Medical sciences
Article

Materials of Conferences

CONTENTS

EFFECTS OF DOXORUBICIN AND RONCOLEUKINE ON LIVER MORPHOLOGY IN DIETHYLNITROSAMINE (DENA)-INDUCED HEPATOCARCINOGENESIS

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After experimental drug therapy for diethylnitrosamine (DENA)-induced carcinogenesis with doxorubicin, roncoleukin and their combination, mortalities by the end of experiment were 25; 25, and 16.7%, respectively, whereas in the untreated group was 30%. The most positive morphological changes in the liver tissue were identified after combined use of doxorubicin with roncoleukin, which was manifested, to some extent, by restoring of beam arrangement of hepatocytes, decrease of symptoms of tumor degeneration, hyperchromasia, and nuclear atypism.

Keywords: diethylnitrosamine-induced carcinogenesis, experiment, liver, doxorubicin, roncoleukin

The incidence of liver tumors trends to increase in recent years. Sherlock and Dooley (1999) reported that the incidence of malignant liver tumors is 2–3% among oncological diseases. Asriviadis et al. (1998) and Schoning-Hekele et al. (2001) found that primary malignant transformation develops in 86–90,2% of all liver tumors, and of them, hepatocellular carcinoma is about 90%. Increase of the number of primary liver cancer in last decade is, probably, because of increased frequency of liver cirrhosis and better detectability of cancer. Despite advances in the treatment of this disease, mortality remains high. A median survival in hepatocellular carcinoma is reported by Schoning-Hekele et al. (2001) to be less than 8 months.

Kiselevsky (2003) noted that cytotoxic lymphocytes and natural killer cells play the key role in the antitumor surveillance system and their killer activity is significantly increased under the influence of cytokines – interleukin-2 (IL-2) and interferon. Simbirtsev (2006) reported that these cytokines are characterized by participation in anti-tumor immunity. Study of the role of cytokines in the development of neoplastic processes allowed developing recombinant drugs of interleukins (IL).

The purpose of our study was to evaluate effects of doxorubicin and roncoleukine on liver structure in diethylnitrosamine (DENA)-induced carcinogenesis.

Materials and methods of research

The research was carried out in 70 male rats, weighing 100–120 g. The animals were kept in a vivarium on a normal diet without giving milk. We used a model of DAN-induced hepatocarcinogenesis by Evgrafov et al. (1966). To induce hepatocarcinogen, 60 rats were injected with carcinogen intraperitoneally 5 times a week at a dose of 10 mg/kg of body weight for 2 months. By the end of the 4th month, mortality was 23,3%. 46 surviving animals were divided into 4 groups:

1) control (10 rats) received saline solution 0,5 ml/100 g placebo;

2) 12 rats received doxorubicin at 0,6 mg/kg intraperitoneally in the tail vein daily within 3 days (Doxorubicin, «Pharmitalia»);

3) 12 rats received roncoleukin at 0,006 mg/kg intraperitoneally («Biotech», St. Petersburg);

4) 12 rats received a combination of these drugs in the same doses. Mortality by the end of experiment was 30, 25, 25 and 16,7%, respectively to groups. The animals were killed at 6, 7 and 8 months from the experiment onset. The comparison group consisted of 10 intact rats kept under the same conditions during the whole experiment. The animals were killed under light anesthesia after 7 months from the experiment onset in a cold room with an air temperature 0–+2°C. Part of the liver were taken for morphological and cytochemical studies.

Results of research and their discussion

Liver morphometry in DENA-induced carcinogenesis have shown that in the liver initially develop pathological changes in the form of dystrophic, dysregeneratory and dysplastic processes in liver parenchymatous elements. Later on, we observed discirculatory, dezorganizational, proliferative and sclerotic changes in liver stroma-vascular elements. Subsequently, they were aggravated; seal and homogenization of cytosol with impaired cell configuration were noted. In the nuclear structures we observed polymorphic changes as kariopicnosis, karyorrhexis and kariolisis of some hepatocytes, whereas in other cells was marked pathological hypertrophy of nuclear structures in the form of appearance of abnormal and dual-core structures (Fig. 1). In this case, sinusoids of hepatic tissue were significantly narrowed, twisted; in their lumen there were destructive and deformed blood elements. Subsequently, because of deformation and dysplasia of structural elements of the cytoplasm of hepatocytes, they turned into abnormal and polymorphic cells (Fig. 2).

