Latin America	26 422	30 405	30 485	32 968	35 081	37 597
Afrika/the Near East / other world	15 931	20 284	17 988	19 240	21 003	22 822
World	482 047	493 988	443 704	447 734	465 052	487 360

T h e n o t e . Table 2 is made on the basis of data Zenith Optimedia [1].

As a whole on a global scale as well as in Russia, there is the tendency of decrease the volumes of advertizing in a press, on radio, outdoor advertizing and rather stable sales increase in television media carrier. The growth of volumes of Internet advertizing is take place, because this media carrier is cheaper, operative and rather actual.

Thus, the most dynamically developing and growing media carrier in Russia is Internet advertising. The enterprises of advertizing-publishing services should provide the diversification of services of advertizing character. The development of market of Internet advertising is necessary to set productivity of economic activities.

The results of SWOT-analysis (strength, weakness, opportunities, threats) for a typical producer of advertizing services in the Russian megacity for 2011-2012 show the possible list of strength, weaknesses, possibilities and threats. This factors are necessary to account during the creation the strategic plan of development the enterprises.

Among the strengths of the advertizing-publishing enterprises is expedient to note:

– the competence of enterprise in the certain market, long-term work and experience in the branch of advertizing services;

– strong advertizing-capacity in the concrete media carrier;

– the presence of constant loyal clients-advertisers, and also stable occurrence of new consumers;

– the presence highly-skilled personnel, which is capable to work in the conditions of dynamically developing environment;

– stable growth the efficiency use of a manpower and payment fund;

– well established connections with suppliers;

– the possibility to get the costs reduction from the growth the volume of services;

– the possibility to attract the attention of audience with high consumer ability.

The weaknesses of the advertizing-publishing enterprise consist in the following trends:

– an insufficient popularity of the media carrier among the potential audience;

– the poor advertizing-capacity of the media carrier;

– the increase of the costs for the goods accompanying the advertizing-services negatively influences at the profit indicator;

– the lack of financial assets for the expansion the wide advertizing company for the goods and services of a producer and the organization of actions for sale stimulation;

– low personnel potential, high fluidity of managers for personal sellings of advertizing services;

– inefficient system of payment of the advertizing agents, not promoting growth of their development;

– the unwillingness of advertizing agents to work with the new inventory and services.

The possibilities which can arise in 2011-2012 for enterprises of advertizing services sphere:

– the addition of new clients-advertisers and the growth of income because the market of advertizing in line with forecast will increase in 2010-2012 and restore after financial crisis;

– the increase of publicity expenses for all media carriers in connection with increase in consumer ability of the population, growth of investment activity of the enterprises, heat of competitive struggle;

– the rise of prices for advertizing for television and an outdoor advertizing can become the reason influencing the decision of advertisers to redistribute the budget in favor of placing the advertizing in a press;

– the growth of Internet-users and, as consequence, substantial growth of publicity expenses on this media carrier.

The basic threats for the enterprises of advertizing-publishing services consist in:

– the appearance of new producers of services;

– the increasing competitive pressure from existing advertizing-publishing enterprises;

– the growth of expenses for the goods accompanying service;

– negative consequences of financial crisis of 2008-2009 which slow down growth of the market of advertizing.

Thus, the producers of sphere of advertizing-publishing services should expense the sale of services in new specialized editions, in the electronic versions of the press which is possessed such positive characteristics as a high speed of distribution of the information, presence of feedback with readers, possibility to react operatively to inquiries of consumers, cheapness of routine maintenance. This diversification of business should provide increase the volume of financial assets and profit of enterprises.

For this purpose, the advertizing-publishing management is expedient to position the site as an advertizing medium, to involve on it more visitors and actively advertize it in Internet, and in other mass media. During the working out the strategy of sales of services in Internet and in the electronic version of the edition it is necessary to consider the main features of pricing, sales and advancement of the goods and services in Internet.

The strategic orientation of development the advertizing publishing complex of a megacity, according to our representations, should provide constantly towering consumption in process of growth of volumes of output, investment activity of the enterprises, increase in incomes of citizens and increase of their solvency.

In line with forecast the growth of incomes of the population in Russia will make in 2011 – 2,8% in comparison with 2010, in 2012 – 4% in comparison with 2011. The strategic orientation of social and economic development of an advertizing-publishing complex of a megacity in Russia should correspond to the developed modern lines in branch and as a whole to universal tendencies, restoration of the market of advertizing services after an economic crisis and its further increase at the expense of developing countries.

It gives the possibility to advertizing-publishing managing subjects in the perspective period of time according to the conditions to work out and introduce the strategic plan for development the enterprises, which should be aimed to achieve the high economic and financial results, to reach the set productivity of economic activities and to function in the conditions of dynamically changing environment.

References

1. Research ZenithOptimedia: the forecast of development the global and Russian advertizing markets [Electronic resource]. – Access: http://gtmarket.ru/news/media-advertising-marketing/2010/07/25/2617.

2. The Volumes of advertizing markets (The site of Russian Association of Advertising agencies). [Electronic resource]. – Access: http://www.akarussia.ru/market.

3. The Official statistical information. [Electronic resource]. – Access: http://www.gks.ru.

NEW ECONOMIC GEOGRAPHY AND THE LAWS OF ECONOMIC SPATIAL

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The methodology of New economic geography is analyzed in the article. The analysis of founders works NEG allows to draw a conclusion that substantive provisions of theory NEG are formulated on the basis of synergetrics methodology. The category analysis of « the economic space» as component NEG also is carried out from synergetrics positions. Use of methodology of synergetrics gives the chance to raise the question about laws of economic spatial. It is shown that the basic law of economic spatial is the entropy law, the universal law of any system. Entropy conducts that there are asymmetry displays, catastrophic changes and a spatial hysteresis as the precondition of spatial accident initially put in economic spatial.

Keywords: new economic geography, laws of economic spatial

The term «New economic geography» has been used for the first time in M. Fujita's works (1988 г.), P. Krugman (1991 г.) and T. Venables (1996). Today the New Economic Geography (NEG) turns to one of the most interesting and perspective areas of modern economy.

Term NEG involuntarily forces to search the answer to a question – what is the novelty of New economic geography. Thus real novelty of NEG is called by a number of researchers in question. P. Krugman considers that the main advantage of NEG consists in that it helped to change the isolation position which was occupied until recently with spatial economy in an economic science. [1]

The traditional economic geography and the placing a priori theory considered natural geographical advantage of placing in certain territory. The Krugman's new economic geography stands as the corner the got advantage connected with placing in spatial.

Our problem is to pay attention to those moments in model of NEG (reflected not only in works of Krugman, but also Tisse, Fujita, Venables, etc.) who describe specificity of economic spatial. We will pay attention to feature of foreign publications on problems of spatial economy – they are written in the co-authorship of scientists living not only in the different countries but also on different continents – Krugman, Fujita , Tisse, etc. Thus the priority of only German spatial school has ended but today it is difficult to isolate national leadership in this question.

According to Gianmarco Ottaviano, Jacques-Franyocois Thisse the economic spatial is the outcome of trade-off between various forms of increasing returns and different types of mobility costs. [2] Agreeing with this enough simplified definition, it is possible to make a conclusion that the spatial is always subjective, since it grows out of interaction of subjects of the market.

Ottaviano and Jacques-Franëcois Thisse have specified definition of economic spatial which has to be understood as the outcome of the interplay between agglomeration and dispersion forces. [2] Such definition inevitably demands finding-out the reason of agglomeration forces occurrence and a dispersion, influencing, in turn, on size of economic spatial.

Both these definitions underline in the implicit form basic position – the economic spatial arises as the result of external influences. Thus forces creating spatial operate to different places.

Actually objective properties lie at the heart of these processes of the spatial In other words, after creation of economic spatial the spatial demands certain behavior for the subjects. We suggest that in this case it is possible to speak about laws of spatial functioning which are necessary for considering in practical activities. As at house building it is necessary to consider, for example, laws of physics and mechanics, and at functioning of the subject in economic spatial it is necessary to consider its laws. To the laws functioning in spatial, we refer to, first of all, the entropy law, the universal law of any system.

We pay attention for understanding laws of spatial functioning and in spatial it is possible on the basis of the methodology complex of various sciences. The analysis of founders works NEG allows to draw a conclusion that substantive provisions of NEG theory are formulated on the basis of methodology concerning a new interdisciplinary direction of scientific research – synergetrics. The theoretical description of such properties as multistability, bifurcation, the theory of accidents and a hysteresis makes a synergetrics integral part.

Z. Tisse and J. Ottaviano underline that the main components of NEG are:

1) circular causality;
2) endogenous asymmetry;
3) catastrophic agglomeration;
4) locational hysteresis;
5) self-fulfilling expectations and as result of the home-market magnification [2].

However, these five components of NEG are absolutely new and can't be considered as are characteristics of properties of any economic spatial and have been to some extent reflected in previous works of other authors.

Let's consider each of five NEG components asserting that the properties of economic spatial analysed from positions of synergetrics in this case.

It is known that symmetry and asymmetry, the concrete form and the sizes, a site, distance concern specific properties of space of material systems between bodies, spatial distribution of substance, the borders defining various systems. [5]

Tisse and Ottaviano suppose under a circular causal relationship a situation at which firms and house economy carrying out a site choice are guided against each other. As a result the industry site can be during some times explained as result of historical accidents. In technical systems such as circular causal relationship is known as feedback. However, unlike technical systems in which the order parameter is fixed from the very beginning, in synergetic systems order parameters are created by separate parts of system which, in turn, generate order parameter the collective behavior [3]. Thus, presence of a circular causal relationship predetermines presence an order which arises from chaos. In this case we can soundly say that the entropy law is shown in the created space.

Economic practice is the full of examples of the orderliness phenomenon. In the beginning of XXth century in Russia approximately 80% of wholesale trade were carried out at local fairs, that is a certain orderliness was gradually formed of trade elements. Already the economic spatial starts to make certain demands to the subject of economic activities. In particular, round seaport or successfully located transport knot the city starts to be formed. So, for example, there was Novonikolaevsk (Novosibirsk) on the Trans-Siberian trunk-railway. So, the spatial aspires, overcoming chaos, to streamlining. Orderliness doesn't eliminate chaos and coexists with it. Thus, the spatial is characterized by an impulse streamlining because in the ordered system economic return is more over. The economic spatial aspires and streamlining of the form. Well-known A.Lyosha's gives an example about the form of the market in the form of a correct hexagon or a circle. Results of the researches spent to the USA, it shows that market zones have a squared shape or are close to a circle. [4]

Entropy, i.e. occurrence of an order from chaos conducts that in economic spatial asymmetry, catastrophic changes and a spatial hysteresis as the precondition of spatial accident are put.

Endogenous asymmetry means that, as highlighted, small historical accidents may generate regional imbalances even in an otherwise homogeneous spatial [2].

It is possible in any economic spatial to allocate the center (or system of the centers) both periphery and these making spaces develop on to a miscellaneous. It is possible to ask a question – what is more steadily to external influences: the center or periphery? There is a fundamental distinction between behavior of parameters of an order and the subordinated parts eventually in synergetrics. Order parameters react slowly to influence from the outside, and parts – quickly. G.Haken believes that order parameters live longer, parts live less (in the behavioural dynamics) [3] In our case, those regions which are to a measure depend on communications with a foreign market of external circumstances are able to instability than the country as a whole.

During the certain period of time the spatial is characterized by unstable balance of supply and demand. Eventually this balance is broken.

The spatial can be considered as dissipative system, i.e. nonequilibrium open system in which unstable conditions are possible. Dissipativ structures grow out of an antagonism of two contrasts: a rating of energy environment in system and energy outflow; inflow of weight of reacting substances and their dispersion at the expense of diffusion or a drain of products of reaction. Thus it is possible to explain space occurrence as result of agglomeration and economic activities dispersion in spatial. Differently, under the influence of external and internal circumstances quality, size and the form of economic spatial which aspires to an order, through chaos changes. Chaos is not the destructive factor, and the force deducing on a tendency of self-structurization of the nonlinear environment. Catastrophic agglomeration means that firm location changes in a discontinuous way. [2] Catastrophe is the spasmodic change arising at smooth change of external conditions. Catastrophe means is a qualitative change of a condition at which the order is replaced by instability. The reasons of changes of an order are connected with small influences (fluctuations). Thanks to these influences system gets in one cases orderliness, in others this orderliness, having sputtered out, collapses, thus the system gets to an instability condition. Change of modes of stability and instability occurs in systems where there is an influence from out of.

Concentration of manufacture possesses self-reproduction function. Firms placed manufacture in regions with good access to the market but access to the market improved in regions where manufacture concentrated. If the region economy enough reaches the big scales it can enter the period of cumulative growth. And it is valid, the phenomenon of distribution

considerable disbalance of economic activities is observable in well-known spatials.

We suppose that if the distribution density on spatial is not always low the certificate of economic spatial poor quality . The given situation can testify to low level of a competition, so potential on placing in this territory of any economic objects.

Thus, catastrophic agglomeration is an illustration of circular causal interrelation.

As sign of coming nearer catastrophe the hysteresis can serve. The hysteresis of development of spatial means that it can be interrupted in connection with features of historical accident. Locational hysteresis implies that spatial development can be locked in by historically inherited patterns [2]. Actually the effect of a hysteresis is shown that the spatial develops by inertia though external circumstances have already changed (so the spatial of the USSR has collapsed). The hysteresis is an indicator of presence so-called «an accident flag», in other words, features of behavior on which it is possible to judge approach of a critical point.

Thus the main novelty of New Economic Geography consists that known characteristics of any economic spatial are explained from new methodological positions. The spatial can be considered as a certain condition, but the analysis of its potential quantitative and qualitative change is possible. Authors of NEG don't spend such division in the obvious form. But the economy characteristic (so also economic spatial) as constantly updated processes is a synergetrics integral part.

Therefore, application of methodology of synergetrics gives the chance for understanding of the processes occurring in economic spatial.

References

1. Krugman P. What s new about the new economic geography? // Oxford Review of Economic Policy. – 1998. – Vol. 14, № 2. – P.16.

2. Gianmarco Ottaviano, Jacques-Franëcois Thisse New Economic Geography: what about the N? // Environment and Planning A 37(10) 1707 – 1725 26 January 2004. – P.18

3. Haken H. Can we use synergy in the sciences about human? // http://spkurdyumov.narod.ru/Haken7.htm.

4. Mills E., Lav A. A model of market areas with free entry // Journal of Political Economy. – 1964. – №72. – P. 285.

5. The Dictionary of philosophy. Editor E.F. Gybskyi. – M.: INFRA–M, 2002. – P. 541-542.

ENHANCING EDUCATION IN SCIENCE BASED ON INFORMATION TECHNOLOGY APPLICATION

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The article regards the fundamentalization of scientific education exemplified by developing and using interactive teaching systems in physics for technical students. The system is designed for practical classes and students' individual work in a physics course according to the course syllabus. The results of the system piloting in the process of study indicate that the students' knowledge has improved.

Keywords: fundamentalization, information technology, teaching system, test items, assessment

Challenges faced by higher technical education in Russia are connected with decreasing interest in it, eliminating the examination in physics from obligatory disciplines, problems with the graduating students' employment because of weakly developing economy and crisis directly influence on the secondary school education and, as a result, students' ability to learn science and mathematics.

Maintaining and enhancing education in science and mathematics directly related to the fundamentalization of professional education (developing high professional competences of a technical university graduate) requires systematic changes in the process of teaching science and mathematical disciplines.

These changes, as well as enhancing education in science and mathematics with interrelations found between physics and mathematics, creates the basis and conditions for the fundamentalization of professional education, which enables the specialist to be quickly retrained and study new technologies and production processes at a high level of efficiency. This makes it possible to effectively develop such characteristics of a professional as a high level of professional awareness, professional adaptability and mobility, capability of self-education and self-development throughout their life, flexibility in thinking, etc. Besides, enhancing the education is impossible without introducing information technology into the educational process and resources for students' self-study [1-7]. An up-to-date model of enhancing education in science and mathematics is presented in Fig.1

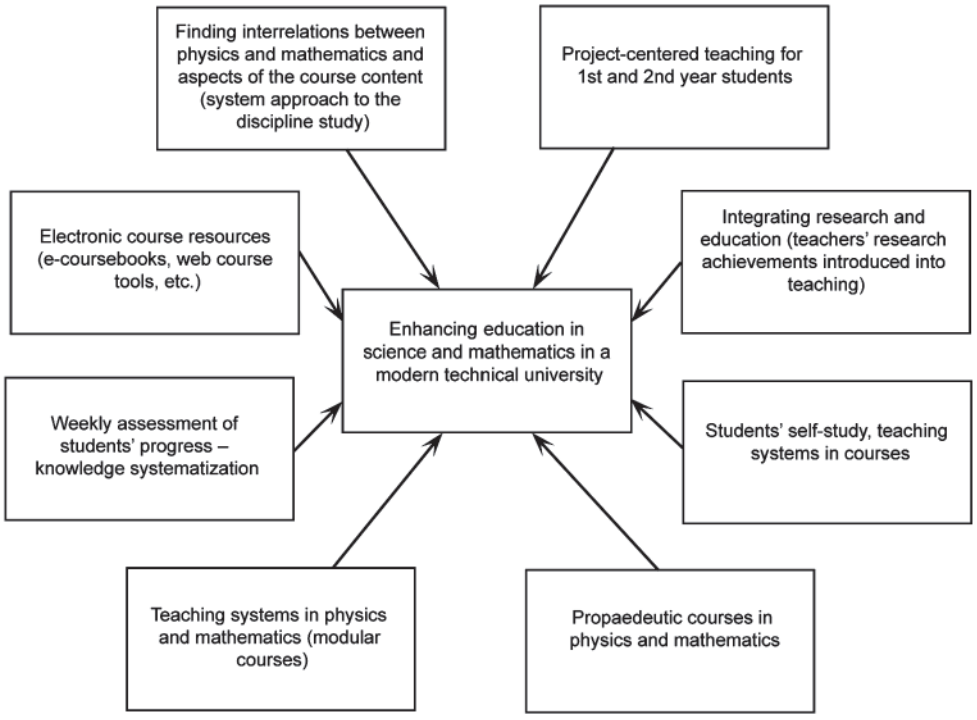

Fig. 1. Components of the enhancement of scientific education

Methods

The fundamentalization of education in science is impossible unless the interrelations between physics, mathematics and special disciplines, as well as within the course of physics, are taken into account [8]. Models in physics undergo transformation and transfer from one section of the course to another. If the system of interrelations between models within the course of physics is not presented to the student, it is almost impossible to find them without the teacher's help. The analysis of interrelations within the course of physics as well as awareness that postulates of the Special Theory of Relativity change for those of classical physics if the object velocity is much lower than that of light in the vacuum allows for applying the theoretical and deductive method rather than historic and inductive one (Fig. 2). The use of IT also makes it possible to apply the productive method (problem solving), personality-centered approach (various learning trajectories), and developmental teaching methods.

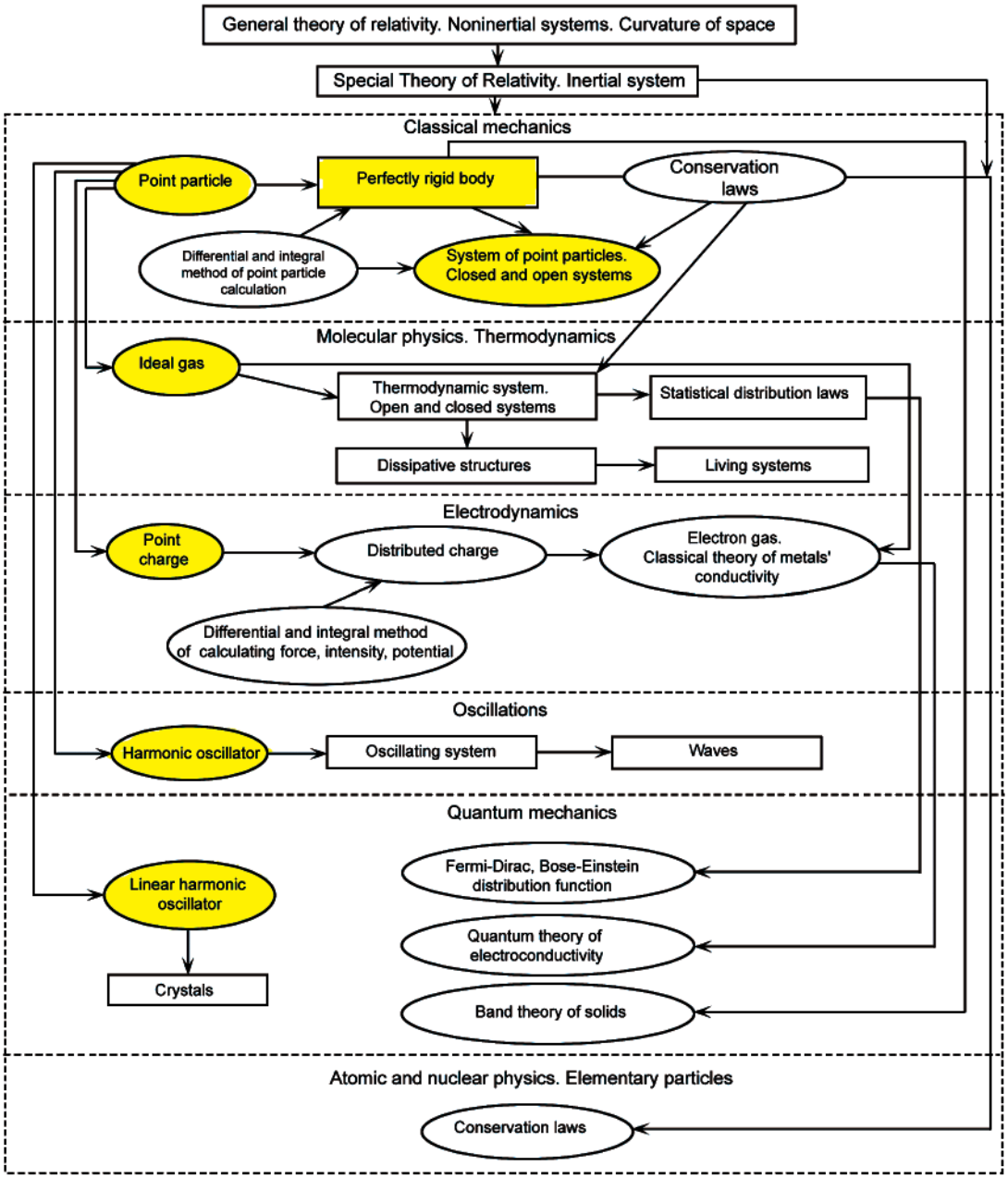

Fig. 2. Analysis of interrelations within the course of physics (system approach to the discipline study)

For the purpose of enhancing the educational process in the course of physics and fundamentalization of scientific education, an interactive physics courseware based on Macintosh and IBM PC computers has been developed in National Research Tomsk Polytechnic University. The courseware is designed for practical lessons, independent, individual students' work and distance teaching and learning. Nowadays there are four parts of the courseware which has been completely developed, tested and introduced in the teaching process. These parts are devoted to the following units: «Mechanics. Molecular Physics. Thermodynamics». (part I), «Electricity. Electromagnetism». (part II), «Oscillations. Wave Optics». (part III), «Nuclear Physics. Quantum Physics Accidence». (part IV). The courseware has been tested at lessons with full-time and part-time students of different faculties for 10 years (more than 10 thousand class hours).

Course sections:

1. Point Particle Kinematics.
2. Kinematics of Rigid Body.
3. Dynamics of Rigid Bodies.
4. Conservation Laws.
5. Special Theory of Relativity.
6. Ideal Gas Laws.
7. The First Law of Thermodynamics. Thermal Capacity. Entropy. Thermal Engines.
8. Coulomb's Law. Electric-field Intensity. Gauss Theorem.
9. Movement of Charge in the Electric Field. Potential. Intensity and Potential Relation. Electric Capacity.
10. Direct Current Laws.
11. Electromagnetism. Ampere Force. Lorentz Force. Motion of Charged Particles.
12. Biot-Savart-Laplace Law and its Application to the Calculation of Magnetic Induction and Intensity of Magnetic Fields. Material Magnetism.
13. Hall Effect. Electromagnetic Induction Law. Maxwell Equations.
14. Mechanical Oscillations and Waves.
15. Electromagnetic Oscillations and Waves.
16. Geometric Optics.
17. Interference.
18. Diffraction.
19. Polarization.
20. Thermal Emission.
21. Photoeffect. Compton Effect.
22. Hydrogen Atom according to Bohr. Linear Spectrum.
23. Quantum Physics Accidence. Particles' Wave Properties.
24. Schrödinger Equation. Particle in the Potential Well.
25. Physics of Atomic Nucleus and Particles.

Methodological support of the system [9]:

1. Theoretical section structured to be the necessary minimum and consisting of:

a) interrelations of physical values and laws with those studied at previous classes and interdisciplinary relations with other courses within the curriculum;

b) up-to-date achievements in the relevant field of science.

2. Feedback or communication to organize a dialogue between the student and the computer.
3. Non-standard test items of various types to measure students' type I and II knowledge – productive activity.
4. Solved problems (typical ones, to develop the ability to build problem solving algorithms and remember the relations in theory and a corresponding individual version of the problem to be solved independently).
5. Solved integrated problems (non-standard, original ones) to develop the ability to think creatively.
6. Progress check tasks with a wide range of skills development, including type III and VI knowledge (writing tasks relevant to the course section) – productive activity.
7. A variety of studying trajectories corresponding to the student's present proficiency level, intentions and opportunities.
8. Rating scale to assess the students' learning results at any stage of the class.
9. Facilities for modeling and simulating phenomena studied and performing simple experiments as well as video presentations.
10. Historic background (interesting didactic stories about scientists and their discoveries) and supporting illustrative material.
11. Reference material – a table of derivative values, integrals, trigonometric functions, constants, etc.
12. Comfortable conditions for studying and communication with the student.
13. Necessary conditions for self-study and individual work.

The random number generator for the dispersion of the problems' numerical data or test items provides for different variants of student's simultaneous independent work. The developed software makes the change of teaching possible if the study of the theoretical part or problem solving is not necessary. The credit-rating system of knowledge evaluation is implemented. At the end of the lesson the teacher receives a protocol with the results of students' work which can be used for the analysis of the students' progress in studies and results of the courseware testing. The analysis of these data enables the instructor to assess the students' knowledge as a whole and identify issues which have caused difficulties and build the learning process so as to increase the percentage of the material successfully learned.

Experiment

Interactive physics courseware was piloted in the computer lab of the Department of General Physics, Physico-Technical Institute of Tomsk Polytechnic University during 2000-2010. The piloting of the system involved over 800 people. The courseware allows for the analysis of changes in the students' learning curve from the first lesson (Fig. 3a) to the subsequent ones (Fig. 3b). The result of the analysis performed in 5 groups of students at the Faculty of Machine Building reveals the rise of the learning curve which displays itself as an increase in the number of students who got high scores for the lesson (Fig. 4a,b)). Fig. 4a shows the results of testing different groups of students over three themes. Fig. 4b demonstrates the increase of the grade point average during the physics course study, which confirms the learning curve rise.

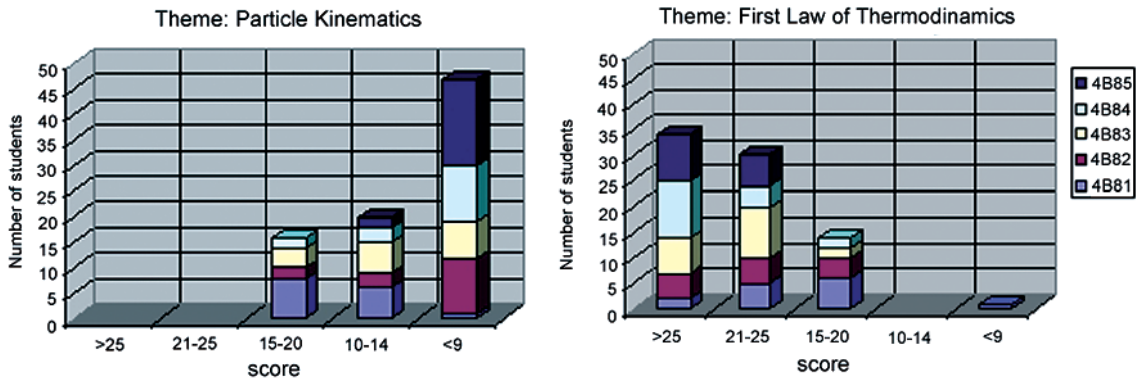

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Fig. 3

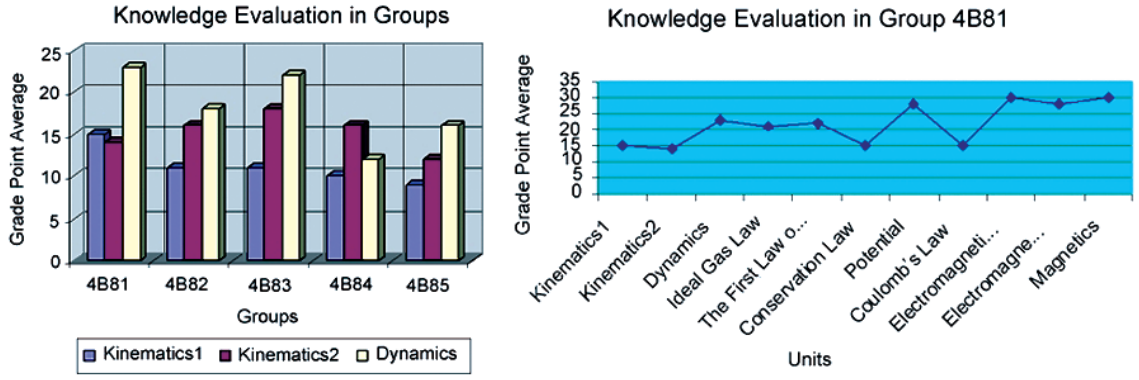

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Fig. 4

Conclusions

Advantages of the interactive courseware:

1. The courseware allows for teaching and simultaneous assessment of knowledge of many students.
2. Due to the software and scientific-methodological support of the courseware all types of knowledge assessment are possible: progress assessment, achievement testing, residual knowledge assessment as well as final examination.
3. Teacher receives an assessment protocol (of a lesson or examination) with the analysis of results of the unit learning.
4. Originality of the test item bank developed by a creative team provokes interest of the test-takers in the process of studies and the testing.
5. The courseware provides for visual expression, intelligibility, comfortable environment of the test item presentation and the process of studies and testing.

6. The courseware allows for teaching and assessment of knowledge in any other discipline if the test questions bank is replaced.

References

1. Nirmalakhandan N. Computerized adaptive tutorials to improve and assess problem-solving skills // Computers & Education. – 2007. – Vol. 49, Issue 4. – P. 1321-1329.

2. Lilley M., Barker T., Britton C. The development and evaluation of a software prototype for computer-adaptive testing // Computers & Education. – 2004. – Vol. 43. – P. 109-123.

3. Mason B.J., Patry M., Bernstein D.J. An examination of the equivalence between non-adaptive computer-based and traditional testing // Journal of Educational Computing Research. – 2001. – Vol. 24. – P. 29–39.

4. Van Horn R. Computer adaptive tests and computer-based tests // Phi Delta Kappan. – 2003. – №84 (567). – P. 630–631.

5. Gwo-Jen Hwang A conceptual map model for developing intelligent tutoring systems // Computers & Education. – 2003. – Vol. 40, Issue 3. – P. 217-235.

6. Wood D. Comments on «Learning with ICT: New perspectives on help seeking and information searching» // Computers and Education. – 2009. – Vol. 53. – P. 1048–1051.

7. Tian Jeff. Software Quality Engineering: Testing, Quality Assurance, and Quantifiable Improvement // J. Tian. – Hoboken : John Wiley & Sons, Inc. – 2005. – 412 p.

8. Efremova N.A., Rudkovskaya V.F., Sklyarova E.A. The importance of fundamental approach to studying physics at university // European journal of natural history. – 2007. – №2. – P. 120-122.

9. Erofeeva G.V., Sklyarova E.A., Kryuchkov Yu.Yu., Malyutin V.M. Methodical aspects of the design of science courseware // Izvestiya TPU. – Tomsk: TPU, 2003. – Vol. 306, № 2. – P. 49-56.

THE MUNICIPAL MODEL OF TRAINING THE SPECIALISTS FOR THE MACHINERY INDUSTRY

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The present research was conducted in Zelenodolsk municipal region of Tatarstan Republic. We present the description of the dynamics of transformative actions focused on building an integrated model of training of the engineering and technical personnel. The realization of this model in Zelenodolsk Municipal region showed: the integration of educational programs of elementary vocational education, intermediate vocational education and advanced vocational education. In one educational institute helps to form an integral specialist who is able to use gained knowledge and skills holistically and synthetically, to think integrally.

Keywords: the municipal educational complex, a multi-leveled training the specialists, the machinery industry

The present research was conducted in Zelenodolsk municipal region of Tatarstan Republic. We present the description of the dynamics of transformative actions focused on building an integrated model of training of the engineering and technical personnel.

The methodological basis of the research was provided by the fundamental works in the field of the philosophy of education and the methology of psychological – pedagogical science such as education.

The methodological basis of the research is the following:

The first one: the dialectical method of cognition allows to see and explain the current changes in the system of training of the professional personnel in cross-connection with the processes which take place in Branch Manufacture and in society as a whole.

The second one: the principle of complex determinism providing the possibility to study the interdependence of connections between the components of the integer.

The educational system of the institute of higher education, integrated educational environment which includes educational institutes, manufacture and other social objects.

The third one: system and social cultural approaches which provide the understanding of the general laws of the organization of the multi-leveled vocational training which is directed towards the needs of regional manufacture in providing the favorable conditions for the social progress.

The fourth one: the conceptual ideas of the professional training and education, modern theories of personality and activity, principal propositions on the role of the external factor's in personal and professional development.

Addressing the problem of multi-leveled training of the specialists (for satisfying the needs of Economics of modern Russia) also updates the developments in the field of comparative pedagogic. A great contribution to the study of the foreign system of education made such scientist as Brajnik, Wolfson, Jurinskiy, Ivanov, Malkova and others. The possibility of using the positive experience of the foreign system for the reformation of Russian Education on the regional level updates the works of Dobrynina, Oleynikova, Pisareva, Smirnova and others.

Generalization of the gained domestic and foreign theoretical and practical experience on the issues of organization of vocational education in providing stuffing needs in the field of manufacture showed that despite the development of each of the strands of the research, there is no an organic synthesis of theory and practice of integrating the efforts of social partners in providing effective multi-leveled and variative training of the specialists of machinery building branch for the regional needs of the industry.

The municipal model of training the specialists for the machinery industry built on the basis of cooperative efforts of the industrial and educational institutes of all levels the municipal model of training the specialists for the machinery industry calls for the number of changes in the structure of relations:

– the creation of united educational space, in other words the municipal educational complex;

– the integration of vocational training with the enterprises of the branch;

– the reduction of the prime cost of training of the specialists at the expense of the reduction of the preparation periods;

– the possibility to choose the trajectories of training which answer the opportunities of the students;

– the optimization of the use of the scientific production and training production basis;

– the joint activity pointed at generation the requirements to the graduates in accordance to the received speciality and the specifics of the business of the employer;

– the attracting of the leading specialists, the faculty and students for the research activ-

ity and project development on orders of enterprises on a contractual basis;

– improved utilization of human resources;

– the organization of retraining and improvement of the qualification of the specialists of all the levels: a worker, a technician and an engineer;

– the realization of production projects which include the development, introducing and mastering the new technologies, the output of competitive products.

The introducing of information systems of product design and technologies, enterprise managing provides the qualitative preparation of the demanded specialists.

The development and testing of the model of multi-leveled specialists training was fulfilled in Zelenodolsk city, which is an industrial city in Tatarstan Republic. There you can find large industrial Associations of the machinery Branch:

1) «Zelenodolsk Factory named after Gorkiy».

2) «Zelenodolsk Factory named after Sergo».

3) The branch of Kazan motor-building industrial Association, called Zelenodolsk machienery-buildind Factory.

4) Zelenodolsk project-construction bureau (design).

5) «Region-Prontech» Company.

6) Volga-region Plywood-Furniture Factory.

The city is a unique project-design centre in the field of Economics, household appliances and shipbuilding.

The needs of all the enterprises connected with high technologies have a clear upward trend. The deficiency of highly-qualified workers especially in high-tech and innovative branches is a serious barrier for the development of the regional economics.

The creation of an integrated model of training of the demanded specialists of all levels of professional education for the regional enterprises is one of the solutions of the problem of stuff preparation. The realization of this model in Zelenodolsk Municipal region showed:

– the integration of educational programs of elementary vocational education, intermediate vocational education and advanced vocational education. In one educational institute helps to form an integral specialist who is able to use gained knowledge and skills holistically and synthetically, to think integrally.

The experimental work shows that in the integrated groups among the students an individual metacognitive experience is formed. Also an ability to build up more complex connections between different conceptions is developed.

Moreover, they are able to see phenomena in the context of their holistic relationship, to isolate more complex and multiple connections between them.

– The improving of the level of general and vocational training of the students of elementary and intermediate vocational education is due to the use of scientific potential of the Faculty.

– The number of Real graduate engineers is growing as the loss of the students contingent is compensated by better graduates at elementary and intermediate stages.

– After the completion of the whole curriculum of the certain stage of vocational training the graduate gets the diploma of qualified worker, technician or engineer.

– There is a mutual enrichment of all the team members, the scientific-educational and learning-teaching level of engineering pedagogical workers and the Faculty increases.

There is an interchange of information, types and methods of activity, value orientations, social settings in the process of cooperation.

– More rational and efficient usage of training material basis such as training area, teaching and laboratory equipment visual teaching aids and so on.

– Thanks to the integration and training of the specialists according to the integrated curriculum the terms of training the specialists are shortened.

There is the possibility of the expansion of the activity based on the development of the students at the integrated educational institute, which realizes the programs of various levels of vocational education. And the integration of the educational process into the industry process gives more opportunities for the direction of personal development at the level of motivation, action and goal.

Such an integration of the educational process is possible thanks to the cooperation of industrial enterprises and integrated educational institute. Considering the problems connected with the professional motivation, the problem of the influence of the motivation on the success of the activity is one of the most important. The cooperation with the enterprises, establishments, employment center of the city allows to plan and to settle the question of the graduates employment. The technological laboratories were created on the basis of the enterprises. Also various kinds of practice works and probations of the Faculty are organized, the leading specialists in the field of research-pedagogical activity are attracted.

The proposals of the subjects for the real course and final projects are come from enter-

prises. They are worked out for the students who are focused on the future work at the company. The project approach to the formation of the professional competence of the graduates is fulfilled. The employing enterprises take part in it either. Also probations and additional education of the students in other domestic and foreign Universities at the expense of the employing enterprises are carried out. The quality control of the training of the specialists is fulfilled by the employer. The structure of the municipal education of complex includes not only the establishments of vocational education but also professional – oriented schools.

The training of the matriculants is focused on formation and building up the contingent professionally-oriented in machinery building complex. The cooperation of integrated educational institute with the employers will support the refinement of training the demanded specialists in the labour market, the reveal of talented young people, and the additional motivation of the students to get the higher results in studying and successful career at the certain company.

PROBABILISTIC-STASTIC METHOD IN PEDAGOGY (PART I): METHOD EXPLANATION AND MATHEMATIC MODELLING OF STUDENTS' BEHAVIOR WITHIN THEIR EDUCATION PROCESS

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A survey of the literature that is devoted to the basics of probabilistic-statistic method in students' behavior description within their educational process has been carried out. In is defined, that each student is identified by a distribution function that defines a probability of his location in a certain information space. On the basis of probability saving law a differential equations' system was obtained for the distribution function that are continuity equations and link a probability density alteration in a time period with the probability density flow divergence, analytic solutions of these equations were found. The equation of individual distribution function mathematic expectation movement in information space has been found.

Keywords: information space, distribution function, probability density, mathematic expectation, movement equation

The questions of condition analysis and prognosis of the development of the whole education system and each single educational institution have a great significance. It is conditioned by a number of reasons, and the major one is that education, being conservative in a certain way, does not meet the modern requirements of the scientific-technical progress. Some even speak of a crisis within education in modern world. While predicting education development trends, many often restrict it to an abstract theory statement and broad generalizations that are distant from reality. So, measures, taken to improve the education system often prove to be low-effective.

An achievement of a positive effect in taking measures, aimed for the education system improvement, as we think, is possible only in case of an education development concept development that would be based, first of all, on knowledge what «a student» in its general meaning and how he interacts , for example, with a professor-tutor personnel of an institution. A concept should also include a strategy of the whole education system reforming strategy, aimed for the securing of optimal conditions for each student creative abilities. A definite help in the solution of the described problem can be provided by an education process probabilistic-statistic modeling method [1]. Let us study the mian aspects of this method.

Determinism and randomness of a cognition process

A quantity and quality of the information, processed and learned by a man within a cognition process is condition by his mind development level. The study of the human mind phenomenons forms an extremely difficult objective. It is related on principle to the direct non-observability of its mechanisms. Within the cognition structure we can include such cognitive processes as sensation, perception, memory, thinking, imagination. The analysis of these processes shows that they carry elements of uncertainty and randomness that are conditioned by a principle non-repeatability of a full-scale person' psychosomatic condition and environment conditions from one experiment to another, and also physiological, psychological, and information noises in a brain activity. The latter led to the denial of determinist dynamic model usage within the thinking process description and the accepting of the random dynamic system model.

From the described above it is obvious that a mind determinism that expresses in the objective reality reflection within a man's brain is realized through randomness. Therefore we can conclude, that a man's knowledge, being, in fact, a product of mind, also carry random character. So, to describe a cognition process one can use the probabilistic-statistic method [1, 2].

A student model

In [1] a student probabilistic-statistic model is developed in accordance with which a person within the process of his education moves within informative space. However, as a man's knowledge carries elements of uncertainty and randomness, it proves impossible to define a student's definite location in informative space. It is only possible to speak of his probable location in one of another part of it. In this model each individual is identified by a distribution function (probability density) – a probability to allocate him in a single information space area. Within an education process a distribution function that identifies a student, evolving, moves within the informative space. Each student has individual properties and independent localization (areal and kinematic) of individuals is possible.

According to the law of probability saving a system of differential equations has been written down. They are continuity equations that link probability density alteration per a time unit it phase space (space of coordinates and kinematic units of different orders) with the probability density flow divergence in the studied phase space. When the distribution function that for any random individual depends only on coordinates and time, the continuity equation looks as follows

$$\frac{\partial\Psi(\sigma;t)}{\partial t}+div_{\sigma}[<\dot{\sigma}>\Psi(\sigma;t)]=0,$$

$$<\dot{\sigma}>=\int_0^{\infty}\dot{\sigma}\,\Psi(\sigma,\dot{\sigma};t)d\dot{\sigma}\Big/\int_0^{\infty}\Psi(\sigma,\dot{\sigma};t)d\dot{\sigma}, \quad (1)$$

where $\Psi(\sigma;t)$ is the probability density in the coordinate system; $\Psi(\sigma,\ \dot{\sigma};\ t)$ is the probability density in coordinate and speed space; σ is a coordinate in the informative space; $\dot{\sigma}$ is speed; $<\dot{\sigma}>$ is avarage speed; t is time.

In [1] we have obtained the following equation solution (1):

$$\Psi(\sigma;t)=\int_0^{\infty}\frac{C_1(\omega)}{<\dot{\sigma}>}\exp\left[+i\omega\left(t-\int\frac{d\sigma}{<\dot{\sigma}>}\right)\right]d\omega+$$
$$+\int_0^{\infty}\frac{C_2(\omega)}{<\dot{\sigma}>}\exp\left[-i\omega\left(t-\int\frac{d\sigma}{<\dot{\sigma}>}\right)\right]d\omega, \quad (2)$$

where ω is frequency rate; $C_1(\omega)$ and $C_2(\omega)$ are integration constants, dependent on ω, and normnormalized for a singular frequency interval; $i=\sqrt{-1}$ is an imaginary unit.

In case, when average individual movement speed in the informative space does not depend on the coordinate $(<\dot{\sigma}>=\ \text{const})$, the equation (1) looks like:

$$\frac{\partial\Psi(\sigma;t)}{\partial t}+<\dot{\sigma}>\frac{\partial\Psi(\sigma;t)}{\partial\sigma}=0, \quad (3)$$

and the general solution of (2) can easily be transformed to:

$$\Psi(\sigma;t)=\int_0^{\infty}C(\omega)\cos(\omega t-k\sigma+\alpha_{\omega})d\omega, \quad (4)$$

where $k=\omega/<\dot{\sigma}>$ is a wave number; $C(\omega)$ is the integration constant; α_{ω} is intial phase for frequency ω.

On the other hand, (3) directly leads to the fact that its solution is the function of the argument $(<\dot{\sigma}>t-\sigma)$, or, exactly:

$$\Psi(\sigma;t)=\Psi(<\dot{\sigma}>t-\sigma). \quad (5)$$

It becomes certain, if we place (5) in equation (3). Therefore, the solutions of (4) and (5) are equal. An evident form of the distribution function $\Psi(\sigma;t)$ can be found from (3) if the initial probability density distribution of $\Psi(\sigma;\ 0)$. In a close investigation of a weak interaction between students we can use the additivity of individual distribution functions and find a distribution function for a stident group or a stream [3].

The research of the experimentally-found individual distribution functions of a higher education institution students [3] showed that their mathematical expectations move within the informative space with a constant speed (for «strong» students within the whole education period, and for «average» and «weak» students with different constant speed indexes on younger and higher courses). The coordinate in the informative space was evaluated in points. The distribution function was defined in re-calculation for one education discipline per semester. Mathematical expectation was found according to the formula:

$$<\sigma>=\int_0^{\infty}\sigma\Psi(\sigma;t)d\sigma\Big/\int_0^{\infty}\Psi(\sigma;t)d\sigma.$$

It is shown, that the movement of mathematical expectation in the informative space depends on the intensity of a student's interaction with a professor-tutor personnel.