In the cytosol of most cells we found vacuoles of different shape and size, lumps colored evenly basophilic with eosinophilic tint. The nuclei of these hepatocytes had different shapes and sizes, and their location and chromaphility were disrupted. Chromatin had no localization; due to it improper distribution in karyoplasms, abnormal hematoxylin nuclear structures were marked.

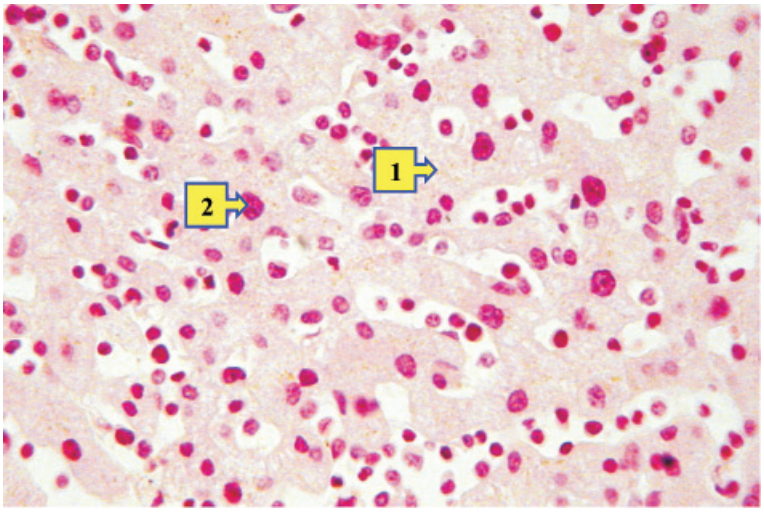

Fig. 1. Seal and homogenization of the matrix of the cytoplasm (1), the appearance of nuclear polymorphism (2) in DENA-induced carcinogenesis. Staining with hematoxylin and eosin. Magnification: ocx10, obx40

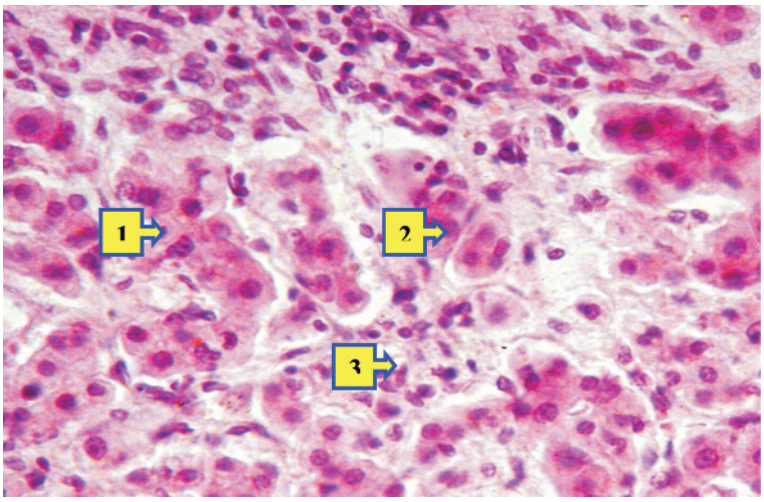

Fig. 2. Disorientation (1), appearance of abnormal tumor cells (2) and lymphoid infiltration (3) in DENA-induced carcinogenesis. Staining with hematoxylin and eosin. Magnification: ocx10, obx40