Movement equation

In article [3] an equation of mathematical expectation movement for individual distribution functions was found. It looks as follows:

$$\frac{d<\sigma>}{dt}=\alpha(\kappa,\sigma,\Psi,\{\Psi\};t)(F,\lambda,\sigma,\Psi\ \{\Psi\};t), \quad (6)$$

where $\alpha=\alpha(\kappa,\sigma,\Psi,\{\Psi\};t)$ is the function of a student's knowledge mastering; $\kappa\equiv\{\kappa_i\}=\kappa_1,\kappa_2,\ldots,\kappa_n$ is the totality of parameters that define a student's ability to master knowledge (intellectual development, psychological and physical health, potential abilities, etc); $\{\Psi\}$ is the functional from the distribution function $\Psi(\sigma;t)$; $F(\lambda,\sigma,\Psi,\{\Psi\};t)$ is the function of a professor-tutor personnel impact upon a students' subsystem; $\lambda\equiv\{\lambda_i\}=\lambda_1,\lambda_2,\ldots,\lambda_l$ is the totality of parameters that characterize professional and personal traits of a professor-tutor personnel.

According to (6) the speed of mathematical expectation movement in the informative space is defined by the actual interaction of student with a professor-tutor personnel. The equation (6) can be transformed into:

$$\frac{d<\sigma>}{dt}=\frac{F(\lambda,\sigma,\Psi,\{\Psi\};t)}{m(\kappa,\sigma,\Psi,\{\Psi\};t)}, \quad (7)$$

where $m(\kappa, \sigma, \Psi, \{\Psi\}; t) = 1/(\alpha, \kappa, \sigma, \Psi \{\Psi\}; t)$ is the function that characterize an individual unmanageableness (inertness) to an alteration of his location in the informative space. Equation (7) is in fact an analogue of Aristotle's movement equation in mechanics, the power role in which is carried out by the impact function $F(\lambda, \sigma, \Psi, \{\Psi\}; t)$, and mass – by the inertness function $m(\kappa, \sigma, \Psi, \{\Psi\}; t)$.

To obtain an information on characteristics of the impact function and inertness function it is necessary to carry out some deep pedagogical, psychological, and social researches of the professor-tutor and student subsystem. If we know a specific form of the impact and inertness function, we will be able to find speeds of mathematical expectation of individual distribution functions in the informative space.

Resume

1. A man's knowledge, being a product of his mind, carry some uncertainty and randomness characteristics, so, it proves impossible to measure a students' knowledge volume and deepness. To solve this problem we suggest using the probabilistic-statistic method.

2. Within an education process an individual moves within an informative space, where he is defined by a distribution function that defines the probability of his location in a singular volume of the informative space.

3. According to the solution of the continuity equation we have found an analytical form of a student's distribution function that spreads in the informative space in time for the case of an average speed random dependence on a coordinate.

4. A speed of individual distribution functions' mathematical expectation movement speed in the informative space is proportional to a function of a professor-tutor personnel impact and inversely proportional to an inertness function that characterizes an unmanageableness the mathematical expectation in space alteration.

Reference

1. Romanov V.P., Sokolova N.A. Probabilistic-statistic model of a student // Modern problems of science and education. – 2009. – № 6 (Part 3). – P. 122-129.

2. Sokolova N.A. Education process: determination and randomness // International magazine of applied and fundamental research. – 2010. – №12. – P. 81-82.

3. Romanov V.P., Sokolova N.A. The analysis of students' behavior within an education process in a higher educational institution // Modern problems of science and education. – 2009. – №6 (Part 3. – P. 130-135.

PROBABILISTIC-STASTIC METHOD IN PEDAGOGY (PART II): SCALING AND EXPERIMENTAL RESEARCH

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A review of literature on scaling and pedagogy has been carried out. It was defined that a probabilistic-statistic scaling can be used in order to evaluate the completeness of students' knowledge. It has been shown that an analysis of experimental distribution functions, that characterize the probability of a students' presence in a certain location within an informative space within his education process, can be used to obtain a data on education process in a higher educational institution.

Keywords: student, informative space, distribution function, distribution function moments, probabilistic-statistic scaling

While carrying out a pedagogic research, a great attention is paid to the problems of scaling. To estimate a research object traits in pedagogy, various scales are used. Their selection in each specific case proves to be a difficult task. In accordance with the modern estimation theory, scales are often classified by types, for example, scales of names, order, intervals, relations, and differences are distinguished. In Russian education system while estimating a knowledge completeness nowadays five-unit ordinal rating scale is implemented, its main advantage is its simplicity and habitualness. However, it also has some significant disadvantages, to which, because of the narrow rating interval (2-5 units), we can refer low differential ability and high estimation inaccuracy ($\Delta\sigma = \pm 0{,}5$ unit).

In order to decrease the relative estimation inaccuracy some transfer to ten-, twelve-, twenty-, and one hundred-unit scale. It, no doubt, increases an estimation accuracy, but does not provide us with new qualitative results. The solution of this problem greatly depends on the success in the way of an adequate student model development. Some definite hope here is linked to the probabilistic-statistic student model [1, 2], and, therefore, to the probabilistic-statistic method of a knowledge completeness estimation [3, 4].

Probabilistic-statistic method of a knowledge completeness estimation

In [1] it has been shown, that within his education process a person moves within the informative space, and his behavior is associated to the behavior of some distribution function $\Psi(\sigma; t)$ that reflects a probability density in other words, the probability to allocate a student in a singular coordinate interval of the informative space in a time moment t. So, a student estimation problem, in fact, comes to finding his individual distribution function with usage of probabilistic-statistic scaling. Let us study some major aspects of probabilistic-statistic scaling.

According to the evaluation scale [3] an ordinal system $< A; L_\Psi, F, G; f, M >$ is mentioned. Here A is some ordered object (individual) totality, these individuals carry some traits that interest us (empiric system with relations); L_Ψ is a functional space (space of distribution function $\Psi(\sigma; t)$) with its relations; F is an operation of homomorphic imagery of A into the subsystem L_Ψ; G is the possible alterations group; f is an operation of the distribution function $\Psi(\sigma; t)$ from the subsystem L_Ψ upon digital systems with relations of n-mensural space M. Operation f was introduced as it is relatively hard to work with distribution functions within a functional space. In order to simplify it a transfer from functional into digital space is carried out. It is supposed, that each distribution function can be set in accordance with a number of digital values $\{\mu_n(t)\}$, moments of the distribution function from zero to an unlimitedly large order ($n = 0, 1, 2, 3, \ldots$). It is also supposed, that a reverse problem can be solved – the reconstruction of the distribution function $\Psi(\sigma; t)$ on the defined moment number $\{\mu_n(t)\}$.

Zero order moment $\mu_0(t) = \int_0^\infty \Psi(\sigma; t) d\sigma = 1$ defines a probability to allocate a person within the whole informative space and, therefore, equals one. The first order moment $\mu_1(t) = \int_0^\infty \sigma \Psi(\sigma; t) d\sigma$ defines the mathematic expectation (an average value of σ, the coordinate of the distribution centre). Moments of n-order ($n > 1$) look like $\mu_n(t) = \int_0^\infty [\sigma - \mu_1(t)]^n \Psi(\sigma; t) d\sigma$. Moments of even orders characterize a distribution function smearing, and non-even order moments – an asymmetry of a distribution function relatively to its mathematic expectation.

Thus, in order to define students' knowledge completeness and rate them according to their knowledge level is necessary to undertake the following actions: experimentally find, according to the results of a control measure, for example, an exam, individual students' distribution functions; calculate individual distribution functions moments; carry out students' rating according to their knowledge level through comparing different order moments of their individual distribution functions.

Experimental research

The maximum student's advancement within an informative space per one education discipline in the traditional five-unit evaluation system equals five points. It, as mentioned above, leads to a high relative inaccuracy while estimating a student's knowledge completeness. In order to decrease the inaccuracy while estimations a knowledge completeness in [3], twelve-unit system and probabilistic-statistic scaling was used.

In table 1 some typical results of students' knowledge completeness evaluation are shown. They reflect a knowledge on a general physics course and were obtained with the method of probabilistic-statistic scaling for all four traditionally-accepted knowledge levels (marks «excellent», «good», «satisfactory», «unsatisfactory»). In the table columns probability (in percents) of students' knowledge «allocation» in a certain informative space coordinate interval is shown. Each line is in fact a distribution function in percents. It simplifies the evaluation procedure, without changing its essence.

Table 1

The results of students' knowledge completeness evaluation according to the probabilistic-statistic method
Moments of distribution functions that are provided in table 1 are placed in table 2.
Ordinal numbers in the corresponding divisions of table 1 and 2 are same

№ п/п	Interval scales, points																			
	0–1	1–2	2–3	3–4	4–5	5–6	6–7	7–8	8–9	9–10	10–11	11–12	12–13	13–14	14–15	15–16	16–17	17–18	18–19	19–20
Traditional mark «5» (excellent)																				
1														10	30	30	20	10		
2																10	30	40	20	
3													10	20	20	20	20	10		
Traditional mark «4» (good)																				
1												20	60	20						
2									10	20	50	20								
3													20	50	20	10				
Traditional mark «3» (satisfactory)																				
1						20	50	30												
2									10	30	40	20								
3			10	20	20	20	20	10												
Traditional mark «2» (unsatisfactory)																				
1	10	20	30	30	10															
2		10	20	40	20	10														
3	100																			

The fact that each traditional mark corresponds with a wide range of mathematic expectation indexes allows us to carryout students' rating according to their knowledge level within the limits of a mark. Besides, for an accurate rating higher distribution functions' orders can be used. In [3] it is shown, that in majority of cases besides possessing a mathematic expectation index, it is enough to have an information on a second order moment, that defines a distribution function dispersion, and the third order moment, that characterize a distribution function asymmetry.

In article [5] within the five-unit knowledge evaluation system experimental distribution functions for each of 78 students, who studied for 5 years on one of the technical faculties of Moscow electronic technics institute, were found. On basis of this functions distribution function for this students' stream were constructed (picture 1). The construction of students' stream distribution functions was carried out within the concept of an individual distribution function additivity, that were approximated by rectangular functions. Mathematic expectation of an individual' distribution function after n – semester was defined by an average sum of marks that a students got within n semesters on every education discipline, or:

$$< \sigma >= \sum_{i=1}^{n} < \sigma_i >,$$

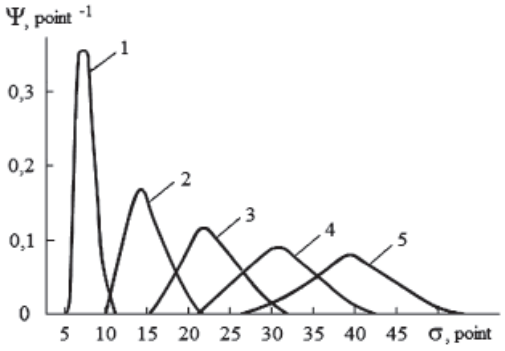
where $< \sigma_i >$ is an average mark that a student got in i – semester, and the function width equaled n points (after the first semester it equaled 1 point, after the second – 2 points, etc).

Table 2

Distribution functions' moments

№ п/п	Moment order				
	μ_1, point	μ_2, point^2	μ_3, point^3	μ_4, point^4	μ_5, point^5
Traditional mark «5» (excellent)					
1	15,40	1,29	0,29	3,74	1,75
2	17,20	0,81	–0,14	1,48	–0,73
3	15,00	2,25	0,00	9,86	0,00
Traditional mark «4» (good)					
1	12,50	0,40	0,00	0,40	0,00
2	10,30	0,76	–0,34	1,55	–1,46
3	13,70	0,76	0,34	1,55	1,46
Traditional mark «3» (satisfactory)					
1	6,60	0,49	–0,05	0,50	–0,15
2	10,20	0,81	–0,14	1,48	–0,73
3	5,00	2,25	0,00	9,86	0,00
Traditional mark «2» (unsatisfactory)					
1	2,60	1,29	–0,29	3,74	–1,75
2	3,50	1,20	0,00	3,60	0,00
3	0,50	0,08	0,00	0,013	0,00

The analysis of data, provided in Figure, shows that, while advancing within an informative space, a distributive function diffuses. It happens because a mathematic expectation of individuals' distribution functions moves with different speeds, and functions themselves diffuse because of dispersion. We should also outline, that a complete distribution function maximum within its evolution process moves from its left limit to the centre.



Evolution of the complete distribution function of a students' stream, approximated by smooth lines:
1 – after the first course;
2 – after the second course;
3 – after the third course;
4 – after the fourth course;
5 – after the fifth course

Another important result is an overshot of distribution functions, especially evident on higher courses. It testifies that a knowledge volume, possessed by a weak higher course student (his individual distribution function is located in the «tail» of the complete distribution function), can be smaller than that of a strong younger course student.

The diffusion of experimental functions in time shows us a significant heterogeneity of a students' subsystem. It leads to the fact, that from the third course, an education effectiveness in such groups decreases. In cases of large students' groups or streams, tutors usually have to orient for average students within an educative process, and it affects both weak and strong students' training under the terms of observed high distribution function dispersion. Strong students work worse than they are able to, and the weak ones are unable to master an education material. It leads to a greater heterogeneity of a student subsystem. Such situation forces tutors to lower their requirements while an assessment of students.

Resume

1. An effective method of students' knowledge evaluation within their educative process is the method of probabilistic-statistic scaling. It allows us to carry out an accurate rating of students according to their knowledge level through the comparison of different individual distribution functions' orders' moments.

2. A research of experimental distribution functions implementation in time provides us with I important information on an education process condition, that, no doubt, proves to be useful for both students and tutor personnel, an educative institution administration, for an education process improvement and its structure optimization.

References

1. Romanov V.P., Sokolova N.A. Probabilistic-statistic model of a student // Modern problems of science and education. – 2009. – № 6 (Part 3). – P. 122-129.

2. Sokolova N.A. Education process: determination and randomness // International magazine of applied and fundamental research. – 2010. – №12. – P. 81-82.

3. Romanov V.P., Sokolova N.A. Probabilistic-statistic scaling in pedagogy // Modern problems of science and education. – 2010. – № 2. – P. 57-63.

4. Romanov V.P., Sokolova N.A. Probabilistic-statistic method of higher educational institution students' knowledge completeness evaluation // International magazine of experimental education. – 2010. – №7. – P. 85-87.

5. Romanov V.P., Sokolova N.A. The analysis of students' behavior within an education process in a higher educational institution // Modern problems of science and education. – 2009. – №6 (Part 3). – P. 130-135.

ACCENTUATED KNOWLEDGE

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Nature of human knowledge is determined not only by its objective content but by relation of person to surrounding world concluded in it. Knowledge is a product of human activity and being created by person, it carries every aspect of human relation to surrounding world. The article deals with the concept «accentuated knowledge». Accentuations are clearly shown in knowledge, which person has.

Keywords: knowledge; person; accentuation; accentuated knowledge

A person having knowledge sees problems where they exist. The one who knows much notices many problems. Defining the problem requires grandiose cogitative work, based on certain knowledge, but when careful clarifying of the essence of one or another question it is found out that there is no obvious solution. And the larger circle of knowledge about nature person has, the more unsolved problems he sees (one of knowledge functions – search of problems). Knowledge is necessary not to calm down and stop. Knowledge makes sense only as a tool of reception of new type of knowledge. A person aspiring to knowledge finds out everything new and his own lack of knowledge. This process expands in an avalanche and bewilders any rational epistemology (the more I know, the more I do not know): if to direct our knowledge about objective world toward infinity, our ignorance of it will direct toward infinity as well (if I know everything I know nothing).

Why to study the Nature, if it is impossible to study it? Why to learn incognizable? What for is it necessary to study natural sciences (first of all, physics), if this knowledge only increases ignorance and uncertainty? These issues are more and more frequently set by men, receiving secondary and higher education. And if in the process of studying humanities students receive knowledge concerning survival in the complex modern society, knowledge of physics, in many students' opinion, is not in the least necessary for them. The question is important; therefore it is important to find the answer.

To the beginning of the XXI century people accumulated the large volume of knowledge about nature (natural-science knowledge). It is so large that to acquire it is beyond man's power.

Nature of human knowledge is determined not only by its objective content but by relation of person to the surrounding world concluded in it. This problem has interesting special psychological component. In the one and the same text, containing the statement of some knowledge, we can accentuate it variously, selecting (exceeding, exaggerating) one or another aspect, selecting urgency and (powerfully) stressing them. The term «accentuation» is not new, it has linguistic origin. Accentuation is a system of accents in any language, designation of accents and rise of voice tone in the places of speech, requiring it. From linguistic area this scientific term was moved to psychology, and, so, got psychological and pedagogical meaning. For the first time about accentuations in a new terminological quality started talking K. Leonhard [2] expanding its content, keeping in view personalities and characters.

On the basis of long experience he singled out 10 types of accentuations, explaining their presence by disharmonious development of character with subsequent expressiveness of its separate features, understanding accentuations as extreme variant of norm. General theory of accentuations by K. Leonhard can find practical application in other areas of psychological and pedagogical sciences. Value of this issue turned out to be much wider and deeper than K.Leonhard and his followers assumed. The careful analysis of research array, devoted to the features of human knowledge, including scientific knowledge, forces us to single out and to substantiate the concept of «accentuated knowledge».

Existence of accentuated knowledge follows from M. Polany's concept [3]: personal knowledge is necessary component of researcher's activity. Personal knowledge is formed by means of personal contacts; it exerts significant influence on scientists, on their ability for research and creativity. And from formal point of view: if personal knowledge exists, and person has accentuations, than knowledge extracted by such researcher will be accentuated.

And the most honest researcher, studying one or another object, weighing the pros and cons before making some critical decision, deliberately or unconsciously, with passionate bias, for the sake of more or less strongly pronounced personal anomalies, selects arguments, formulates reasons in favour of desired result. And whatever expert's educational level is, research problem is being solved not in favour of objective content of knowledge, but of imaginative blessing. And justification of own accentuated feelings, accentuated interests, accentuated predilections are searched in so-

called «reasons of heart», and many reasonable arguments are considered by researcher to be not corresponding to the facts, to be opponent's imagination.

But can researcher make a discovery without having accentuations at all? Presence of accentuated aspirations gives to the research idea large tension, breadth, acuteness, passion. An accentuated person is capable to penetrate into subject which is interesting for him much deeper than the other, indifferent one and developed without accentuations. Any activity is realized with strong will. Personal accentuations generate persistence and purposefulness, having therefore decisive importance for success and generating accentuated knowledge. Knowledge bears imprint of researcher's character as it is him who extracted and expounded it. Any scientific article, any monograph, any manual is written by person. The unique impression of human mentality, like fingerprints, is contained in every of these products.

It is obvious that studying everything is impossible, for example, because of infinite variety of surrounding world and of any of its part. Even the same facts can have various subjective interpretations. And these interpretations may not only complement each other, they often contradict each other.

Objective knowledge of K. Popper [4] is accentuated too. Its third world, objective knowledge, is a certain system of logically organized statements, expressed in language, fixed in the texts, functioning in society as a product of human activity. But differently accentuated people, having read the same book, having listened the same lecture course, having passed the same examination and having even received the same mark, acquire different knowledge and different skills. This very phenomenon gives rise to the problem of mutual understanding. If this was not so, this problem would not exist.

So students' knowledge of mastered disciplines (books, objects, phenomena, laws, theories, methods and so on) is different, since they took notice (accentuated, put accents) of different elements of the same knowledge being passed to them objectively. They perceive the same world in different ways. Even the well-trained experts (in the field of natural sciences, medicine, education, economy etc.) have disputes; moreover, they have basically different and sometimes opposing opinion about one and the same object. The reason of these disputes is differently accentuated knowledge.

A consequence of really existing personal accentuations is accentuation (emphasis, underlining) of human activity and its results as well. Knowledge is inseparable from activity. Knowledge is a product of human activity, and as everything that is created by person, it carries all the aspects of human relation to surrounding world. Accentuations are clearly shown in the knowledge, which person has.

It is possible to find phenomenon of knowledge accentuation in epistemology by Plato. Socrates (by Plato) talking with Theaetetus draws interlocutor's attention first to the one, then to the other side of the discussed object (knowledge), showing advantages and disadvantages of one or another attempt to answer the question «What is knowledge?», also impressively exposing his personal accentuations [1].

Accentuation of knowledge mentally comes to light in facts of presence of «focus» and «periphery» of consciousness. We cannot simultaneously think about everything, decide all the problems at once. Transferring of focus of consciousness on various elements (parts) of the same knowledge allows us to understand the same thing in different ways. Cognitive process has a feature to be focused on various details, and result of knowledge depends radically on what details will remain in periphery of consciousness. We are calmed only by deep belief of M. Polany in the fact that the more cognitive process is focused on integer, the more it is subordinated to it, and the more functional knowledge of its elements becomes [3].

Any knowledge can get in focus, sometimes becoming obvious and actual absolutely unexpectedly. But what knowledge is most likely to get in focus clearly depends on personal features, especially on the strongly marked ones, on its accentuations.

References

1. Cornford, F.M. Plato's theory of knowledge; The Theaetetus and the Sophist / Plato; translated, with commentary, by Francis M. Cornford. Mineola, N.Y. – Dover Publications, 2003. – 336 p.

2. Leonhard K. Akzentuierte Persönlichkeiten / Karl Leonhard. – Würzburg: Klinik und Poliklinik für Psychiatrie und Psychotherapie, 2000, 3., überarb. Aufl. / Hrsg.: Ernst Franzek und Helmut Beckmann. – 350 S.

3. Polanyi M. Personal knowledge: towards a post-critical philosophy / Michael Polanyi. – London: Routledge, 1997. – 428 p.

4. Popper K. Objective knowledge : an evolutionary approach / Karl R. Popper. Oxford [Eng.]: Clarendon Press ; New York : Oxford University Press. – 1979. – 395 p.

Materials of Conferences

URGENT ASPECTS OF STUDENTS' MOBILITY INCREASE IN CONDITIONS OF INTERNATIONAL EDUCATION STANDARDS INTEGRATION

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A rough development of the world society on the millennium border provides ground for more consequent move away from the national reserve, self-isolation to interaction and collaboration in the world education society, the formation of its wholeness considering regional specificity that is defined by needs, interests and goals of a separate country. The beginning of the XXI century is linked to the formation of a single educational space, about which almost two centuries ago S.M. Taleyran said: «Education is really a special state, which influence area cannot be defined beither by one man, nor even by national authority: its influence area is huge, unlimited…»

Within the world society there are numerous examples of funds, centres, cooperations, organizations which goal is to solve the problems of integration in areas of science and education, international cooperation and mobility:

1. European organization of scientific and technical research support. Objective: national research coordination on European level, assistance in fortifying European collaboration in the area of scientific and technical research.
2. Danish centre of international cooperation and mobility in training and education.
3. Netherland organization of international cooperation in the area of higher education.
4. International mobility centre – assistance for international collaboration in field of education, training, culture, business life of youth.
5. Swedish Fund of International cooperation in Science and Higher education, etc.

The most clear expression of the integration process in Europe is the Bolognese process which ideas and goals found development and specifying in the following documents: Lisbon convention (1997), Bolognese declaration (1999), Salamanca declaration (2001), Paris (2001), Berlin (2003), and Bergen (2005) communiqué.

In his message «New decade – new economic rise – new opportunities for Kazakhstan» president of Kazakhstan Republic N.A. Nazarbayev said that the quality of higher education must correspond to the highest world requirements, «…Higher Education Institutions of our country must aim for entering the ratings of the leading world universities» [1].

In different years state programmes, legal acts, and laws devoted to the problem of Kazakh education integration into the world society and experience were accepted in Kazakhstan. For example, in the report on the Kazakhstan Republic Government program for 2006-2008 it was said: «The going on changes within the social relation area requires mobility and correspondence to the economy development from from education system. In the education area the Government sets goal to create a competitive system of modern education, personnel training and re-training, as it is one of the major factors of Kazakhstan's integration into the number of the most developed countries». Among numerous objectives of the education developmet in Kazakhstan Republic a necessity to solve the integration ito the world education space problem was outlined.

Among other documents, accepted in Kazakhstan Republic it is also said about the educational integration: Kazakhstan Republic Law «On education»; state program «Children of Kazakhstan» for 2006-2011; state program of patriotic citizen upbringing for 2006-2010; a transfer for 12-years secondary education plan; state program of education development in Kazakhstan Republic for 2005-2010, etc.

In Kazakhstan a number of educational institutions was created. Their activity also solves problems of international integration: «New International University», «Special fund», and «Intellectual schools».

If we investigate Kazakhstan experience of the credit system introduction, we will see that its formation was spontaneous (the mid-1990ies), and, as it was studied, higher education institutions clearly saw the evident advantages of students' mobility because of unification of different education plans and programmes. A whole number of Kazakhstan institutions started to actively broaden their international relations with leading foreign universities, participate in international projects and programmes. A great desire to accelerate the integration of all nation's education system into the world system of education led to a launch of pilot projects, financed by European Union (1995-1997), several Kazakhstan higher education institutes won the Tempus-TASIS projects. Institutions' personnel started an active work to study the world experience of leading coutires in the area of education systems organization, speciality programmes' formation, and also studying the legal acts in the area of higher education of the most developed countries.

Nowadays in the area of Kazakhstan higher professional education a work of transferring to the international institutions' accreditation model takes place with involvement of international outer experts as well as that in transferring to the activity results estimation standards that are used in the countries of Economic Cooperation Organization. In other words, trends of strengthening the international education structures of various kinds and purposes take place, the development of education

internationalization not only in its from, but also the education technologies and organization methods, an integration of international and intercultural dimension into education, research, and service universities function take place [2].

In order for national education programmes to be accepted, for students to become mobile, and also for the specialists' training quality increase it is often defined by the comparability of national education programmes and the whole system of educative-training activity organization, as well as by the succession secure for all levels and stages of higher education.

Of course, European countries within the period of Bolognese process existence faced a number of ambiguous and discrepant problems, for example, the variety and, often, incomparability of European education systems, differences not only in the countries' education systems, but also in apprehension and interpretation of the «credit» term. Numerous fears about the threats for stable national high schools development; academic mobility of students and tutors might mean only one direction – to the West; the two-stage education system may result in the decrease in training quality of graduates, etc [3].

But, on the other hand, in the world society designs of recommendations on internationalization process development, legal basis of international collaboration creation it the area of higher education are being initiated. The basis for these processes is the presence of universal regulations of academic freedom and democracy and international conventions that obtain the greater legal importance for national education systems, as well as world-wide declarations accepted by UNESCO and European Council. Gradually, general «game rules» are being produced within education systems [4].

As we speak of the prospects of national institutions' formation model in Kazakhstan in terms of international education standards integration, we should outline the following: a national institution accreditation model will be realized as well as the transfer to international standards of institution and special accreditation; Kazakh institutions' participation in the International academy World Universities Rating (2020); functioning of several world-class universities; creation of integrated inoovative scientific-educational structures, creation of stimulus and infrastructure for education services import and export; acknowledgement of Kazakh diplomas on the world labor market. Under the terms of Kazakhstan globalization a 2020 education system will function as a part of the single world information-educational space. A maximum accounting of international experience in the education informatization field, stable partnership with international development institutions in the area of ICT and leading IT companies [5].

All these directions will, no doubt, provide for the students' mobility at the account of the individual education program trajectory formation.

High social mobility, wide opportunities in social experience enrichment are significant peculiarity of a person self-realization in terms of modern society, that should not be neglected [6].

In accordance with the decisions of the 30th session of UNESCO General conference the main principles of the education strategy formation are availability, quality, and mobility.

In Europe (within all European Union territory) students' mobility equals more than 750 thousand people annually. This number grows persistently because of the Eastern Europe countries entrance, productive facilities distribution unevenness, decrease in education prices and many other factors.

In modern world the labor market conjuncture is exposed to changeability, so institution education plans and specialists' training process cannot consequently and fully correspond to the employers' requirements. That is why institution graduates have to be mobile, in order to be claimed in different regions. To provide this mobility it necessary to create a single educative space [7].

The higher education system is one of important stratifying components in the process of social-professional mobility and a condition, a factor of youth vertical professional mobility processes, as it increases their starting professional abilities.

But, in this question there are several negative moments. A lack of accounting our education programmes and their foreign analogues mechanism, worldwide acknowledgement of educational documents straps the academical mobility of students, tutors, and labor. Territorial mobility in local conditions is available only for few citizens' category because of high transportation tariffs, specific labor market peculiarities, housing prices inaccessibility, etc. So the students' mobility problem solution can be transformed into a virtual mobility that is a distant education and work for foreign organization via internet network. To professional mobility we can refer obtaining a second higher education, personnel retraining, qualification increase, additional education services. One of the professional mobility provision problems is the increase in the institution's role in the formation of social and cultural environment that would be attractive for life goals realizations.

Nowadays the major problems in the Kazakhsatn mobility area refer to the following aspects:

1) mobility organization only within the terms of signed agreements and memorandums of two-side, or multi-side character. As rule, these agreements carry formal character and are not functional;

2) lack of internationalization in context of education plans themselves. They are not oriented for the development of students' language skills, attraction of foreign professors and further employment on labor market;

3) weak potential and low qualification of Kazakhstan institutions' foreign departments' personnel;

4) low language skills of both students and tutors, especially in knowledge of the second and third foreign language.

If we refer to the action plan for mobility development in European universities that was supported by the European Council in 2000 (Nice), we can underline the complex of measures that is significantly important nowadays foe Kazakhstan education and Kazakhstan institutions and is related to the creation of conditions for mobility increase:

1) multi-language development;

2) mobility information availability;

3) stable mobility financing scheme creation on basis of funds sources coordination and broadening;

4) broadening of mobility participants and forms;

5) improvement and unification of acceptance for of mobility participants' groups;

6) coordination and simplification of mobility academic calendar;

7) motivation and mobility results strengthening.

It also includes: the most important requirements of foreign institution education acknowledgement by one's university, the creation of mutual acknowledgement system, diplomas and the whole education equality.

References

1. New decade – new economic growth – new opportunities for Kazakhstan. – Astana, 2010.

2. Chirva A.S. Internationalization – a prior development direction of higher education // Materials of the New scientific idea conference. – 2007.

3. Robva E.A. National alterations of international integration in education system // Vysheyshaya shkola. – 2009. – №4. – P. 17-20.

4. Sbdygapparov S.B. The basics of credit education technology I Kazakhstan / Ed. by J.A. Kulekeyev, G.N. Gamarnick, B.S. Abdrasilov. – Almaty: Қазақ университеті, 2004. – P. 4.

5. Long-term education development program up to 2020.

6. Doroshenko V.Y., Zotova L.I., Lavrinenko V.N. and others. Psychology and ethics of business communication. Higher education institutions textbook / Ed. by professor V.N. Lavrinenko. – 2nd edition. – M.: Culture and sport, UNITY, 1997. – 279 p.

7. General ideas of the Bolognese declaration.

The work was submitted for the international scientific conference «Problems of international integration of national education standards», Russia – France (Moscow – Paris), 18-25th of March 2011, came to the editorial office on 17.03.2011.

ABOUT THE TECHNIQUES AND MEANS OF COGNITIVE VISUALIZATION OF THE EDUCATIONAL MATHEMATICAL INFORMATION

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The formation of the high level of professional competence has become the basic requirement to a vocational training of the expert. It inevitably involves the change of traditional educational technologies, the transition to the interactive methods and the modes of study, qualitatively new tutorials.

The theoretical and experimental work of the authors in creation of teaching materials convinces that it is necessary to recognize the intensification of the educational process as a strategic direction of the increase of efficiency of students' informative activity. In our opinion, for this purpose the performance of two interconnected conditions is necessary:

– the ergonomics of the educational information;

– the elimination of the irrational time expenses connected with the educational process.

Let's discuss in details one of the ergonomic means of the educational information – its visualization. The visual information is stimulating (simultaneous), while the verbal one is successive (consecutive). The average formation of representations while using the visual information is in 5-6 times faster, than by means of the verbal statement.

The effective mastering of the information assumes using the system of visual and verbal means simultaneously. It is necessary not only for the subject action organization, but also for the allocation of the form and content relations, essence and phenomenon, the ability to model a situation. Figuratively presented information should increase the possibility of its preservation in memory and operating with it. Besides, the specificity of the mathematical content assumes the organic combination of both languages (visual and verbal), therefore it is important to find the optimum balance.

Designing of educational materials is based upon the principle of cognitive visualization according to which the visualization should carry out not simply illustrative function but also to promote the natural-intellectual process of new knowledge reception.

The product of cognitive visualization is the thoughtform generated by consciousness, which defines an unknown person, an unrecognized object (phenomenon), represented in the external plan of educational activity. Therefore working out of techniques and means of purposeful creation of thoughtforms in the course of educational-informative activity becomes the central problem of cognitive visualization.

According to the analysis spent by N.N. Manjko [1], we will list some important ways of visualization, essentially influencing the degree of activization and the dynamism of intellectual and educational activity while processing and mastering of information. They are:

– the concentration of information (the basis of intensification);

– the information generalization;

– the expansion of roughly-presentational functions of visual didactic means (the presence of support);

– the algorithmization of educational-informative actions realized in visual means;

– a multicode presentation of the information.

Let's give the examples of cognitive visualization means, applied by the authors while working out of educational materials, illustrating the use of separated ways of cognitive visualization.

Tabular-matrix structures. With the help of these cognitive visualization means at the expense of additional systemization and generalization, the educational information is condensed, concentrated. More often they serve for systemization of already studied material. However, they aren't less effective while studying of a new material when they are presented incompletely or being designed (filled in) during the course of study. In the process of knowledge control, the tabular-matrix structures can be presented as matrix tests (matching tests) or classical tests of a choice. Tabular-matrix structures are also convenient for using of a multicode presentation of the educational information.

Flow-charts. They are characterized by a rigid structure of the represented material. The obligatory presence of each element of the scheme demonstrates the severity, symmetry and beauty, and also the cause-and-effect relationships of various elements of the educational content. With the help of these cognitive visualization means the generalization of representation of an intrinsic semantic core of the educational information is carried out. The flow-charts are used both in a theoretical part, and in mastering and controlling blocks, for example, as tasks for the description of algorithms of the problem decision.

The generalization technique works also while using of structurally-logic schemes, functional structurally-logic schemes, schemes-classifications.

Within the framework of mathematical courses students should master independently the sequence of actions during the solving of the basic classes of typical problems. In order to describe the process of the algebraic problem solution in training manual it is quite enough to point out and enumerate the steps of problem solution, but it is more difficult to do the same with a geometrical problem. In our opinion, one of the most effective ways of the visual description of dynamics of process of the geometrical problem solution is the graphic algorithm. It is based upon the principle of simplicity and a minimum of the verbal information. The problem solution is reduced to a series of the visual drawings (shots), reflecting the stages of its solution. Such representation allows to restore the process of the problem solution easily. Thus, the algorithm constructed in such a way, carries out not only the illustrative function, but also a cognitive one.

The graphic algorithm can be «sounded», i.e. the verbal information is placed near each drawing. Such types of algorithms can be used in tasks of two types:

1) the verbal information is available, it is necessary to restore the visual one;

2) the visual information is available, it is necessary to restore the verbal one.

Notably, the task can be offered both to the whole algorithm, and to its separate stages – drawings.

A variety of properties and action mechanisms, differentiation of forms and functions of visual means allows to include them into an educational activity taking into account the didactic expediency, educational problems, conditions and situations.

The techniques of representation of the educational information given above, allow to organize an educational material in an optimum way and to provide the professional competence formation of the future experts.

In particular, in the course of the long-term work we have realized that due to the considered techniques and ways of cognitive visualization in the educational mathematical information organization during the creation of training manuals and working out of training technologies, the following results were reached:

– the activization of educational-informative activity;

– the formation of the mechanism of self-development of the student's personality;

– strengthening of professionally-pedagogical orientation of teaching disciplines;

– the initiation of the author's style of the future teacher;

– the support of the modernization process of traditional technologies and innovative educational processes.

References

1. Manjko N.N. Cognitive Visualization – The basic psychological- pedagogical mechanism of a didactic design // Vestn. of Educational-method. Association of professional-pedagogical education: spec. release. – Ekaterinburg: Publishing house GOU VPO «Russ. prof.-ped. Un-ty», 2007. – Issue. 2 (41). – P. 224-234.

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THE PROFESSIONAL-PEDAGOGICAL WORK FROM POSITIONS OF THE COMPETENT APPROACH

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The competence approach to education convinces us in necessity to analyze critically and to estimate the gained experience in pedagogical activity of the teacher. Only the teacher can create for pupils conditions for success, self-determination and self-realization. In our opinion, the motivation of the teacher, his personal and professional opportunities is the main conditions for introduction of the competence approach.

On the one hand, the pedagogical activity appears as one of kinds of the activity, which is expressed in a purposeful development of the learner,

in mastering of culture's bases and in an all-around development of his abilities. On the other hand, the joint activity assumes «the subject – subject attitudes», the teacher and the learner act as equivalent subjects of the pedagogical process.

Knowledge, skills, abilities and personal qualities of the teacher under certain conditions can be considered from the point of view of professional competence.

Competence represents the personal characteristic, it assumes, that the individual is not simply informed and is able to apply this information, but also uses it as a basis for own decisions acceptance.

Professional competence of the teacher is defined by experience and individual abilities of the person, his motivate aspiration to self-education, self-improvement and to the creative attitude to business. Professional competence of the modern teacher is characterized by the following: the first, the task of the teacher does not consist of knowledge transfer, but it must support new kinds of the pupil's behaviour (activity). It is necessary to consider the competence of each pupil and to organize cooperation of pupils and the teacher for an effective use of experience of all learners and for training of new ways of thinking. And the second, teachers always have got one task set: to take possession of new pedagogical and information technologies.

The base components which form teacher's professional competence, in our opinion, are: the project and the research competence, the information and the personal-humanistic competence.

The project competence is a leading component of professional competence of the teacher. A modern and successful teacher should be competent in the following technologies: planning of the own activity; projection of the educational process and the individual development of pupils; projection of the innovative curriculum, the plan of the training course, etc.

Mastering of the research competences is command of the time. The teacher is an explorer of changes in educational sphere and works in conditions of changes: increase of volume of the scientific-methodical and the research components in structure of pedagogical activity.

The process of development of the research competences is long and also demands regular tracking of the productivity.

The research competence of the teacher can be defined as an ability and a readiness of the person independently and effectively to carry out the research activity, to predict its results and to put them into practice.

The research activity which forms the research competence, is a component of the teacher's professional work. The research competence can exist as an independent ability of the teacher, or can be shown as the special kind of the professional competence of the teacher.

The research activity allows expanding the set of necessary skills in professional work, that it is means of development of intellectual skills which, in their turn, provide success of any activity, in particular, the professional pedagogical activity.

Thus, the formation of the research competence is necessary, because it can be a universal way of the of any problem solving in the professional pedagogical activity. Besides, the innovative potential of the teacher is defined in the given conditions by a degree of its readiness for the research activity, which depends not only on its creativity, but also on a level of the following components formation : the motivational aspiration and the requirement to carry out the innovative activity; the methodological possession of the conceptual and theoretical bases of the research activity, the orientation in modern approaches to the decision of pedagogical problems, presence of own pedagogical position; the technological skill for carrying out a choice of an innovative problem and a subject of research, the skill to make the program of experimental work, the possession of a technique of development of author's programs, various ways of introduction of innovations in the pedagogical process and the ability to introspection of the activity and the pedagogical problems.

There is a representation in pedagogical studies that only this person can effectively influence pupils of any age who possesses certain set of «teacher's features». And when oftener the educational process is considered as art, then the greater accent is done on personal qualities of the teacher, especially at the decision of problems of educational process's optimization because the teacher passes its personal values to the pupils; the teacher reinterprets the purposes of their training and education on the basis of the analysis of the pupils' features; personal factors define style of pedagogical activity which renders the specific influence on pupils.

The modern training is the means of expansion of opportunities for cooperation of the teacher and the learners and the creation of absolutely new culture of training. Introduction of new educational technologies in educational process puts forward essentially new requirements to teachers: skill to create the special psychological climate, which is constructed on coauthorship and cooperation; mastering of the new pedagogical technologies; using of subject's knowledge for the more effective education of the person; development of computer techniques; ability to vital self-determination and an active creative position.

The pedagogical creativity is a basis that determines the professional competence. The teacher participates in the creative act – becoming of the new person, hence, the creativity is the most essential side of the teacher's activity. First of all, teacher's creativity is the faith in potential and opportunities of the child, the skill to see the social role in success of the learners, their moral becoming.

The professional experience is the essential factor that determines the attitude of teachers to

problems of perfection of their skill. The professional experience includes set of knowledge, skills, ways of activity and valuable orientations. The professional experience is reflected in style of activity which is shown in character of the forwarding purposes, problems and results of education, in the use of various methods and means of education, in breadth and depth of spiritual contacts to pupils.

Thus, one of the factors that influences improvement of the education's quality is the professional competence of the teacher which is reached by the optimum productive organization of the methodical preparation at municipal and regional levels.

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DIAGNOSTICS QUALITY PREPARATION STUDENT TO SOCIAL-ECOLOGICAL FORMATION SCHOOLBOY: ASPECT OF THE OBSERVATION AND TESTING

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A necessary element of the students training system for the schoolchildren social-ecological education is the diagnosis of quality of this training. In social-ecological diagnostics various students' characteristics are outlined on cognitive, activity, and personal level; the attitude of society to the problem of mankind and nature interconnection is defined in its global, regional, and local scale; the peculiarities of education process aimed for the formation of social-ecological readiness are revealed; necessary conditions that influence the outlined parameters are defined. For example, while defining the degree of students' readiness for social-ecological school children education we should reveal the condition of their theoretical preparation, their attitude to the natural environment, the condition of its optimization, relations with various competent social structures, personal involvement of each student into practical creative activity in nature.

Besides, it has been defined that the diagnostics include not only the content, nut also the corresponding methods. An approximate complex of social-ecological diagnostic methods is represented by the means of social, psychological, pedagogic, and ecological diagnostics. And the selection of sought-for methods from the outlined groups is carried out via definition of the greatest presence of any of them in each totality. As a result, we have outlined four major method groups:

– **monitoring:** observation, evaluation, content-analysis, prognosis;

– **questioning:** questionnaire poll, conversation, interview, testing;

– **mathematic methods:** statistic methods, definition of the tested totality;

– **modeling:** analog, logical, mind experiment.

The used scientific approaches, method groups of social-ecological students' education diagnostic, as we see, will allow us to establish an actual condition of their readiness to interact with natural environment, education of different society groups in this area, especially school children. The reveal of particular diagnostic methods essence formed the content of one of the objectives of this research, the next goal is to reveal the essence and functions of each method, its approval within experimental work. The outlined social-ecological students' diagnostic methods required their testing in experimental work. On this stage *observation* and *testing* were examined. The development of these methods' content was carried out considering principles that raise their effectiveness: continuance, systematicness, diversity, objectiveness, large-scale involvement.

Let us show the major results. Thus, the *observation technology* includes the following commonly-known steps: the definition of goals and objectives, the outlining of objecys, the development of the observation scheme, registration of the results, data processing (N.V. Kuzmina and others) [2].

According to the introduced algorithm and the matter of the research, we will describe each of the steps.

I. Observation goals.

1. Natural-science block

Observation objectives:

– definition of students' motivation in the area of interaction between the society and person and nature;

– reveal of students' awareness condition in the area of social-ecological interations (actual level of social-ecological students' knowledge);

– definition of the actual level of students' skills formation in the area of natural interaction (social-ecological skills);

– definition of the level of creative and emotional-value attitude of students towards nature.

2. Psychological-pedagogic block.

Observation objectives:

– students' motivation in the area of social-ecological school children education;

– definition of the students' knowledge on social-ecological school children education formation level;

– definition of the students' level of skills formation in the area of social-ecological school children education;

– definition of the students' attitude level towards the solution of the problems of ocial-ecological school children education (reproductive, search, creative);

– reveal of the condition of emotional-value attitude of the students towards the social-ecological school children education.

II. Observation object – the students' qualification in the area of school children social-ecological education.

As an observation object we took students of Belgorod State University, particularly of pedagogic specialities.

III. Types of observation – direct, immediate study of an observation object and indirect, that is carried out within the process of students' self-education in the problem field.

IV. Time and place of the observation – studies within students' groups on courses «Pedagogy», «Social-ecological school students education», «Ecological pedagogy and psychology».

V. Observation plan.

Within the plan formation process a remark by N.I. Shevandryn was considered. It underlines that an observation is mostly effective in the following situations:

– acquirement of the psychic phenomenon data in its "clean" form;

– collection of the initial data that does not require large selection of the studied objects;

– evaluation of facts that have been acquired via different methods;

– recommendation check, etc [3].

In our research a collection of initial data on students' attitude towards the necessity of school children social-ecological education on motivation, emotional, cognitive, and activity level was carried out. The search was carried out at courses 4 and 5 of the Geological-geographical faculty of Belgorod State University, within the process of ecological-pedagogic disciplines mastering. An observation matter here was represented by verbal and non-verbal students' communication at classes.

VI. Registration form – table, which form reflects the major studied parameters.

Another method of students' readiness diagnosis in the area of social-ecological school children education that we would like to underline was the *testing*. According to the common test composition algorithm (N.V. Kuzmina and others) their content has been developed by us, and in the studied context test peculiarities have been defined. The algorithm includes: the pedagogic research goal, its objectives, objects, material on which the task is based. More detailed stages list is illustrated by A.N. Mayorov: the definition of testing goals, developers' resource abilities definition, material content selection, construction of technological matrix and its expertise, composition of test tasks and their expertise, formation of tasks' and tests' approval selection, approval tasks arranging, test tasks' approval, definition and evaluation of the test tasks' quality indexes, tasks' sorting out and test composition, test approval, definition and calculation of test indexes, definition of the test final version, text standardization, test provision [1].