The appearance of many lymphoid cells between such dysplasia cells of hepatocellular origin corresponded to the development of anti-tumor immunity in liver tissue in the process of carcinogenesis. Histochemical study of the liver tissue during carcinogenesis showed that dysplasia cells degenerated in the tumor cells in PAS reaction had a significant increase in the number of pyronin-positive substance. Characteristic morphological changes in the cytoplasm of dysplasia hepatocytes for histochemical detection of NADPH-diaphorase were manifested by reduction of tetrosole granules in the form of small, vague inclusions of gray-brown or gray-violet colors. In the cytoplasm of hepatocytes with increased carcinogenic changes, their amount was increased and they evenly distributed throughout the entire area of the cytoplasm. In cells with pronounced signs of tumor growth, granules of NADPH-diaphorase were mostly concentrated in the perinuclear area of the cytoplasm and were fused with nucleus chromatin. Around carcinogenic dysplastic changes of the liver cells were determined accumulations of mononuclear hematohistiogenic as a defensive response to neoplastic degeneration of the liver parenchyma in induced carcinogenesis.

After pharmacotherapy with doxorubicin for hepatocarcinogenesis, in liver tissue pathological signs of tumor degeneration of hepatocytes are still remain. In this case, the liver

tissue had polymorphic structure with atypically localized elements of both parenchyma and stroma of the liver. Almost all of liver cells were vacuolated with loss of the typical structure of hepatocytes, localized as groups and atypically. Their nuclei were shifted to the periphery of cell, had polymorphic structure with hyperchromasia of chromatin. Separate groups of atypical hepatocytes contained formazan granules in the form of pulverized clusters with a concentration in the cell membrane. In other cells, where the cytoplasm was much vacuolated, formazan granules were located in the cell membrane. Between clusters of atypical hepatocytes we marked massive accumulation of histiocytic lymphoma cells. They had formazan granules in the cytoplasm of macrophages.

Pharmacotherapy with roncoleukin for hepatocarcinogenesis showed a significant effect in the form of normalization of the structure, shape and location of hepatocytes. Although the cells were arranged randomly, without beams orientation, and had no Disse spaces and sinusoids between them, in some places around the carcinogenic degenerated cells we determined small clusters of mononuclear cells from lymphocytes, macrophages, and young connective tissue cells. Hepatocyte nuclear structures had relatively uniform shape and size, and significant chromatin concentration with signs of mitosis and amitosis. Histochemical determination of NADPH-diaphorase marker in rat hepatocytes showed irregular arrangement of a significant number of small, sometimes medium formazan granules in the form of gray-purple to gray-blue granules. Also accumulation of formazan granules was found in the intercellular substance as gray-purple stripes.

The most positive morphological changes in the liver tissue were identified after use of combination of doxorubicin with roncoleukin. In this case, the beam location of hepatocytes was restored in only separate hepatocytes, were preserved signs of tumor degeneration in the form of an eccentric location, hyperchromasia, and nuclear atypism. In these cells, the cytoplasm was vacuolated, in matrix histochemically were determined some formazan granules in the form of small gray-brown clusters in the perinuclear region. While hepatocytes merged together, their small nucleus is divided into several parts; the cytoplasm is colored with grained formazan granules in the form of gray-brown inclusions.

We obtained positive results due to the fact that IL-2 has the ability to induce the activity of almost all clones of cytotoxic cells, as noted by Berezhnaya et al. (1992). Histochemical studies have shown that cytokines serve the protective role by providing recruitment of additional effector cells in pathological focus, stimulating their phagocytic activity and inducing antigen-run response, all of which contributes to the elimination of tumor cells (Jafarova, 2009). Studies by Chechina et al. (2011) demonstrated that recombinant IL-2 at a dose of 0.1 ng/mL has a pro-apoptotic activity against lymphocyte cells by changing the ratio of anti-(Bcl-2, Bcl-x1) and proapoptotic (Bad) family proteins Bcl-2 in favor of the latter.

Conclusion

Thus, pharmacotherapy with different preparations for liver induced tumors showed that the most positive morphological changes in liver tissue were detected by the action of doxorubicin in combination with roncoleukin.