Within the process of the outlined stages' passing we have also considered some definite requirements: content validity, or correspondence between the training content that is reflected in the logical structure and expressed in definite educative elements, in other words, in one test there must be one problem of the fixed definition level. It means that a test task must be formulated clearly and definitely, so it is equally apprehended by all the tested. Another factor is the definiteness of a stage within which complete and correct solution (or solution variants) of the problem must be contained. We should add that in the studied diagnostic achievement tests were developed as well. They are traditional evaluation tools in an education system.

So, according to the introduced full algorithm (A.N. Mayoriv) and the requirements, let us show the algorithm of the approximate tests tasks creation for the diagnostic system in thearea of students' social-ecological education.

Testing goal – evaluate the students' readiness in the area of school children social-ecological education.

Usage level – professional needs.

Resource facilities – orientation for static evaluation methods. Need for specialists involved into the static data procession.

Content selection – carried out in accordance with the diagnostic blocks of students' social-ecological education. Main block: social-ecological skills and knowledge, experience in creative and emotional-value students' attitude towards nature; students' competence in the area of school children social-ecological education.

Technological matrix (specification table, test grid) – formed on basis of students' courses «Social ecology» and «School children social-ecological education». Test grid of the course 2Social ecology» (V.A. Sitarov, V.V. Pustovoitov, Social ecology, – Moscow, 2000) consists of two major divisions: *«Course content»* and «*The number of questions*». They include some definite content, upon which the corresponding test tasks are composed: Introduction (2 questions), Social-ecological interaction and its subjects (6 questions), Global social-ecological problems (3 questions), Ecological ethics (3 questions), Ecological culture (2 questions). In total: 16 questions.

Test grid of the course «*School children social-ecological education*» is represented as follows: Introduction (2 questions), Social-ecological concepts in philosophy thought history (38 questions), Social-ecological ideas in the pedagogic thought history (85 questions), School children social-ecological education: essence and objective aspect (13 questions), School children social-ecological education content (14 questions), The process of school children social-ecological education. Formation technology of the school children social-ecological education content (12 questions). In total: 164 questions. Afterwards a development of each test task and its expertise is carried out (up to date we have developed 70 test tasks).

To sum up the exposition of some research results, we would like to outline, that by now the testing problem is developed quite well. Here a special attention is paid to the necessity of some requirements meeting. To the number of necessary minimum of test tasks composition A.N. Mayorov refers, for example: instruction presence, task text of question, correct answer [1]. These requirements exactly were considered within the process of our tests' creation and their correspondence to the test grid was established. We should add that the major function of the testing, besides the very control function, is its educative, upbringing, and developing function. Test tasks were formed so that students obtained all the information they need from its content. That information will broaden their scientific outlook, influence their knowledge and skills level advancement, their personal qualities.

References

1. Mayorov A.N. Education system tests creation theory and practice. – M., 2000.

2. Methods of system pedagogic research / Ed. by N.V. Kuzmina. –M., 2001.

3. Shevandrin N.I. Social psychology in education. – M., 1995.

4. Shilova V.S. School children social-ecological education. Monograph. – M., Belgorod, 1999.

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INFORMATION TECHNOLOGY IN PROCESS OF PREPARING THE FUTURE TEACHER TO SOCIAL-ECOLOGICAL FORMATION SCHOOLBOY

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Present time is characterized by the broadening of various life and social activity areas' informatization. The informatization spreads into both science and education, including all its stages. Under informatization nowadays we mean a complex of measures of the pedagogical processes transformation based on the introduction of informative products, means, and technologies into the upbringing and education. According to a number of scientists a penetration of new information technologies into education forces us to study the didactic process as in informative one, within which a student obtain information, process it and use.

The education informatization, according to Y.S. Branovskiy, should be studied not just as usage of the computer and other electronic means in education, but as a new approach to the education organization, science branch that is called pedagogical information science. The courses of information study, psychology, pedagogy, and quotient methods are, as points out Y.S. Branovskiy, the basis for the study of pedagogic information study. Within it the problems of computer didactics, pedagogic labor informatization, the implementation of informative environments for the common subjects learning, usage of informative study methods, informative training environments synthesis (multimedia), education systems that are based on multimedia approach, and the new education and training model creation tool are investigated. This model is based on the advancement of student to the construction of knowledge structures, the methods of electronic textbooks implementation.

Besides, Pedagogic information science is defined as a scientific-methodic direction that develops theoretical problems, methods, and technologies of informative provision an and pedagogic activity automatization in order to improve the pedagogic process, individualize and optimize it. On the whole, pedagogic information science studies the problems of interaction between education and information science, reveals trends and legislations of this interaction. Pedagogic information science forms on the joint of information science and a number of pedagogic sciences, it has its own conceptual apparatus, goals, methods etc [1].

An important factor of the education informatization is, according to Y.S. Branovskiy, information culture of a pedagogue, the tutors' readiness to implement informative technologies in education. To solve this complicated problem personnel training to use new information technologies (NIT), formation of pedagogues' information culture, including social-ecological education of the studied youth are required [1].

On the whole, nowadays in Russia the Education Informatization Concept has been developed. Its main points are: mastering and introduction of new information technologies into education, training and education management on basis of research work in dialectics, information science; formation of the information culture within scholars (information knowledge, computer and other electronic devices education skills, basic programming skills); shifts in content, methods, means, and forms of education in relation with the information technologies integration into the education process; tutors' training for the implementation of electronic devices in education.

Outlining the special features of the modern Education Area Informatization Concept of Russian Federation V.A. Izvozchikova and I.V. Simonova rightfully draw our attention to the following points:

– the acknowledgement of high development potential of the information science and of its science status;

– the concept of subject information science area that corresponds to modern outlook;

– module concept of the studied subjective area in contrary to the discipline concept that has been used previously [2].

Authors outline that wide and deep education system informatization in our country is a result of the realization of ideas that have been provided not only in «The Concept of Education Area Informatization in Russian Federation» (1998), but also the accepted federal target program «Electronic Russia» that has been estimated for 2002-2010. These programmes imply irreversible development of the world level information technologies in Russia, first of all, in education.

According to a number of researchers, new information technologies in education include three components: technical devices, program applications, and educational provision. Important components of information technologies are programmes that manage the computer operations and those that attend to these operations. However, the main information technologies component from the position of dialectics is the educational provision. It is, in fact, a special class of programmes – education programmes, education systems that define and determine the process and the technology of the computer training.

All mentioned fully corresponds to the system of students' education in the area of the natural environment, their preparation to the social-ecological upbringing of new generation. Thereby, we would like to say that nowadays all necessary conditions for it have been outlined and developed by us. First of them are the technical devices (computer technique). Modern education is characterized by a wide spread of personal computers, the appearance of new information techniques, usage of network technologies of full-time, extramural and distant education.

The next necessary condition is the program provision that is a specialized application pack, program products and computer components. Exactly these things provide for the formation of practical skills and information analysis practice, self-education in the information technologies area, stimulating the independent activity in the information process.

No less important condition is a specially-prepared educational provision. By today we have developed the following material for students, that are studied via information technologies: course programmes «Social-ecological scholars education», textbook «Pedagogical basis of social-ecological scholars education», tutor's manual «Nature and ancient civilizations».

Besides, a version of electronic training course «social-ecological scholars education» has been developed and is being approved. It contains the following categories:

1. *Social-ecological concepts in history of the philosophical thought*

1.1. Philosophical roots of the idea of the nature and society interconnection (philosophical inheritance of the Ancient East nations on nature, society, their relations; philosophical inheritance of the Ancient Mediterranean nations on nature and society, their interaction and relations; social-ecological ideas in the philosophy of ancient Greeks; social-ecological ideas in the philosophy of ancient Romans).

1.2. The development of the ideas of nature and society interconnection in opinions of medieval thinkers (social-ecological ideas of the Easter nations philosophical thoughts (IX–XVII centuries); the development of the social-ecological ideas in the Western Europe nations philosophical thoughts (V–XVII centuries); social-ecological ideas in the period of the capitalistic relations origin; social-ecological concepts from the end of XVI century up to the end of XVIII century; social-ecological concepts from the end of XVIII century up to the end of XVX century).

1.3. Social-ecological ideas in Russia (the formation of social-ecological concepts in Russia (IX – the beginning of the XIX century: social-ecological ideas in the end of XIX–XX century).

2. *Social-ecological ideas in the history of pedagogic thought.*

2.1. Social-pedagogical ideas in the pedagogical inheritance of ancient nations (social-ecological ideas of the pedagogic thought of the Ancient East people; ancient pedagogic concepts on the natural impact upon a child development).

2.2. Upbringing value of nature in medieval foreign pedagogy (social-ecological ideas in pedagogic opinions of medieval thinkers in V–XVI-II centuries; Social-ecological ideas in the ideas of pedagogues-thinkers of XIX–XX centuries).

2.3. Social-ecological ideas in Russian pedagogic thought (social-ecological concepts in Russian pedagogy of IX – XIX centuries; social-ecological concepts in Russian pedagogy of XX–XXI centuries).

3. *Social-ecological scholar education.*

3.1. The essence on value character of social-ecological school children education (the essence and general legislations of social-ecological school children education; value character of school children social-ecological education).

3.2. Values, goals and objectives of social-ecological school children education (axiological premises of the formation of social-ecological school children education).

3.3. Principles of the social-ecological school children education formation.

4. *The content of school children social-ecological education.*

4.1. The essence, criterions, sources, and selection principles of the social-ecological school children education content.

4.2. The peculiarities of social-ecological school children education content (content structure of social-ecological school children education; prognosis normative content realization).

5. *Social-ecological school children education as a process: the essence, content, and peculiarities.*

5.1. The essence and peculiarities of social-ecological schoolchildren education process.

5.2. The complicity of social-ecological school children education process.

5.3. The technology of social-ecological school children education process formation (on the basis of objective approach).

The course is finished by the test on all categories. The approval of the complex is carried out on foundation of Belgorod State University, particularly within the process of training geography, biology, and life safety tutors.

To sum up, we shall again outline the necessity and possibility of usage of information technologies within a higher education institution education process, and not only within the very process of professional training, but also of personnel training process, that will be able to solve social-ecological problems, establish harmonic relation with the natural environment, upbring new generation for an optimal interaction with nature.

References

1. Brnovskiy Y.S. Introduction into the pedagogic information science. – Stavropol, 1995.

2. Informology, information science, and education / Ed. by V.A. Izvozchikova and I.V. Simonova. – M., 2004.

3. Shilova V.S. Social-ecological schoolchildren education: monograph. – M.-Belgorod, 1999.

4. Shilova V.S. Pedagogic basis of social-ecological school children education. – Belgorod, 2003; 2010.

5. Shilova V.S. Nature and ancient civilizations: student textbook. – Belgorod, 2003; 2010.

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Short Reports

MAIN FACTORS INFLUENCING SUCCESSFUL CAREER

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Education, competence, professionalism, ability to educate themselves non-stop have become the measure of the importance of a modern person in the society. The range of life goals of a person who constantly self-educates is being expanded, and the probability of achieving them dramatically increases, while education is not only a prerequisite for a successful career, but a pass to the other, more saturated and vivid life, a different social environment.

Despite the fact that the significance of many professions that require higher education has declined, there are some changes, proving that this negative trend is ephemeral and is associated with major structural changes in various spheres. The necessity to improve the training system, creating a society where education, skills and professionalism define the social status of individuals and the prestige of various jobs raise questions of professional development of specialists, professional environment and ways of self-promotion in it.

The process of professional self-promotion is often considered in connection with the process of achieving success and building a career. D.E. Super divides success into professional and career. Professional success, in his view, is self-estimation of professional level achieved, the individual person's perception of how fully his abilities are used and how broad his opportunities for self-expression offered by a particular profession are. To estimate the career success vertical mobility in professional space is important, and the person appreciates not only the level but also the tempo, speed, time of promotion. Overall assessment of a successful career is made up of the relations of objective and subjective assessments of achievements both professionally and in business [3].

The necessary conditions for building a successful career are the personal factor, the need for achievement and self-fulfillment, forecasting professional future.

Today's youth is trying to achieve success in the process of professional and personal self-determination. The success of the individual is often assessed from the perspective of its material prosperity, pragmatism, individualism, and mobility. [6] In modern social reality young people are dominated with pragmatic motivation: job application and (or) further education abroad [1]. The knowledge of foreign languages helps young people to open new wide horizons.

In the process of developing their personal and professional capacity people face the contradiction, when their closest professional environment has already mastered, but there are still some reserves for further growth. One of the ways to solve this problem is the continuing professional education [2].

Tolochek V.A. considers a career as:

– Professional promotion, professional growth, transition from one professional stage to another;

– Dynamics and the whole sequence of stages of human development in basic areas of life (work, family, leisure);

– Dynamics of socio-economic and status-role positions;

– A form of social activity of people;

– The success of human life;

– People's desire to achieve a definite status which allows them to meet their needs more fully;

– Active promotion of human in their development and improving the ways of life that ensures their stability in the social life;

– A successful life as a whole;

– People's own judgments of successes and failures;

– Relationship of personal and professional development of the individual [4].

We can single out the most important psychological components of career. They are nature of goals which are set by people when they start their social activity, a system of motives, a degree of actualization of specialist's skills.

We can identify the following mechanisms of a career process:

– Internal sources – activity, energy of a person;

– External sources – social environment (needs, interests of society, etc.);

– Competition.

The career strategy is a way of promotion designed to make optimal use of the driving mechanisms, and weaken the effect of any constraints and resistance.

The process of professional self-promoting in the professional environment is initiated by the external environment, as well as by the personal development and is one of the most important manifestations of mental development of a person, his becoming a full member of the society of professionals and – more broadly – of the social community as a whole [7].

The modern idea of a successful career includes a number of conditions for effective adaptation of graduates in the labor market, namely: to relate to career development adequately, to be informed of employment in certain professional fields, to develop the ability to look for work and develop the competencies demanded in the labor market. One of the most significant of these is the linguistic competence [8].

The research, conducted by the Centre The Economist Intelligence Unit, gave the forecast of major trends of the global labor market in the next 15 years. Thus, a further growth of companies will lead to the need for efficient use of labor resources and establish new economic links between the participants in the global market, increasing the demand for professionals who speak foreign languages. Hired professionals must possess the following qualities: communication skills, creativity, flexibility, openness, mobility, ability to respond adequately to the tasks and make the necessary decisions [5].

We should mention the strengthening international labor migration which affected our country as well. Dynamic transformations of social reality in modern Russia produce a number of objective and subjective factors that stimulate professionals to get additional education. The expansion of the communicative environment and the need to use innovative technologies, the Internet as professional tools of the modern person increase the importance of foreign languages.

Knowledge of foreign languages ensures that graduates are prepared to work productively in global educational and professional environment, to expand the professional needs of the individual, to improve the quality of training, to provide professional development of a specialist.

A foreign language is one of the major factors in the success of future specialist training, the formation of his ideas of the diversity of the surrounding world and his rapid adaptation to changing conditions of life and work, as well as his self-promotion in the professional environment.

References

1. Dorokhova S.V. In-depth study of a foreign language by junior students in the idea of teachers and parents // Psychological Science and Education. – 2007. – № 1. – P. 103-107.

2. Ismagilov D. Career Development Center as acmeologic technology of professional development of managers of enterprises [electronic resource]. – Electron. text, graph., Sv. lan. and applied. progr. November 18, 2005. – Http: // flogiston.ru / articles / labour / center_akme.

3. Personality and occupation: psychological support and maintenance / study. Textbook for students of Higher. Ped. Institutions / L.M. Mitina, Y.A. Korelyakov, G.V. Shavyrina and others, ed. L.M. Mitina. – M.: Publishing House Academia, 2005. – 336.

4. Tolochek V.A. Modern psychology of work. – St. Petersburg: Peter, 2005. – 479 p.

5. Trends in the labor market in the world and Russia. 01.03.2008 [electronic resource]. – Electron. text, graph., Sv. lan. and applied. progr. (56 Kb). -Http: // jobeasy.ru / index.php? Fn = show_news & prm = 124.

6. Shamionov R.M. Notions of social success and self-determination of youth [electronic resource] / R.M. Shamionov, A.R. Tugusheva // Electronic Journal «Psychological Science and Education». – 2009. – № 3. – Www.psyedu.ru. – ISSN :2074-5885.

7. Yudenkov O.N. Career self-determination of graduates and the possibility of their careers [electronic resource]. – Electron. text, graph., Sv. lan. and applied. progr. (40,5 KB). – Http:// www.kspu.ru/folders/__x-folder-webcache/1/Konferencii_po_uchebno_metodicheskoi_rabote/2006/

8. Zikic J. Job search and social cognitive theory: The role of career-relevant activities / Jelena Zikic, M.Alan Saks // Journal of Vacational Behavior. – 2009. – №74. – P. 117-127.

GEOPOLITICAL MEASUREMENT OF THE CENTRAL ASIA REGIONAL ANTAGONISMS

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Some aspects of existing geopolitical influence factors reciprocal are studied in the article as well as separate political, ethnic, and geopolitical antagonisms in modern Central Asia. According to the author, a formation of such antagonisms is linked to both new political realities that formed after the Soviet Union collapse, and some fundamental historic-geographic factors. New geopolitical authority disposition basically determines domestic and regional political processes that have rather complicated structure of differently-aimed objectives and, at the same time, influence the appraisal of mutual regional problems.

Keywords: geopolitical measurement, antagonism, Central Asia

After the world socialism system collapsed an era of two political influence centres war-strategic confrontation ended. It seemed that the formed double-pole world image only proved the axiom of not just two super-states, USSR and USA antagonism, but a contradiction between two world structures, views and ways of life, values and thoughts. However, the collapse of the «iron curtain» pushed both social thought and political practice, especially in post-soviet contries, to the search for new analysis and estimation of post-communist period political realities approaches. Particularly, an implementation of geopolitical science principles and methods to study separate regional problems provides for a deeper apprehension of undergone political processes in these countries.

Among different areas of the Central Asia states activity, the foreign-political direction plays the major role. In is linked to the unique geopolitical location of the region. A Central Asian peculiarity here is that the region is situated right in the middle of the huge Eurasian continent and is distant from the shores of the world ocean. Here on Kazakhstan territory is where the most distant from the ocean shores land point is located. It is situated approximately in the Notrth-east Seven-rivers region. There is no other place on the planet that is located on a bigger distance from an open-sea shore, than Central Asian territory [1].

In this relation two geopolitical constants have a significant impact on the region's condition: areal location and geographical distance. Central Asia is surrounded by neighbor countries' territories and in fact is an enclave region. Such position is complicated by the second circumstance – it suffers a great influence from its neighbor countries and, in particular, Russia and China. Sovereign foreign policy of the countries is significantly defined by their free access to so called open area of the world ocean and air space above it. For the region states this ability is seriously restricted. That is why for them a geopolitical direction implementation is strictly dictated by the existing geopolitical determinant.

No less important geopolitical facto significance index is economic relations. Created during the Soviet authority, national enterprise complex united scientific-technical, transport-communication, and production-technological economic area of different republics into one. A resources periphery role was played by the region's economy within so called socialistic labor division system. It means that region's economic infrastructure had expresses resource orientation. National economies of nowadays sovereign countries are still ones of the recipient type but are able to function in self- sufficient regime. In this case the region development without the creation of openly-functioning economies seem to be problematic at least because the consumer market of the region has little capacity because of its low purchasing power. Thus, during the independent period three post-soviet republics – Kirgizia, Uzbekistan, and Tadjikistan appeared to be the countries with low income level, Turkmenia – with income below the average level, and only Kazakhstan's income is above the average level [2]. Therefore, geopolitical aspects of different Central Asian countries' economies imply their active participation in the process of world-enterprise relations internationalization, undergo of the structure modernization in order to create modern economic branches found on the existing competitive advantages as well as strengthening of the regions integration to form new goods, services, and capital markets.

One more important factor that has a significant influence on the countries' foreign political direction formation is the region's place in geographic coordinate of modern world policy. If we look at the world political map, we can see the special feature of the region's location in modern political space. From the out-

side on a significant part of its territory it is surrounded by the two largest territorial countries in the world – Russia and China. These states that pretend to become over-states in a short-time period with special global political interests are able to directly and indirectly influence the surrounded countries' foreign policy that can significantly restrict the abilities of small neighbor countries to implement independent policy of the world arena.

If we speak of the foreign political influence factors coming from Russia to Kazakhstan for example, they are determined by the following geopolitical factors. Not so acute nowadays, but still actual problem of the «Northern territories». «Kazakhs consider Russians to be the Slavic minority in their country, while Russians organizations see them as an enclave within a bigger Slavic territory that include Russia, Ukraine, and Belarus» [3]. Interest to this problem is caused by the following geopolitical circumstances. A predominance of Russian population in the ethnic region structure that is in possession of rich natural resources and also has war-strategic interests that are linked to the maintenance of South-east Russian borders safety. So while defining its foreign political direction Kazakhstan cannot ignore these factors impact. However, it has its positive side. Two neighbor countries have ability to develop mutual profitable cooperation in economic, war-strategic, and scientific-culture areas. Another geopolitical constant that significantly influence relations between Russia and Kazakhstan is exposed in the territorial regulations factor. Great territorial extent of Russian from East to West and a significant mutual governmental border line restricts Kazakhstan's abilities to carry out its foreign political direction m especially in the area of trade and economic interests where they appear to be competitors. For example, in the hydrocarbons and nonferrous minerals prospection and transportation area. For Kazakhstan great distance from their foreign trade partners directly increase not only economic, but also political costs that are linked to the geopolitical significance of its Northern neighbor. Russia always can, if it is necessary, take definite political decisions to restrict foreign economic Kazakhstan interactions with the third party, when Kremlin thinks that a serious damage to the Russian national interests is possible. The examples of the big Kaspian oil route definition export hydrocarbon, ferrous and nonferrous minerals that are supplied by Kazakhstan for the foreign market tariffs, and artificially long period of oil-pipeline Tengiz – Novorossiysk are just the confirmative facts.

The Chinese factor impact upon the region geopolitical situation is displayed differently. For example, the problem of water supply restrictions is especially actual for Kazakhstan. Major water arteries of Kazakhstan are transit rivers which origins are situated outside the country. Because of the number of reasons, these transit rivers regime is not regulated legislatively. So China's location upper along the two greatest rivers channels – Irtysh and Il – gives it actual advantage in one-way water resource usage, particularly in defining the amount and regimen of its usage. Thus, after the start of Irtysh-Karamay channel in 2020 China plans to collect 1 bil. cubic metres of water from Irtysh each year while the total amount of the river drain is 9 bil. cubic metres [4]. Eastern Chinese borders are being roughly developed in economic area. It requires an increase in fresh water consumption. However, for Kazakhstan it can turn to be ecological cataclysm. Il or Irtysh shallowing will lead to the Balkhash dry out and northern regions will suffer fresh water deficit for production and household consumption. In totality with the Aral problems it can lead to full-scale ecological problems in the region.

Processes of population dynamics in Central Asia are becoming a serious geopolitical problem. If in some countries, like Kazakhstan a significant population decrease is obvious, in Uzbekistan we can observe its serious growth. A considerable demographic disbalance has already created some tensity within the region. However, a potential impact of the demographic factor coming from China can bear much more serious demographic consequences. Regardless of the birth restriction policy and high economic growth dynamics an acute surplus population problem is present in the country. «According to the official estimation the surplus labor in villages equals 150 million people, and the unemployed townsfolk – 16,2 million people, in other words, a total «unemployed army» in the country has exceeded 166 million people, 22 % of the population able to work» [5]. A huge mass of potential immigrants will not only shift within the country, but also look for a better living abroad. Though this problem is not sensed by the region so acutely, in close future it can become a high ethnological tensity factor.

New hotspots have added to former conflict hotbeds. Xinjiang, Fergana, Osh region, separate Tajikistan areas represent the insta-

bility zone, for which Afghanistan serves as a basis of instability, fed by some definite forces from the outside which are interested in the region's political unsteadiness. As it adds to the common trend of the Islam role strengthening not only in religious-household, but also in politic-ideological area, a problem of national self-definition in the region might obtain the status of sacred fighting «unfaithful» not only outside the countries, but also within them. In case of further worsening of the Central Asia economic situation and subsequent impoverishment of the population majority slogans of the Islam state creation and calls to destroy soviet regimes can find support within the most of the Central Asian republics' population. It is obvious that such prospects of the region instability strengthening that are linked to the geopolitical alteration in the politic authority disposition and dictate the necessity to strengthen both interstate and regional contries' cooperation, international organizations, social movements in order to broaden mutually profitable international processes and security in dual-side format and on regional level.

References

1. Great geographic atlas. – M.: AST, 2009. – 222 p.

2. New look at the economic geography. World development report 2009. – M.: All World, 2009. – 351 p.

3. «Russian problem» in independent Kazakhstan: history, politics, identity / M. Laruel, S. Payrus. – M.: Ed. Natalis, 2007. – 310 p.

4. Report on Central Asia man development / United Nation Development Programme regional bureau of European and CIS countries. – 2005. – 104 p.

5. The Chinese peasantry migration / V. Gelbras // Questions on economy. – 2005. – № 5. – P. 96.

THE LOGICAL SCHEME OR-NOT IN THE NETWORK RECTIFIER CONTROL SYSTEM

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A new scheme of a semi-controlled network rectifier for a secondary supply of an inverter type where a complicated rectifier control system is replaced by a simplified control system executed as a logic scheme «OR-NOT» consisting of three optoelectronic pairs and a transistor key and an impulse-phase control system is offered.

Keywords: an impulse-phase control, a logic scheme, optoelectronic pairs, a transistor key

Single-phase secondary power supplies containing a network rectifier with a filter condenser at the output and a one or fuo-stroke inverter connected with it have bound a wide application both in installations of small and big (up 10 kw) capacity (inverter werding devices, single- phase plasmotrones, special electric drives etc).

It is know that at the voltage of 200 V according to the restriction rule of rectified voltage pulsations (the range is 10 ± percent) the capacity of a filter condenser should be about 1000 mf per 1 kw of capacity [1]. At such capacities it is necessary to restrict the charge current of a filter condenser when a power supply is switched on. Two methods are usually applied to restrict the charge current: resistor in series with a filter condenser switched on during a charging time with its subseguent shunting; condenser charging by a semi-operated rectifying bridge with a phase control. For single charging of a filter condenser from a network of ~200 V the energy $W = C\frac{\left(U\cdot\sqrt{2}\right)^2}{2}$ is reguired, at the capacity of 1000 mf it will make:

$$W = 10^3\cdot 10^{-6}\cdot\frac{\left(220\cdot\sqrt{2}\right)^2}{2}\approx 48\ Dg.$$

It is obvious that at capacities above 1 kw the second method is preferable from the economic point of view. Besides, in emergencies locking out of a rectifier is necessary but is feasible only for an operated or semi-operated network rectifier.

A semi-operated network rectifier in common schemes is supplied by means of an impulse-phase control systems and secondary power supply protection and the necessary rate of filter condenser charging is set by a forming R-C circuit at the input of an impulse-phase control system. To provide the supply of an impulse-phase control system and synchronize it with the supply network the network rectifier control system in addition to an impulse – phase control system contains power and synchronization units. It complicates the secondary power supply as a whole.

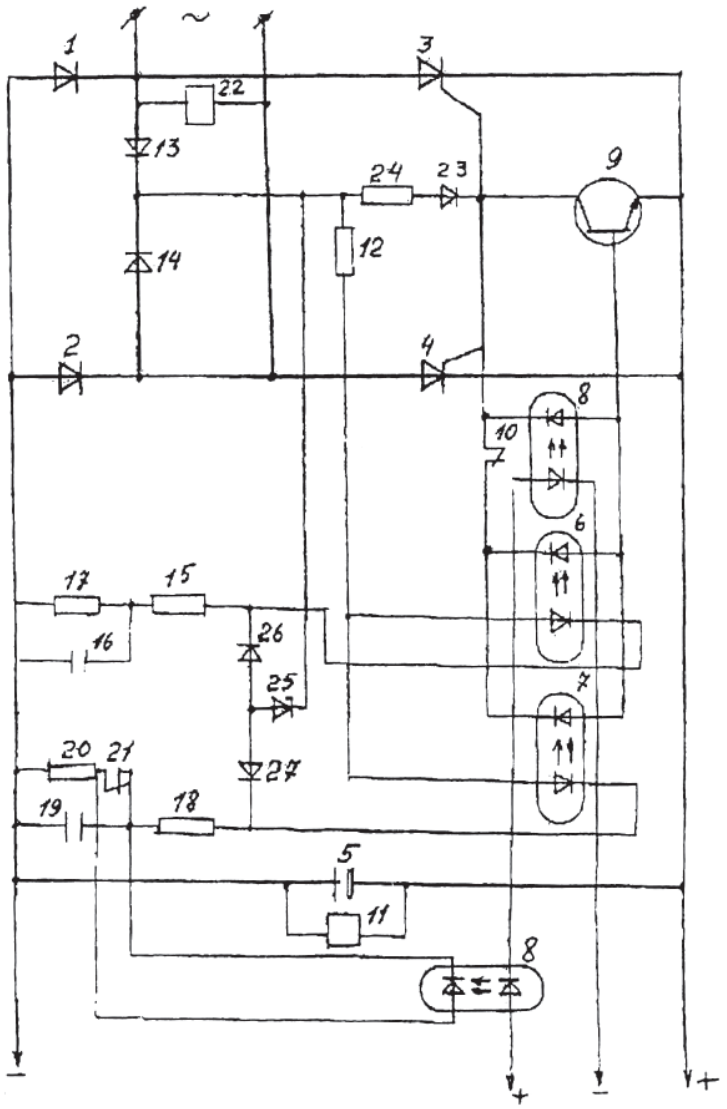
The complexity of the network rectifier control systems for a secondary power supply of an inverter type is not justified as regulation functions of output coordinate (voltage, current) are usually performed by an inverter and control over a network rectifier as was stated above is necessary only for smooth charging of a filter condenser and locking out of a network rectifier in emergencies.

Simplification of a control systems is achieved by means of a logical scheme OR-NOT consisting of three optoelectronic pairs and a fransis for key instead of a power and synchronization unit and an impulse-phase control system.

The logical scheme in the control system is given in Figure.

The new control systems is executed as a logical scheme OR-NOT containing three optoelectronic pairs 6, 7, 8, and transistor key 9, the latter being included in a conducting direction between controlling electrodes of thiristors 3, 4 of a network semi-operated bridge rectifier and common cathodes of these thiristors, the controlling electrodes of thiristors mentioned above 3 and the controlling input of transistor key 9 are shunted in a non-conducting direction by photodiodes of optoelectronic pairs 6, 7, 8, mentioned above ,so that photodiodes of the first and second optoelectronic pairs 6, 7 are connected to shunted points via opening contacts 10 of voltage control relay 11 at filter condenser 5, and one of two photodiodes of the third doubled optoelectronic pair 8 is connected directly to shunted points, the coil of voltage control relay 11 at filter condenser 5 is included in parallel to a filter condenser, photodiodes of the first and second optoelectronic pairs 6, 7 are connected by means of anodes via ballast resistors 12 to the plus output of a diode bridge , formed by two diodes 1, 2 with common anodes of a network semioperated bridge rectifier and two additional diodes 13, 14 with common cathodes ,photodiodes cathodes of first 6 and second 7 optoelectronic pairs are connected each to its own forming R-C circuit ,the first forming R-C circuit contains resistor 15 and condenser 16 in series with ,the condenser is shunted by discharge resistor 17, the second

forming R-C circuit also contains resistors 18 and condenser 19 in series with it, the condenser is shunted by its discharge resistor 20 via parallel opening contacts 21 of network voltage control relay and the second photodiode of the third doubled optoelectronic pair 8,network voltage control relay coil 22 is included into the power network, and free terminals of condensers 16, 19 and discharge resistors 17, 20 are united with the common minus output of the diode bridge mentioned above and network semi-operated bridge rectifier 3, 4, both photodiodes of the third doubled optoelectronic pair 8 are in series with the corresponding output of the device protection system, and the common point of the controlling electrodes of network semioperated bridge rectifier thiristors 3, 4 is connected with the cathode of cutting diode 23, the anode of with via additional limiting resistor 24 is connected with common cathodes of the diode bridge mentioned above 1, 2 and with stabilectrone cathode 25, the anode of which is



united with the anodes of two untying diodes 26, 27, each attached to one of the forming R-C circuit by cathodes.

It has allowed to simply essentially the control systems as a whole by replacing the power and synchronization unit as a whole as the system of impulse phase control by a simple logical scheme.

References

1. Magazinnik A.G., Magazinnik L.T., Magazinnik G.G. Correction of the capacity factor of singlephase secondary power supplies // Electrical energy. – 2001. – Vol. 5. – P. 40-42.

2. Patent 2219648 Russian Federation. A network rectifier for secondary power supplies of an inventor type / L.T. Magazinnik, G.G. Magazinnik. – 2003. no 35, 20.12.2003.

A BRIDGE INVERTOR WITHOUT A CONSTANT COMPONENT OF AN OUTPUT VOLTAGE

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One- and two-cycle inverter circuits, their advantages and disadvantages are considered. A new bridge inverter circuit including additional low-current elements is offered. The device allows us to reduce dimensions of a power synchronizing transformer, dimensions of a smoothing choke, a magnetizing current and losses accordingly.

Keywords: a galvanic outcome, an integrator, a comparator, a magnetizing current

A single-phax bridge transistor inverts are applied in various secondary power supplies, e. g. in audio and video devices in electrowelding devices etc.

Welding devices of an inverter type containing power supplies (a network rectifier), an actual inverter, a matching power transformer connected to an inverter via a primary winding and to loading [1] via a secondary winding and a diode rectifier are widely known.

Inverters in the installations listed are carried out under a single-stroke scheme that leads to inefficient use of a matching power transformer and a smoothing choke, to the necessity of having a transformer with an air clearance in the core and, consequently, to the increase of magnetization current and losses. The specified lacks are appreciably compensated by frequency increase of the converter, however losses in a semi-conductor part of the inverter (power transistor, diodes, snubbers) grow and the requirement to semiconductor base frequency characteristics increase. It results in the growth of cost.

A two-stroke scheme of the inverter (e.g. a semi-bride one [2]) is deprived of the abovementioned lacks of one-stroke schemes but provides an inefficient use of switching condensers and the main thing , a condenser built into an inverter power circuit causes nonlinearity of the external characteristics of a device. In [2] a two-stroke bridge scheme of an inverter where the efficiency of a switching transformer is 4 times as higher in comparison with a semi bridge scheme is presented , but a condenser built in series with a secondary winding of a power matching transformer results in voltage resonance and disables the scheme.

A «classical» two-stroke bridge inverter scheme with an inverse diode bridge [3] has the best characteristics. But when used for transformer loading it posesses the lacks stated above. The control of the inverter is usually carried out by means of pulse-width modulator, the typical one- and two-stroke schemes are given in [2, 3].

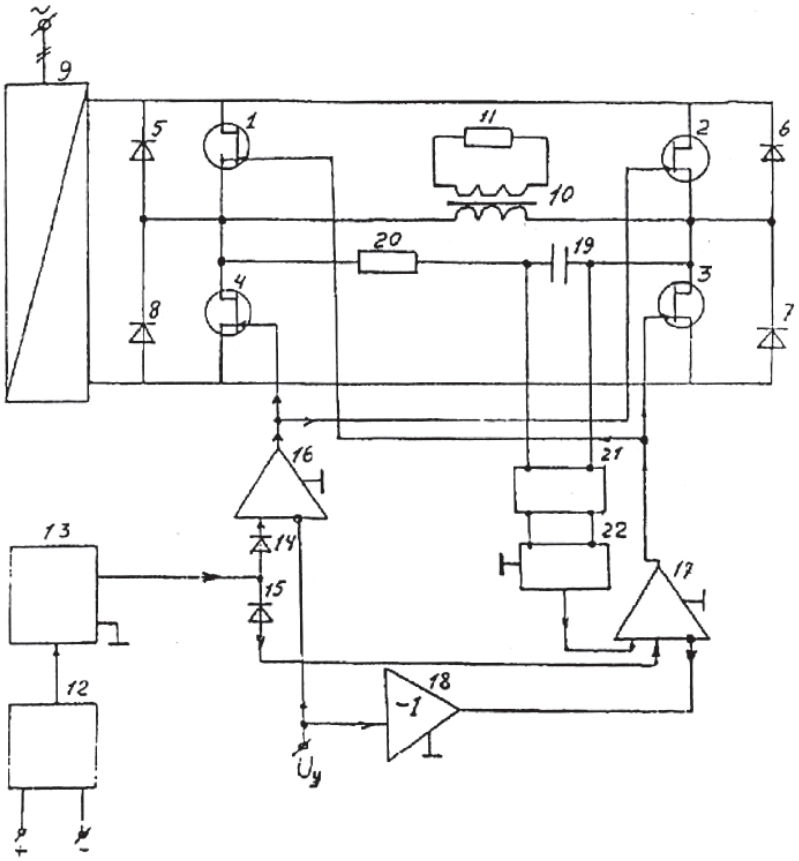
In any two-stroke scheme of an inverter without condensers an asymmetry in the output voltage curve in a power circuit is inevitable because of technical disorder of parameters of separate inverter elements and, as a consequence, a constant component in output voltage may appear. The latter in its turn, makes us to employ a power matching transformer with an air clearance. Dimensions and magnetization current of a transformer are increased accordingly and advantages of a two stroke-scheme over a one-stroke one are brought to naught.

The device scheme allowing to exclude a constant component in the inverter output voltage is presented in Figure.

In the power part the scheme contains a bridge inverter as a single- phax transistor bridge (1, 2, 3, 4) shunted by inverse diode bridge 5, 6,7, 8 which is connected to power supply 9 via a direct current diagonal and to loading 11 via an alternating current diagonal and power matching transformer 10. The control system is a typical two-stroke width-pulse modulator containing two-stroke autooscillator 12, its output being connected to sawtooth voltage two-stroke oscillator input 13. This voltage arrives at the first inputs of comparators 16, 17: plus arrives at the first input of comparator 16, minus at the first input of comparator 17 via dividing diodes 14 and 15.

The control signal U_y arrives directly at the second input of comparator 16 and via logic inverter 18 at the second input of comparator 17. Output of comparators16 and 17 are connected to corresponding inputs of diagonal pairs of transistors 2, 4 and 1, 3. For simplicity galvanic outcome and intermediate strengthening elements between comparators output and control inputs of transistors 1, 2, 3, 4 are not shown in Fig.1. Thus, the scheme in Fig.1 repeats the scheme described in [3]. Some additional elements are included : a R-C circuit consisting of condenser 19 and resistor 20 in series is built in in parallel with a primary winding of transformer 10. Integrator 22, the output of which is connected to the third input of comparator 17 is connected to a condenser via galvanic outcome unit 21.

It is necessary to notice that all additional elements including condenser 19 and resistor



20 are low-current. At the same time the device offered allows us to realize the advantages of the bridge scheme to the full: reduction of the dimensions of a power matching transformer – 2–4 times; reduction of the dimensions of a smoothing choke-twice (in case of a d. c. loading); reduction of a magnetizing current and, accordingly, losses.

References

1. Tranporket-Austria, the Catalogue of 1995-96.

2. Pryanishnikov V.A. Electronics. – St.-Petersburg, 1998. – P. 374.

3. Sources of secondary power supplies. Under the editoship of Y.I. Konev. – M.: Radio and Communication, 1983.

4. The patent 2223590 Russian Federation. A bridge inverter / L.T. Magazinnik, A.G. Magazinnik. – B.I.№.4, 10.02.2004.

OPTIMIZATION OF THE CONTROL OVER A TRANSISTOR INVERTER SCHEME

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The control system of a transistor inverter allowing us to apply an elementary circuit consisting of a quickly saturated choke and two resistors instead of complicated and expensive components including a pulse width modulator and power transistor modules with an optoelectronic galvanic outcome. Expensive power transistor modules are replaced by conventional power transistors.

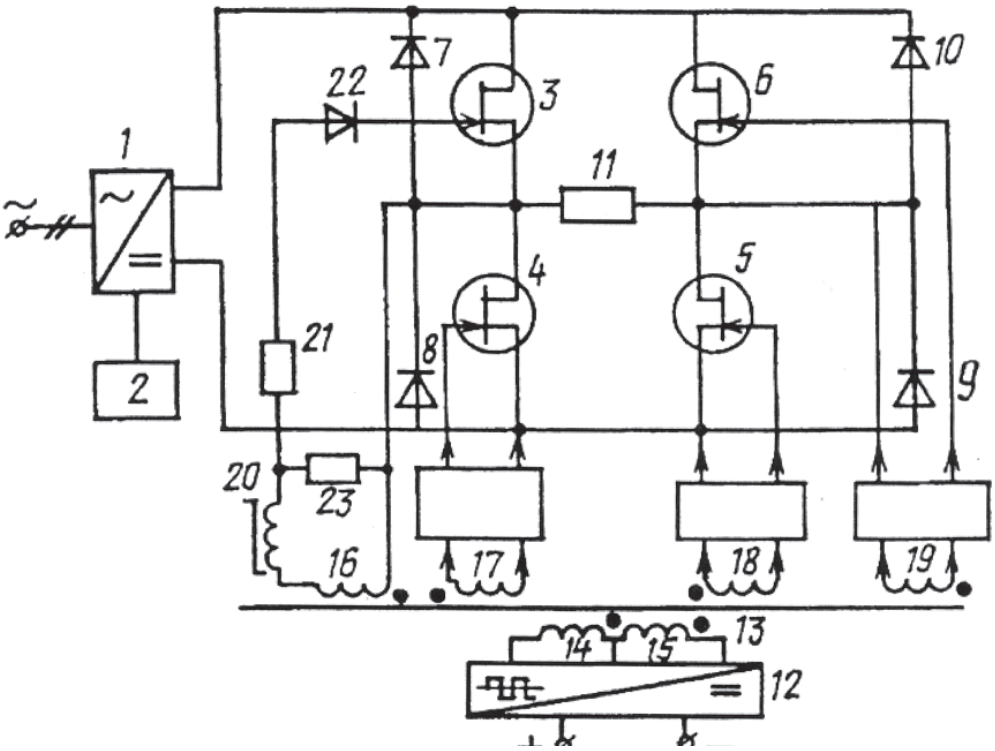
Keywords: a synchronizing transformer, a quickly saturated choke, an auto generator output capacity, power transistor amplification factor

A singlephax bridge transistor inverter can be used in varios secondary power supplies in a power range from tens of watts up to several kilowatts, instance in electrowelding devices, singlephas plasmotrones, electronic voltage stabilizers etc.

Secondary power supplies with inverters are divided into two groups: with a controllable inverter and with a noncontrollable one [1].

A singlephax noncontrollable bridge transistor inverter described in [1] is connected with an adjustable network rectifier with its own control and adjustment system via a direct current diagonal.The disadvantage of this device is that the unverter power transistor control system contains besides a typical oscillator of a given frequency and a synchronizing transformer,a shaper of porosity of controlling impulses operating on the principle of pulse-width modulation and an optoelectronic modular power transistor with an optoelectronic outcome. If makes the device more complicated and expensive as a whole.

A simplified scheme of a singlephas noncontrollable bridge transistor inverter is shown in Figure.



The device 1 contains adjustable network rectifier 1 based on the scheme of a semicontrollable bridge with a smoothing condenser at the output. The controlling input of network rectifier 1 is connected with the output of the controlling and adjustment system 2 and a singlephax noncontrollable bridge transistor inverter direct current diagonal is connected with the outcome of a network rectifier 1. The power part of the inverter contains four power

transistor 3, 4, 5, 6 arranged as a bridge and shunted by the opposite diode bridge 7, 8, 9, 10. Load 11 is connected to an alternating current diagonal. The control system of the inverter consist of autooscillator 12, synchronizing transformer 13 connected with autooscillator 13 via a primary winding. A primary winding of synchronizing oscillator 13 has two identical semiwindings 14 and 15 connected properly and which have an additional average terminal. All three terminals of a primary winding are connected with the outcome of autooscillator 12, it is a typical construction. Four secondary windings 16, 17, 18, 19 according to the number of power transistor are built in pairs and opposite in control channels and in pairs in accordance with each other in diagonal channels of transistor bridge 3, 4, 5, 6. If is also a typical construction. The porosity shaper of controlling pulses and galvanic outcome circuits are combined in each of four identical channels controlling power transistors and contain quickly saturated choke 20, resistor 21, limiting the current and diod 22 connected with the appropriate power transistor (e.g. transistor 3) in conducting direction. All connections are in series. For simplicity one controlling channel is shown in Fig.2. The emitter of power transistor 3 is connected with one of the terminals of the appropriate secondary winding 16 of synchronizing transformer 13, and a free terminal of quickly saturated choke 20 is connected with the second terminal of secondary winding 16 of synchronizing transformer 13. Besides, the emitter of power transistor 3 and the common point of quickly saturated choke 20 and resistor 21 limiting the current are shunted by ballast resistor 23.

The required output capacity of autooscillator 12 when the voltage of secondary windings 16, 17, 18, 19 of synchronizing oscillator 13 is (3...5) will be $2\cdot(3...5)i_{\delta}$, where i_{δ} is the current of unloching of power transistor: $i_{\delta} = i_k/\alpha$, where α – is the strengthening factor of a power transistor, and i_k is the collector current (the «locing» current is negligibly small). It follows that if $i_k = 30$ A, $\alpha = 15$. The output capacity of autooscillator 12 is only

$$P = 2\cdot(3...5)\cdot\frac{30}{15} = (12...20)Wt, \qquad (1)$$

no preliminary amplification is reguired in comparison with shapers with optoelectronic outcome , where current is measured in milliamperes and amplification is necessary.

Quickly saturated choke 20 providing the necessary interval τ is calculated when τ and the voltage of a secondary voltage of synchronizing transformer 13 are known by the formula

$$U = 4{,}44\cdot f\cdot B\cdot S\cdot W, \qquad (2)$$

where $U \approx (3...5)V$, $f \approx 5\cdot10^5$ kc (when $\tau \approx 1\cdot10^{-6}$ c), $B \approx 0{,}2$ TS (for ferrite cores). S is the crossection of a core in m^2, W is the number of turns of a choke. Calculations show that a choke with a winding of (4...7) turns on a core $S \approx 5$ mm^2 provides the necessary interval τ,that is the size and the mass of a 3, quickly saturated choke are rather small.