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STRUCTURE AND PROPERTIES OF CHITOSAN-BASED FILMS FOR BIOMEDICAL PURPOSES

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The sorption, elastic–plastic, surface structural, bactericidal, and medicinal properties of films made of different chemical forms of chitosan were studied. Conversion of the polymer from polycationic to polybasic form resulted in changes in the sorption ability, strength and elastic characteristics, and surface structure. Films made of polybasic chitosan, as distinct from polycationic ones, did not inhibit *Escherichia coli* and *Staphylococus aureus* growth. Fairly high adhesion and proliferation activity of MA-104 epitheliocytes were found on the film substrates examined. The effectiveness of our chitosan film matrices in the treatment of second- and third-degree burns was assessed clinically. The use of chitosan films significantly promotes the process of wound healing (in comparison with traditional therapy), creates an optimal medium for regeneration, and protects wounds from infection and traumas.

Keywords: chitosan of various chemical forms, film, sorption kinetics, elastic–plastic properties, surface structure, bactericidal properties, cultivation of epithelium-like cells, burn treatment

In the past few years, a large number of new pharmacological preparations and cosmetics using the amino polysaccharide chitosan have appeared [1–4]. Such properties of chitosan as biocompatibility with living tissues, functional similarity to dermal components *in vivo*, biodegradability, and ability to act as a biocide determine the further development of novel medical–biological materials on its basis, namely film wound dressings, matrices as carriers of epithelium-like and epithelial cells, matrices for controllable liquation of medicines, and other materials [5–11].

The macromolecule of chitosan has a heterochain structure and is built up from *D*-glucosamine units (mainly) and *N*-acetyl-*D*-glucosamine units linked by β-1,4-glycoside bonds. The presence of an amino group in the elementary unit leads to two possible chemical forms of chitosan in ready films, namely the polycationic and the polybasic form, depending on the preparation technique used. Polycationic chitosan is well soluble in water, whereas the polybasic form is hydrophobic. Films made of these two forms of chitosan differ in other physicochemical characteristics as well.

The aim of this work was to study and comparatively analyze the structure and properties of biomedical-purpose films made of different chemical forms of chitosan.

Materials and methods of research

Powdered chitosan (Bioprogress Corp., Russian Federation) was used. The physicochemical characteristics of the samples are given in Table 1.

Table 1

Properties of powdered chitosan samples

Sample	Molecular mass (kDa)	Deacetylation degree DD (mol%)	$[\eta]^{25°C}$ in acetate buffer (dl/g)	Powder density $\rho_н$ (g/cm^3)	Moisture content W (%)
CTS-87	87	83,6	2,0	0,34	6,5
CTS-200	200	82,0	3,7	0,32	9,7
CTS-280	280	80,8	5,4	0,24	10,8
CTS-550	550	81,0	8,2	0,25	9,9
CTS-640	640	82,6	11,1	0,16	10,9

Films made of polycationic and polybasic chitosan served as the objects of study. These were formed by the dry technique by casting a polymer solution onto a polyethylene support. The chitosan concentration in the working solution was 2 g/dl. A 2% aqueous solution of acetic acid was used as a solvent. The films were formed at room temperature and normal atmosphere pressure for 3–4 days. The readiness of the films was determined visually by the separation of the film sample from the support. In fresh films, the polymer was polycationic. To make it polybasic, we soaked the film samples in a 1 N NaOH solution or in a 50% aqueous solution of triethanolamine (TEA) for 1 h. Then, the samples were washed with distilled water to achieve a pH value of 7 and were dried at 22 ± 2°C. The moisture content of the initial film samples did not exceed 20–22%. The formed films are characterized in Table 2.

Sorption properties were examined at 22 ± 2°C and at 37°C. Distilled water, its vapors, and the vapor medium above a 0,5 N HCl aqueous solution (chosen to imitate wound exudates) were used as sorbates. The sorbate vapor experiment has been described elsewhere [12]. The degree of polymer sorption of vapors (C_s, wt%) was estimated gravimetrically on an OHAUS Discovery DV215CD (USA) and an E. Mettler Zurich (Germany) analytical balance, with an accuracy of ± 0,0001 g. C_s per absolutely dry film was calculated with account taken of the conditional moisture content of the film sample. There were not less than three replicates.