Thus, rather complex and expensive part of the device in the structure of the width-pulse modulator and power transistor modules with optoelectronic galvanic outcome is replaced by an elementary circuit consisting of a tiny quickly saturated choke, a diode and two resistors controlled by one channel and common power transistors instead of expensive power transistor modules.

References

1. Pryanishnikov B.A. Electronics. – St. Petersburg, 1998. – 400 p.

2. The patent 2233536 Russian Federation.A single phas noncontrollable bridge transistor inverter / L.T. Magazinnik, G.G. Magazinnik, V.P. Shingarov. B.I. vol. – 21, 27.07.04.

OPTIMIZATION OF THE SCHEME OF AN ELECTRIC WELDING DEVICE

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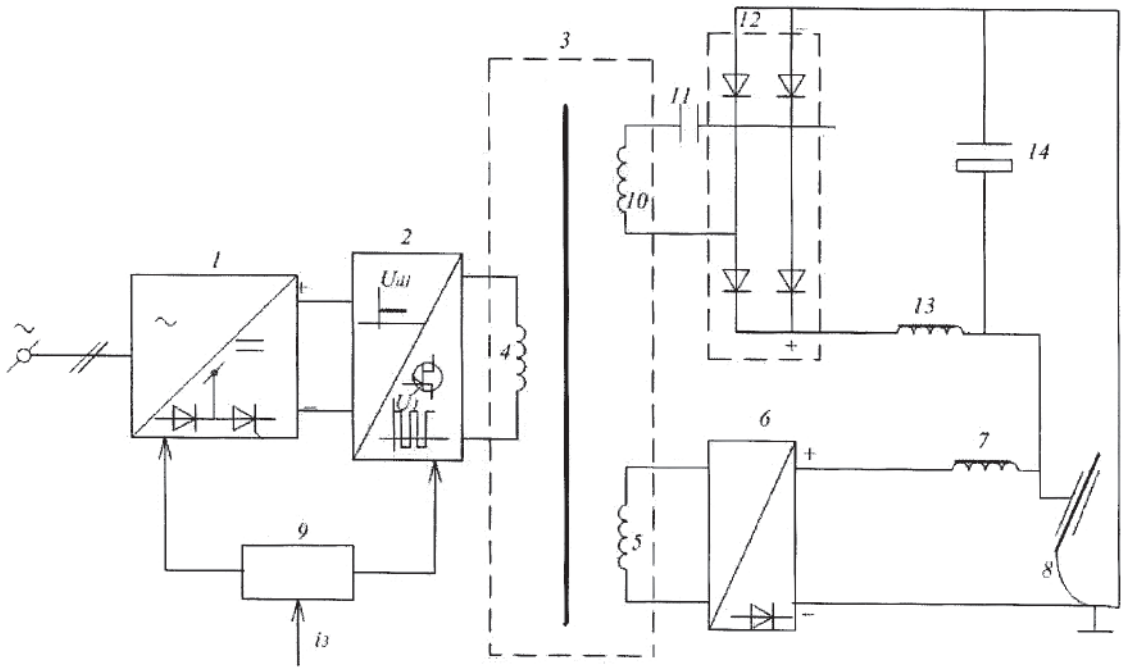
A new device of an inverter type for electro welding device is considered. The analysis of the opportunity to reduce inverter transistor current (~ 3 times) in comparison with conventional Russian and foreign analogues is executed. The cost of the device is reduced considerably and losses are minimized. The effect is achieved due to short-term inclusion of an additional source.

Keywords: «ignition», stabilization of an electric are, a forced energy discharge

Secondary power supplies of an inverter type inverted for electrowelding devices [1...6] are widely known. These devices have some disadvantage, namely, the current amplitude in inverter power transistors intended for electrowelding devices is great and makes about one third of the value of the loading current, i.e. in an electric act .This disadvantage is due to the fact that with a view of stabilization of the "burning" mode of an electric are and its easy ignition elaborators of these devices are compelled to make the synchronizing transformer secondary winding voltage extremely high in comparision with the arc voltage. The value of it is approximately 100 V. accordingly, at the initial network voltage 220 V the straightened and smoothed up to $U_m = 220 \cdot \approx 300$ V voltage at the inverter input makes the transformation factor 300/100 = 3, at this value the current amplitude in inventer power transistors is egual to one third of the arc current. At the same time we know that actually the arc voltage does not exceed the value of 25 V at air welding and is considerably less at welding in CO_2 and argon. This disadvantage i.e. too high voltage results, first, in the increase of inverter transistors capacity and cost and, second, in the grouth of losses in – them.

The principle of the new device is explained in Figure, where the secondary power supply is shown schematically. The device consists of controlled network rectifier, transistor inverter 2, connected by an input with direct current terminals of controlled network rectifier 1, synchronizing transformer 3, a primary winding 4 of which is connected with diode rectifier 6, its direct current terminals being connected with a transistor inverter output. Secondary winding 5 of synchronizing transformer 3 is connected with diode rectifier 6, the direct current terminals are connected to load 8 activating an electrode and a welding arc via smoothing choke 7 in series with it.



They make the basic power supply. Network rectifier I and transistor inverter 2 are controlled by typical system 9, current task signal i_3 being supplied to its output. Besides a synchronizing transformer is eguipped with additional secondary winding 10 connected with diode bridge alternating current diagonal 12 via a filter in series, diode bridge being an additional power supply. The diode bridge direct current diagonal is connected with load 8 in parallel to the basic power supply via a Г-shaped filter. The Г-shaped filter contains choke 13 in series between a diode bridge terminal 12 and a corresponding load terminal and filter condenser 14 in parallel with load 8. It allowed to make the additional power supply perform functions of ignition and stabilization of an electric arc in a zone of small current, to lower the synchronizing transformer basic secondary winding voltage up to 35 V and, thus, to reduce the inverter transistor current amplitude considerably (approximately 3 times).

In conventional secondary power supplies the synchronizing transformer secondary winding voltage is about 100 V. The inverter voltage powered by a single-phase network (~220 V) is approximately 300 V, the transformation factor 300/100 is 3 and, accordingly, the current amplitude in inverter transistors is 1/3 of a load current , e.g. at the load current of 200 A the transistor current (in amplitude) of the devices under consideration will be 200/3 ≈ 67 A.

As in the device elaboratore the voltage is reduced up to 35 V, the inverter transistors current amplitude will be 100/35 ≈ 2,85 times as low . If is rather important due to the fact that power transistor or compound transistor modules, first, make an essential part of the total cost of a device; second decrease of the current reduces losses. The losses in an additional power supply are negligibly small as it is used for a short period of time. One should note that if it is necessary to use the welding device in CO_2 or argon environment, one should just disconnect additional secondary winding 10 of synchronizing transformer, as in these modes rigid external characteristic is reguired and we don´ t need to increase the voltage to “ ignite” an arc. Thus, the offered device does not lack universally and, simultaneously has essential advantage in air welding mode, transistor current in envertery 2 is 3 times as low in comparision with a current amplitude in conventional devices, and ignition conditions of an electric act are improved as an electrode contact with a part being welded is accompanied by a forced energy discharge, this energy having been saved up in filter condenser 14.

References

1. DS-200 AL-Technotron . Russia, a catalogue, 1995.

2. Transpoket // Ausria, a catalogue. – 1995-96.

3. Invertec. V-130-S-Lincoln-USA– 1997.

4. Yastolin YmbH – Yermany.Kraftzwerg– 1994-96.

5. Secondary power sumply. Palent 2242835 of 20.12.2004 / Authors L.T. Magazinnik, A.G. Magazinnik.

6. Magazinnik A.G., Magazinnik L.T., Magazinnik G.G. Correction of the capacity factor of secondary power Supplies // Electrical engineering. – 2001. – Vol.5. – P. 40-42.

AUTOMATED SYSTEM OF OIL QUANTITY AND QUALITY INDEXES ESTIMATION

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In this article an approach to construction of automated oil quantity and quality indexes estimation is suggested. Some technological and project solutions on automated oil quantity and quality indexes within an oil-gas composition are introduced.

Keywords: automated system, quality indexes estimation

The creation of an effective system of the control of oil and its processing products movement from a cavity to a final consumer is impossible without the organization of trustworthy evaluation of the prospected oil in the content of the obtained oil–gas-water composition (OGWC).

The main problems that have the greatest impact upon the accuracy of prospected oil quantity estimation are:

- the content and structure of OGWC estimation object that is characterized by special and time changeability;
- the diversity of the estimated environment that is defined by qualitative characteristics – density, viscosity, sodium content, etc., and also by the diversity of numeral characteristics, such as daily debit, gas factor, watering, etc.
- a lack of complex methods of the implied estimation means check-up on exploitation objects and metrological characteristics control methods;
- a lack or insufficient level of standard and experimental basis for OGWS estimation means;
- a lack of typical solutions on the implementation of approved estimation methods and means to specific exploitation conditions.

The existing unsatisfactory condition in the area of prospected oil estimation provision in the content of prospected OGWC leads to unjustified risks and, first of all, under the control organization by state institutions:

- the correct definition of the taxed base on the prospected minerals tax (further – PMT);
- a rational usage of subsoil and realization of licensed agreements on deposits' prospecting;
- an observance of a cavity work regimen;
- in order to prevent possible thefts and malusage;
- in order to prevent accidents and technological regimen violations concealment, that lead to oil overflow and negative impact upon the environment.

Realization of new technologies with usage of high-quality components, specialized automated systems that preclude a human factor impact and allow us to provide the estimation unity on every stage of prospecting, transportation, storing, processing, and realization of oil.

The system of oil quantity and quality estimation (SOQE) is designed for the estimation of oil net mass, technological and qualitative oil characteristics, and also for indication and registration of the obtained estimation results.

As shows the analysis of domestic and foreign means of oil content estimation in OGWS, nowadays there are no such estimation methods that fully correspond to all requirements of obtaining trustworthy cavity estimations [1]. A high diversity of OGWS as an estimation object makes it impossible to create a single universal estimation technology. Here an extremely urgent objective is to establish the requirements and selection of a basic technology that corresponds to the most widespread cavity type, along with a simultaneous registration of modern condition of the modern multi-phase estimation metrological provision system [2].

In terms of lack of initial standards and check schemes for unseparative estimation facilities makes it more effective to use systems that implement separative methods on the current stage:

To create SOQE it is supposed to ude:

– mass flow meters;

– intellectual temperature indicators and thermometers;

– redundant pressure indicators and monometers;

– net filters with quick-detachable lid;

– wedgebar bolts (or globe taps) as a shut-off fixture;

– consumption calculators;

– software for SOQE automated workplace.

Functional system of raw oil registration joint, provided in Figure includes:

– filer block (FB);

– mixer – disperser (MD);

– quality control block (QCB);

– estimation lie block (ELB);

– pipe-piston facility plug joint (PPFP);

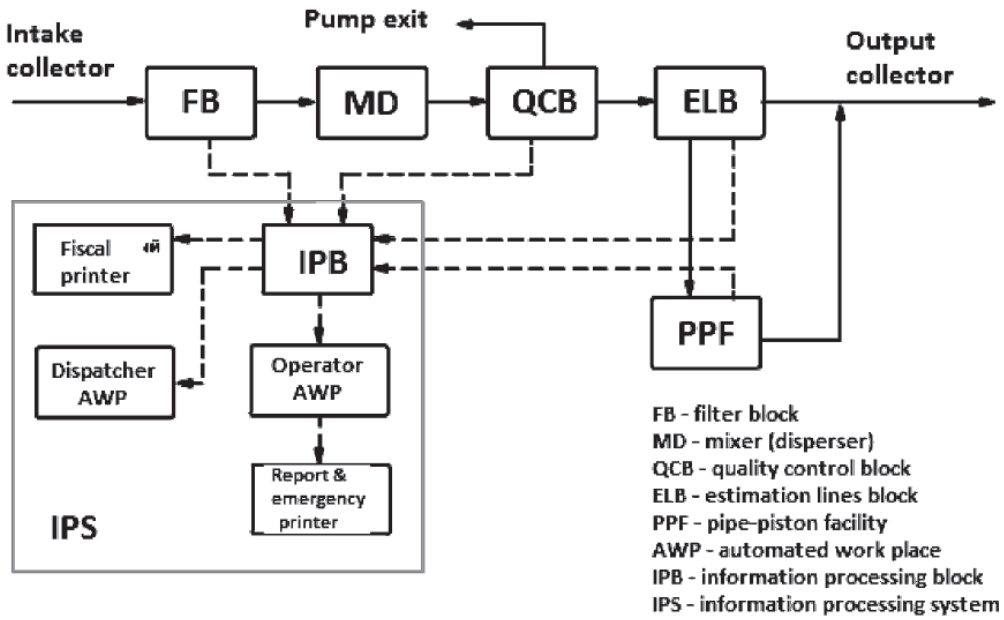
– information processing block (IPB);

– information processing system.

In accordance with recommendations, a filter block must include no less than two parallel working filters: operative and reserve that allows us to turn off any of them for a cleaning without raw oil registration joint (RORJ)

workflow disturbance. On each filter a differential pressure transformer is installed in order to control filter elements obstruction. Shut-off fixture is also implied (4 bolts) that helps to turn off each filter individually.

The estimation line block (ELB) includes:
– intake and discharge collector;
– operative, reserve, and control line;
– shut-off fixture;
– oil drainage system.



Raw oil registration joint functional scheme

Functional scheme of raw oil registration joint

ELB is mounted on the operational frame and constructively consists of three estimation lines (two operative and one reserve), each of which is equipped with mass consumption meters (or turbine consumption transformers), pressure and temperature indicators, monometers, and thermometers. On the exit of each estimation line a shut-off fixture with leakage control is installed. The number of estimation lines is dependent on the operative consumption and product viscosity, and is defined on the project works stage after obtaining a project objective.

Quality control block is suggested to use with the following components:

- automated and manual oil sampler;
- consumption indicator;
- densimeter;
- raw oil moisture gauge;
- cavity sampler;
- monometer and pressure indicator with an output current signal;
- thermometer and temperature indicator with an output current signal;
- fluid consumption indicator through QQB;
- fluid consumption regulator;
- shut-off fixture for plugging a free gas definition facility.

In difference with commodity oil registration joint in RORJ a mixer, or disperser is foreseen, its purpose is to prepare a homogeneous mixture out of water-oil flow.

To compensate thermal losses while work product swapping, it is possible to implement a piping heating system on the basis of heating cables. In this case all the SOQE pipe necking is covered by a heat insulation with an outer aluminium jacket.

On the whole, all domestic estimation facilities realize a number of technological solution types of OGWC that differ in content, functions, and estimation methods.

Nowadays the most widespread because of historical causes have the estimation facilities that estimate OGWC on a cavity mouth by the method of separated liquids and gas with help of simple single-phase estimation utilities that are installed on output pipes for gas, oil, and water of two- or three-phase separators. In Russia theses facilities that are analogues of foreign «separators for test exploitation» are placed on the most of enterprises and are

connected by a collector or a distribution valve with a number of cavities. Their replacement with new utilities is extremely slow.

To define an oil watering percent in an estimation facility a moisture gauge is placed through which all the cavity production is passed.

The most widespread is one of indirect methods of oil watering estimation that is based on the dependence of dielectric water mixture penetrability on dielectric characteristics of its components (oil and water). Waterless oil is a good dielectric and has dielectric penetrability $\varepsilon = 2,1–2,5$, while dielectric penetrability of mineralized waters equals $\varepsilon = 80$. Such difference in oil and water dielectric penetrability makes it possible to create a moisture gauge of a relatively high sensitivity. The action principle of such moisture gauge is condenser capacity estimation that is formed by two electrodes, placed in an analyzed water-oil mixture.

A unified moisture gauge of such type for oil (UMO) allows us to permanently control and register a volume water content in an oil stream with a inaccuracy of 2,5 to 4 %.

For more accurate water content estimation it is necessary to avoid gas bubbles placement on the sensor, as it has low dielectric penetrability that can be compared to oil ($\varepsilon = 1$), and a liquid stream before it reaches sensor should be carefully mixed until the mixture is homogeneous, as the more homogeneous a stream is, the higher a utility indication accuracy.

The following factors have significant impact on layer water and oil content estimation by this utility:

1) OGWC temperature alteration;
2) mixture homogeneity degree;
3) gas bubbles content in a liquid stream;
4) electric field tensity in sensor.

A moisture gauge sensor is placed vertically and must let through all liquid (oil and water) cavity production.

We have studied relative characteristics of domestic and foreign means and methods of oil content in OGWC. The data analysis shows us that practically all modern estimation facilities characteristics are close. This circumstance is explained by the fact that all utilities' producers claim characteristics that are correspond to regulatory and legislative documentation requirements as maximum as possible. Nevertheless, with a lack of initial standards, approved control schemes, metrological characteristics control methods in an exploitation conditions there is no trustworthy method to affirm the claimed characteristics. Under such terms characteristics, declared by manufacturers can form the basis for analysis and development of suggestions of preferable technologies for oil content in OGWC estimation.

References

1. Kratirov V.A., Gareyev M.M. Some aspects of implementation of new means for oil consumption estimation considering its phase condition data // III Russian oil-and-gas producers conference work program. – Ufa: Transtech, 2001.

2. Letton V., Swaren J., Konort J. Multi-phase consumption meters usage experience on the side of a cavity mouth and under water, article of SPE 38783. Annual technical conference and exhibition of SPE. – San-Antonio, Texax, 5-6th of October 1997.

Materials of Conferences

TRAINING ENGINEERS IN RUSSIA AND MODERNIZATION PROCESSES

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A need for engineering personnel is conditioned by an intense development of anthropogenic civilization, formation of which stated more than two centuries ago in European region. Some traditional societies that could not reform fast enough were simply absorbed by it, and others, including Russia, by interacting with it, started to alter dramatically fast, thus taking the direction for modernization and gradual transformation into anthropogenic societies. Since then a strategic objective of any state is its economical independence and prosperity that are directly linked to the technics development and introduction of new technologies. An uninterrupted functioning of an effective personnel training system is a necessary condition of this result achievement, as well as the development and opportune introduction of new technologies.

In the current year it has been 310 years since the foundation of engineer-technical and military education in Russia, when in 1701 the first school of «mathematic and navigation» science had been opened by Peter the First. Since then, modernization processes in Russia that are linked to the names of the greatest state activists, such as Aleksandr the Third, S.Y. Vitte, and others, were followed by reformations in education area, as not only the importance of qualified technical specialists' training was realized by the authority, but necessary steps in this direction were taken as well. Old Russian technical school had a high image. It is commonly known, that in XIX century a great contribution into the training of engineers had been done by the mathematician M.V. Ostrogradskiy, the founder of automatic regulation theory I.A. Vyshnegradskiy, aerodynamic scientists N.E. Zhukovskiy, etc. Truly the breakthrough in the engineer-technical elite of Russian state was the foundation in 1899 of the Polytechnic institute in Sankt-Petersburg. Its scientific and education activity fully corresponded to the realization of industrialization objectives that arose before the country at the beginning of the new century. Its graduates contributed greatly into the development of the domestic science, by pointing out the most important magistral and research directions for the future (A.F. Joffe, P.L. Kapitsa, etc).

USSR engineering-technical school was also a state's concern, as it solved the most significant specialists training objectives. Nevertheless, some critical moments are known in our history, when the country was threatened by a technological lag and significant efforts and, sometimes, even over-efforts were necessary to overcome a negative situation.

Russia had to face the necessity of global modernization on the border of XX-XXI century. Within the previous 20 years of its economic and social-political life some deep alterations took place and they affected all social life areas, including the education system. Here, as we speak of the education system, of course, we mean a whole complex of educational institutions that are logically linked to each other, first of all, by a mutual objective – training of competent well-qualified specialists; secondly – by the succession of educative programs and sequence in education trajectory projection; thirdly – by their inner coordination between time needs and the actual reality in the education area.

The main function of professional education institutions on the whole, and technical institutions in particular, is training specialists for the future. Today it is absolutely obvious that it takes the system too long to respond to the challenge of era. Nowadays a reformation within the domestic education system goes on. What can it give to the country within the problem of needed competent specialists for innovative development of the domestic economy.

Evident negative points of the modern education reform are linked to the fact it can become a time bomb for the system of engineering-technical personnel training.

The practice of the Single State Exam that has been introduced on the state level, significantly affects the modern school-leavers training that are simply coached for achieving a positive mark. The result is logical and consists in a significant basic knowledge decrease that stays with former school children when they enter universities. In this situation with the Single State Exam technical institutions suffer doubly, as less and less school-leavers select physics or mathematics as their exam subjects that are profiling disciplines in such institutions. Thus, a situation is created artificially that increases the students flow into the human science oriented institutions. And here an evident overproduction of economists, lawyers, psychologists, etc. takes place.

Besides, the Single State Exam system, with its visual positive side, such as an avowal of equal possibilities to obtain an education in any of the country's institutions by any region citizens, has its obvious negative point – it pulls the strongest and most talented students from the regions, where young specialists do not tend to return.

Russia is a multinational country that has territories of significant extent that have to be developed and that can give our country the necessary power. That is why, while implementing an education reform, it is so important of think of regions as well. But the reformation gains power, and now on the pretext of school course loading decrease dif-

ficult disciplines such as physics and mathematics disappear from the general course, as they are no longer necessary. Reformers say that for a separate pay, mastering of these subjects is still possible. But who in regions will be able to pay for such expensive education starting with the early age? Obviously, a number of potential institution entrants will decrease.

In the current year domestic institutions must transfer to a two-step training system: bachelor and master. It will transform all the education into paid form. Under the terms of current unemployment and low wages far not each family will be able to afford a student upbringing. So, higher education will become less available and the country will lose its ability to train the necessary number of well-qualified specialists. If we accept a possibility of extensive domestic economy development and natural resources internationalization, then, possibly, the described situation is fully acceptable. We can also speak of another verges of the discussed problem.

Thus, modern era sets more questions before us, than it gives answers for the time deands. In nowadays situation it seems difficult to formulate a successful solution of the domestic economy modernization on the basis of innovative development without clear and organized actual education system, without securing the best tradition of Russian engineering school, without clear strategy and real measures aimed for leading the domestic economy out of the crisis.

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Materials of Conferences

THE INTERFERENCE PROBLEM IN THE POLYLINGUAL REPUBLIC

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The interference problem in the polylingual republic

Academician D.S. Likhachev wrote: «One should learn to speak fluently, quietly, refinely for a long time and attentively by listening, memorizing, observing, reading and studying. Our speech is the most important part of both our behavior and personality, our soul and mind, our ability to resist the environmental influences, if it is «addictive».

In other words, the whole long-term work on the development of the linguistic personality is accompanied by the formation of the orthoepic speech culture, but it is not some final stage of this work.

Bilingual persons' Russian speech is characterized by the phonetic interference. The negative factors of the internal order include the complexity of the Russian language system for Dagestan people and the interfering effect of bilingual persons' native language. The subordinative bilingualism carriers' speech exhibits the following phenomena of the orthoepic interference:

– failure to distinguish the consonant softness-hardness and vowels after them ***и*** and ***ы***: опити «опыты», страни «страны»;

– confusion of ***о, у*** vowels: мукрый «мокрый», устрый «острый», and hypercorrection as well: модрая «мудрая», остно «устно»;

– absent of reduction of the unstressed vowels, that is the equally full vowels pronunciation in all word syllables;

– replacement of the vowels, advanced to the zone of the iota articulation by the soft consonants, glottizied by the vowels: паьмаы «память», а нем «о нем»

– replacement of the consonants ***к, п, т*** by the geminated ones: палка, такой; the occlusive-guttural: ук1ол, лип1а, учит1ил; the aspirated ones: nhakhaihaih «покатать».

From the sociolinguistic view-point, the main factor conditioning the phonetic-phonological interference is considered to be the lack of the development of the phonological consciousness and the phonetic hearing based on it. The bilingualism characteristic phenomenon is the rigidity, i.e. the difficulty of switching the mechanisms of the speech and thinking process and the vocal apparatus from the national speech to the Russian one and vice versa.

In our opinion, it is not quite right to make the communication effect be dependent on the degree of the interference relevance. Since firstly, the context compensates for any abnormality, and secondly, any interference phenomenon obstructs the communication, distracting the listener from the train of thought.

The bilingual persons' pronouncing speech culture is affected not only the interference phenomena caused by specific features of his/her native language, but anomalies characteristic of other national languages. That is, Dagestan bilingual persons' Russian speaking is influenced by the features of both their native language and other Dagestan languages.

The bilingual persons' Russian speech culture is based on the adequate mastering the Russian language, its stylistics.

The only cause of the phonetic interference in bilinguals' Russian speech in the science is considered to be the difference in the Russian and Dagestan phonological systems. But in Dagestan in bilingual persons' Russian speech is influenced by features of other Dagestan languages. Often a bilingual person, who doesn't speak the language of the other nationality, moves features of this language into the Russian speech. The reason for this fact may be the influence of other people's, his/her parents' interfered speech. It results in incorrect speech, not corresponding to the literary language norms.

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GENESIS OF THE TERM «MEDIA COMPETENCE»

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Russian infrastructure needs competent staff. Nowadays this target is among the most important ones concerning development and competitiveness of the market. The rapid growth of scientific and technological progress and the obsolescence of knowledge reinforce the need for radical change in views on the problem of media education in Russia. The issue of its necessity, objectives, terminological apparatus etc. causes some controversy. The utility of its implementation in educational institutions and in universities is investigated. Many scholars proclaim that students should be competent not only in their future field, but also show such personal quality as media competence. This article investigates the etymology of the term «media competence» and the necessity of this qualitative characteristic of the individual to the student.

Let us turn to the term «media» (Lat. pl. medium – intermediate, mediator). Analysis of scien-

tific literature has shown that it is treated differently. Thus, in the broad sense, they are the devices for recording, storing and transmitting information. Moreover, they are technological devices. Although in our opinion, this is not quite true. For example, the letter may also be such a medium.

The Doctor of pedagogical sciences, Professor Alexander Fedorov considers «media» to be technical means of creating, copying, printing, storage, distribution, perception and sharing it between the author of a media text and mass audience.

According to the Doctor of Philology, Professor Elena Vartanova, «media» are means of communication between different groups, individuals and the delivery of any content products to the audience.

From our point of view, these statements are concise and comprehensive. We add only that, firstly, media technologies have been with people for a long time. Secondly, the exchange of information is part and parcel of society, the media, respectively, are the most important means of communication, an indicator of progress. It is obvious that if we turn this amount of information in educational direction, we'll have a very impressive result.

We now turn to the definitions of «competence» and «competency». They are of current interest in connection with the transition to the European standard of education. Study of a number of scientific studies on this subject shows: some researchers believe the two concepts to be synonymous. However, to our mind, they are not.

The term competency is now widely used thanks to the book «The competent manager. A Model for Effective Performance» by R. Boyatzis, written in 1982. He defined competency as the basic characteristic of a person. It may be a motive, characteristic, skill, social role, or the knowledge that he / she has.

Big Dictionary of Russian language treats it as scope of issues in which someone is knowledgeable or as terms of reference of any institution, person, or range of cases, issues to be someone else's jurisdiction [2].

In the academic understanding competency assumes ownership of the methodology and terminology inherent in the field of knowledge, and knowledge of working in this system interactions' area and the ability to determine their axiomatic limits. In the professional context, competence refers to possession of the right of his knowledge or authority to do or decide something, to judge anything.

It can be concluded that the concept of «competency» is considered as: personal qualities needed to perform certain functions, certain tasks, a system of knowledge, ability to act and conduct, structured depending on the purpose and the specific situation, a range of issues in which the person is well-versed.

We also note that the concept of «competency» is universal. It is used in various fields: politics, economics, and psychology etc. This concept is not new in education, not just abroad but also in domestic training methods. Recently one can find not a few dissertation researches investigating the formation and development of different types of students' competencies in professional training.

Let us turn directly to the concept of «competence». Dictionaries of economic terms define it either as knowledge, experience in a particular area or an authority area of certain bodies and persons set by laws and other normative acts, regulations, instructions, statutes.

Dictionaries of foreign words interpret it mainly as possession of competency or possession of knowledge to judge anything.

There is no common understanding of the term «competence» in pedagogical field at present. Thus, V.S. Bezrukova believes the competence to be possession of knowledge and skills that enable to state professionally competent judgements, estimates, opinions.

Doctor of Psychology, Professor E.F. Zeer and O. Shakhmatova in their joint work treat the professional competence as the set of professional knowledge and skills. A dictionary of practical psychologist defines social-psychological competence as the ability of an individual to interact effectively with others in the system of interpersonal relations [1].

It turns out, the competent person, with respect to any area of activity, possesses certain knowledge and abilities that enable him to effectively work in it. From the foregoing it can be concluded that competency is a part of competence, i. e. qualities of competitiveness. For each discipline they are different.

The same goes for media education. It seems that soon it will be included not only in overseas training programs but also in Russian ones. Therefore, it is necessary to have a unified terminological apparatus. Nowadays, unfortunately, it isn't formed. Today there are many variants of the notion of even such a key term as «media competence». Both foreign and domestic scientists use the following synonyms: «media literacy», «media culture», «computer literacy», «information literacy» etc.

Let us define the two most often used as identical concepts: «media literacy» and «media competence». We turn to the glossary of terms written by Alexander Fedorov. Media literacy is the result of media education (V. Gura, A. Korochenskyi, V. Monastery, S. Penzin, L. Usenko, A.V. Fedorov, J. Pungente, I. Rother, D. Suess, Ch. Worsnop). Media competence of personality is the sum of its motives, knowledge, skills, abilities contributing to selection, use, critical analysis, evaluation, development and transfer of media texts in a variety of types, forms and genres, to the analysis of complex processes of media functioning in society (A.V. Fedorov) [4].

We adhere to the views of such respected scientists as D. Baake, S. Blumeke, I. Pottinger, A.V. Fedorov, who use the term «media competence». A.V. Fedorov proves very clearly the validity of us-

ing this particular definition in one of his works. He consistently argues that the term «literacy» reflects the first necessary step in learning, indicates a basic level of knowledge, while the term competence seems to be more targeted and specific in relation to the knowledge and skills of the person [3]. A.V. Fedorov says that the term «media competence» defines more accurately the essence of the existing individual's ability to use, critically analyze, evaluate and transmit media messages in various types, forms and genres, to analyze the complex processes of media functioning in society [3].

To sum up, we arrive at the following conclusion: every minute we get the information – at workplace, in the learning process, during the holidays. Formation of media competent personality is pledge to work properly with information independently, which is one of the priorities of higher education and one of the six main principles of the Bologna Declaration.

References

1. Golovin S.Y. Dictionary of practical psychologis. – Minsk: Kharvest, 1998. – P. 226.

2. Kuznetsov S.A. Big Dictionary of Russian language. – SPb.: Norint, 2000. – P. 446.

3. Fedorov A.V. Media competence of personality: from the terminology to indicators // Innovations in education. – 2007. – № 10. – P. 75-108.

4. Fedorov A.V. Glossary of media education, media education, media literacy, media competence // Taganrog: publ. house of Taganrog state ped. inst. – 2010. – P. 64.

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Materials of Conferences

NEW FUNDAMENTAL CONSTANTS

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These constants should have been discovered in the first half of the twentieth century, but even our time of stationarity, absolute, and axiom opium prevent us from accepting the incredible changeability of our world and inscrutable simplicity of the Universe structure.

A necessity of the search for «magnet» component of a gravity field arose a while ago, nut here a comprehension of space as a mathematical absolute tricks us. The corresponding formulas are written long time ago, but to understand their physical sense we have to implement theory to the reality (make an experiment). Without thorough examination through practice a science transforms into the esotericism, or, even worse, into a religion.

If we implement field theory formulas by J. Maxwell to the physical reality, we can easily consider space to have a physical essence of gravity interaction «quantum» and linked to mass as a 2charge». A relation $\lambda_0 = m/GK$ defines the m charge (table 1) main «quantum» (graviton) wave length, that diffuses with speed V_g. It also obvious that new constants should be searched for within a well studied gravity system that should be described by the theory.

While in order to discover the Universal gravity law I. Newton required the system Earth-Moon, to calculate new constants we need all Solar System that should be studied as a quantum-wave system (table 2). In the main condition of this system should be a planet with the following parameters: orbit radius equals λ_0; orbit movement speed – V_g; spin projection (an equator inclination against the ecliptic flatness) – 0; poses the biggest mass. It is obvious that the main Solar System planet is Jupiter. The following giant planets are placed at the second energetic level and their radiuses are multiple of λ_0: 2·1 = 2, 2·2 = 4, 2·3 = 6. Their spins projections equal: 30°, 90° (Uranus lays on its side), and 150° (here the Neptune satellite moves in the direction of the planet rotation, not the opposite, as it is commonly thought). Earth group planets are placed in the interference zone and their radiuses equal: $\lambda_0/3$, $\lambda_0/5$, $\lambda_0/7$, $\lambda_0/13$. All these coefficients are provided in table 2 and serve for the graviton main wave and «magnetic» gravity constant calculation. To calculate the graviton speed the coefficients are taken in degree ½.

Table 1

Electromagnetic and gravity constants of the field theory by J. Maxwell

Interaction	Electro-magnetic	Gravity
Charge	e	m
Potential constant	ε_0	$GN\text{-}K$
«Magnet» constant	μ_0	$GK = m/\lambda_0$
«Quantum» speed	C	$V_g = (GN\text{-}K \cdot GK)1/2$
Structure constant	$K = C/V_g$	

Table 2

Initial data to calculate new constants

Planet	Средний радиус орбиты			Средняя скорость планеты	
	Coefficient	Observation, million km	λ_0 index, million km	Observation, km/h	V_g index, km/s
1	2	3	4	5	6
Mercury	1/13	57,9	752,7	47,85	13,27
Venus	1/7	108,2	757,4	35,01	13,23
Earth	1/5	149,6	748	29,77	13,31
Mars	1/3	227,9	683,7	24,11	13,92
Jupiter	1	778,3	778,3	13,06	13,06
Saturn	2	1427	713,5	9,62	13,60
Uranus	4	2870	717,5	6,8	13,60
Neptune	6	4496	749,3	5,43	13,30

The following calculation results were obtained:

- The main Sun graviton wave length $\lambda_0 = 739{,}15(10{,}70)\cdot10^{11}$ sm;
- The main Sun graviton period $T_0 = 10{,}95$ years;
- «Magnetic» gravity constant $G_K = 2{,}698\cdot10^{19}$ sm;
- Graviton speed $V_g = 13{,}413(0{,}097)\cdot10^5$ m/s;
- K structure constant = $C/V_g = 22351$.

If we express constant G_{N-K} from the graviton speed formula and provide the calculated figures here, we will obtain the following result:

$$G_{N-K} = V_G^2/G_K = 6{,}668\cdot10^{-8}\ \text{sm}^3/\text{g}\cdot\text{s}^2,$$

which well corresponds with the inquiry indexes of this constant and within its calculation error [1].

References

1. Kurkov A.A. Personal Internet – magazine. Registered on 02.06.2007 [digital source] / Science – News: site: URL: http://zaza149.inauka.ru/ (request date 13.01.2011).

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RELATIVITY OF MOVEMENT TAKING INTO ACCOUNT ELECTROMAGNETIC AND GRAVITATIONAL INTERACTIONS

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If we stick a paper stripe on a rubber ribbon and start to stretch the rubber, the paper will start to break. Under the certain rubber tension only separate pieces of paper will remain on it. This is a mechanical example of the movement relativity that is studied in this article.

The initial constants are: «magnet» gravity constant $G_C = 2{,}698 \cdot 10^{19}$ g/cm, graviton speed $V_g = 13.413 \cdot 10^5$ см/s, structure constant $K = C/V_g = 22351$ and wave length of the main space body with mass m: $\lambda_0 = m/G_C$.

The common Universe attributes: body mass growth and linear growth of their size under the permanent entropy that equals $K^2 = (C/V_g)^2$.

From the electromagnet field theory by J. Maxwell we know, that light spreads with a permanent speed regardless of the reading system. As mentioned constants are calculated according to the Maxwell theory applied to gravity, the graviton will also have all the photon common attributes. Since photon has more speed comparing to graviton, from the moment of the Universe creation its borders (radius is a linear size) are defined by the light spread front. A photon cannot spread in any other way but through space, that is through gravitons. The Universe border moves with the light speed, and all space stretches along with that (like a rubber ribbon) in proportion to the scale. Such Universe is limited, locked on both interactions and has a permanent entropy that is linked to the relation between these interactions' bearers.

In this work we do not study the mechanism of the Universe structures formation or other principles of its apparatus, but give the explanation of the outlined and observed by astronomers structures from the position of movement relativity. The observed structures hierarchy can be divided as follows: space bodies (stars and planets), linked associations of space bodies (planet systems, stars associations, and galaxies), and galactic associations (clusters, superclusters, and the whole Universe). The expansion (recession) speed is dependent on the linear size, that is connected to the mass constant G_C. If the Universe structure is described only by two interactions (electromagnet and gravity), then the structure sizes and their masses are multiple of the constant K. We come up with a very simple rule: if the Universe mass is divided by K, we will obtain the supercluster mass and size. The bottom space body mass limit can approximately be valued according to relict radiation (the difference between a planet and «debris» is conditional), but even debris' masses in asteroid zones and planet rings must correspond to this simple rule.

If we use the equation of S.U. Cary, that consider expansion and place the described constants into it we will understand the number of observed structures and their division according to attributes: $F = (G_{N\text{-}K} \cdot m_1 \cdot m_2/R^2) \cdot (1 - (V/C)^4)$. The first bracket in the formula corresponds to the universal gravitation law of I. Newton. The second bracket considers the Universe expansion, in which a relative speed is in degree 4. Here V is the expansion speed. If all four $V = C$, we will obtain the highest level 1 – the Universe. A sequent placement of $V = V_g$ leads to the following structure level up to level 5 (table). For a galaxy (level 4) a recession speed is comparable to the graviton speed, so multiple galaxies and galaxies with satellites exist. On level 5 a replacement for all four stages is provided, so star associations are represented as multiple stars. Then follow space bodies. If their size is smaller than the wave length, linked gravity systems exist around them.

Universe structure levels

Level	Name	Mass m, g	Wave length λ_0, см
1	Universe	$1{,}3 \cdot 10^{56}$	$4{,}8 \cdot 10^{36}$
2	Galaxy superclusters	$5{,}8 \cdot 10^{51}$	$2{,}1 \cdot 10^{32}$
3	Galaxy clusters	$2{,}6 \cdot 10^{47}$	$9{,}6 \cdot 10^{27}$
4	Galaxy	$1{,}2 \cdot 10^{43}$	$4{,}3 \cdot 10^{23}$
5	Star association	$5{,}2 \cdot 10^{38}$	$1{,}9 \cdot 10^{19}$
6	Star	$2{,}3 \cdot 10^{34}$	$8{,}6 \cdot 10^{14}$
7	Planet	$1{,}0 \cdot 10^{30}$	$3{,}8 \cdot 10^{10}$
8	Planet satellite	$4{,}6 \cdot 10^{25}$	$1{,}7 \cdot 10^{6}$
9	Minimal limit	$2{,}1 \cdot 10^{21}$	-

In [1] you can find more than 20 articles, among which the initial data is provided, as well as formulas and the results of new fundamental constants calculation and their values errors, and also the application of these constants in different science areas.

References

1. Kurkov A.A. Personal Internet – magazine. Registered on 02.06.2007 [digital source] / Science – News: site: URL: http://zaza149.inauka.ru/ (request date 13.01.2011).

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MAXWELL THEORY DESCRIBES SOLAR SYSTEM

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An idea of oscillator exists in quantum mechanics. Let us show, that the planet system really is a linked system of pendulums. A criterion of the platen orbits and the whole planet system steadiness can be the condition:

$$T_j/T_{ij} = m + 1, \quad (1)$$

where $m = 1,2\ldots$ is a whole positive number. For planets with the circulation period T_i and T_j ($T_i < T_j$) the meeting period T_{ij} equals

$$1/T_{ij} = 1/T_i + 1/T_j, \text{ or } T_{ij} = (T_i \cdot T_j)/(T_i + T_j) \quad (2)$$

If we substitute this equation into the initial one, we will obtain the oscillator equation:

$$T_i = T_j/m. \quad (3)$$

As T_j we will choose the period of the sun circulation around the system masses centre $T_j = T_c$ and we will calculate $m = T_c/T_i$ (table 1). Here T_i will be the Planets-Giants' circulation period.

Table 1

The sun controls planets

Object	Sun	Jupiter	Saturn	Uranus	Neptune	pPluto
T_i, years	179,77	11,86	29,45	84,01	164,8	247,7
T_{ij}, years	-	11,12	25,29	57,15	85,75	103,8
m	-	15,07	6,07	2,13	1,09	0,72

Astronomers already refer Pluto to planets and this is confirmed by the fractional index $m \approx 3/4$. For other planets this condition is accurately satisfied.

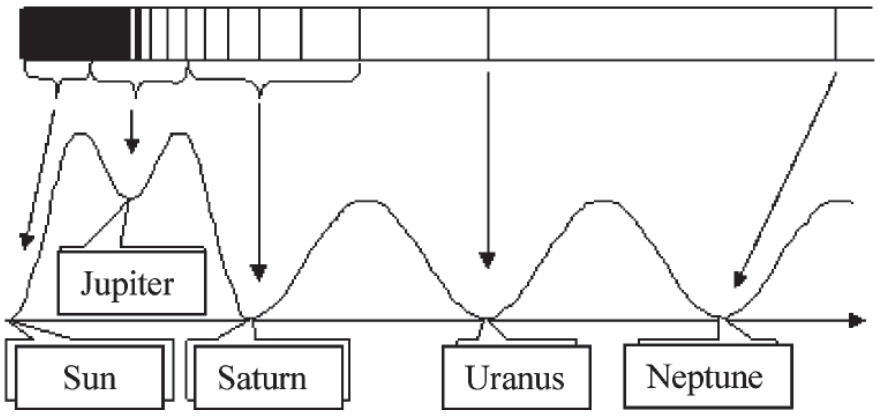
In table 1 index m runs through the values out of sequence, and that gives us grounds to suppose the final number of levels in system $K = C/V_g = 22351$ (this constant is responsible for the Universe structure). Here C is the light speed, $V_g = (G_{N\text{-}K} \cdot G_K)^{1/2}$ is the graviton speed, $G_{N\text{-}K}$ is the constant of Newton-Cavendish, G_K is the «magnet» gravity constant, M_0 is the sun mass. In this case planets Neptune and Uranus are represented by one oscillator level each, and Saturn, Jupiter, and Sun level number is defined by the number of oscillator levels above each Sun gravity wave superposition holes – the graphic analogue of Schredinger equation (Figure and table 2). The Sun main gravity wave length is $\lambda_0 = M_0/G_K$, and period $T_0 = 2\pi\lambda_0/V_g = 10,95$ years.

The sun gravity potential is represented by the sum of two waves. The main wave with length equals λ_0 and is in same condition as wave with length $2\lambda_0$ with three condition of the «spin» projections number. «Spin» is also a quantum analogue.

Table 2

The results of the Planets-Giants' mass calculation

Planet	Observed mass, g	Calculated mass, g	Number of levels
Sun	$1,99 \cdot 10^{33}$	-	22321
Jupiter	$1,90 \cdot 10^{30}$	$1,96 \cdot 10^{30}$	22
Saturn	$5,68 \cdot 10^{29}$	$5,34 \cdot 10^{29}$	6
Uranus	$8,7 \cdot 10^{28}$	$8,91 \cdot 10^{28}$	1
Neptune	$10,3 \cdot 10^{28}$	$8,91 \cdot 10^{28}$	1



At the top the oscillator is showed. At the bottom – the Sun gravity waves superposition. Arrows display the levels and their number above the Sun and planets «holes»

The mass of one oscillator level (gravity level) in system M_{Ur} equals:

$$M_{Ur} = M/K = 8{,}91 \cdot 1028 \text{ г},$$

here M is the Sun system mass

$$M \approx M_0 = 1{,}99 \cdot 1033 \text{ g}. \quad (4)$$

The observed Uranus and Neptune masses ($M_U = 8{,}7 \cdot 10^{28}$ g and $M_N = 10{,}3 \cdot 10^{28}$ g) corresponds to the oscillator level mass well. As all oscillator levels are identical, the other planet masses (and Sun) are defined by the number of oscillator levels above the corresponding gravity wave «hole». To put the obtained oscillator over the wave superposition the time is recalculated into the distance according to the Kepler law. The solar system has two energetic conditions. Jupiter is in the first condition, and Saturn, Uranus, and Neptune are in the second. The position of the Sun gravity potential is showed by Figure.

Therefore, the orbit radiuses, movement speeds, equator inclinations and masses of Planets-Giants are predefined by the Sun mass in the same way as the core charge defines the structure of atom electric cover.

Terrestrial planets were formed in the areas of the main wave interference (ℓ is a whole number):

$$R = \lambda_0/(2 \cdot \ell + 1) \quad (5)$$

is the orbit radius.

If we carry on the quantum mechanics analogy, the «gravity radiation constant» k in a similar way with the Plank constant and «spin» of planets in this index units will look like:

$$k = p \cdot \lambda_0$$

or

$$k = M \cdot V_g \cdot \lambda_0 = M^2 \cdot (G_{N\text{-}K} \cdot G_K)^{1/2}/G_K = \\ = M^2 \cdot (G_{N\text{-}K}/G_K)^{1/2} \quad (6)$$

and

$$S_{kg} = (k/2\pi) \cdot m = (M^2/2\pi) \cdot (G_{N\text{-}K}/G_K)^{1/2} \cdot m,$$

where m is the gravity «spin».

References

1. Kurkov A.A. Personal Internet – magazine. Registered on 02.06.2007 [digital source] / Science – News: site: URL: http://zaza149.inauka.ru/ (request date 13.01.2011).

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