Table 2

Properties of chitosan films

Sample	Chemical form	Base	Thickness d (μm)	Moisture content W (%)
CTS-87	C	-	45	19
	O	NaOH	80	16
		TEA	70	17
CTS-200	C	-	50	20
	O	NaOH	85	15
		TEA	70	17
CTS-280	C	-	50	20
	O	NaOH	85	16
CTS-550	C	-	50	21
	O	NaOH	90	17
		TEA	70	18
CTS-640	C	-	55	22
	O	NaOH	95	17

Physicomechanical properties were examined on a TiraTest 28005 uniaxial tensile testing machine (Germany) with a loading cell of 100 N. The ultimate tensile stress (σ, MPa) and relative elongation (ε, %) were calculated with account taken of the cross-section area and the initial length of the film sample, respectively. The values of σ and ε were obtained by averaging the results (not less than five samples). The Young modulus (E, MPa) was estimated as the σ/ε ratio, and the tension modulus (E_0, MPa) was calculated from the slope of the initial straight segment of the $\sigma = f(\varepsilon)$ tension curve. When calculating E and E_0, we expressed ε in unit fractions.

The film surface structure was examined on a Solver P47-PRO scanning probe microscope (NT MDT, Russia). A 50 μm × 50 μm × 3 μm scanner and cantilevers were used for contact and noncontact microscopy.

The bactericidal properties of the chitosan films were tested on a gram-negative (*Escherichia coli*) and a gram-positive (*Staphylococus aureus*) microorganism grown on AGV solid nutrition medium. The exposure time was 18 h. Bactericidal activity was estimated by the diameter of the inhibition zone for the microbial culture at the places to which film samples were applied.

For estimating the biocompatibility of the film matrices, a transformed cell line of the fetal epithelium of the rhesus monkey kidney, MA-104 (collection of the Virology Institute of the RAMS, Moscow), was used as a test culture. A cell culture grown in Costar plates was used as a reference. Cell adhesion and proliferation were observed with a Biolam P inverted-stage microscope (Russia).

Clinical tests were done at Urban Clinical Hospital No. 7 (The Thermal Wound Center), Saratov, in accordance with GOST (State Standard) P 52379-2005, «Good Clinical Practice». For these tests, films were prepared under aseptic conditions and were additionally sterilized by UV radiation for 1 h.

Results of research and their discussion

Both polycationic and polybasic chitosan films are known to possess high moisture absorption [13, 14]. As polycationic chitosan is water soluble, sorption was performed in a vapor phase for a comparative analysis of the sorption properties of films made of the different chemical forms of chitosan. Fig. 1 shows the kinetics of sorption of H_2O vapors and the vapors above an aqueous solution of 0.5 N HCl by both chitosan forms at 22 ± 2 °C. It can be seen that polycationic chitosan films, in contrast to polybasic ones, were characterized by unlimited sorption kinetics and did not reach an equilibrium swelling degree. After about 72 h of exposure to the vapor medium, the acetate chitosan films started to dissolve (the dashed line). The total sorption degree of water vapors is always higher than that of the vapors above a hydrochloric acid solution. It also should be noted that the sorption degree of polycationic films is about four to six times higher than that of polybasic films. However, after losing their hydrophilicity, modified polybasic chitosan films acquire specific sites of binding to the receptors of cell cultures (see below).

For polycationic chitosan, the sorption rate and the maximum value of Cs were higher for the films made of high-molecular weight polymer samples (Fig. 2).

For polybasic chitosan films, increasing the molecular mass of the polymer did not change the character of the swelling curve and affected the sorption degree only slightly (Fig. 3). The sorption rate was always maximal at the initial stage ($t < 30$ min). The reagent (an inorganic or organic base) in chitosan conversion to the basic form did not change the character of $C_s = f(t)$ either, but it influenced the maximum value of C_s. For instance, a polybasic chitosan film obtained by NaOH treatment sorbs, on the average, about 20 wt% more vapor than does a TEA-treated film. Unless otherwise specified, further work used basic films prepared by modification in an NaOH solution.

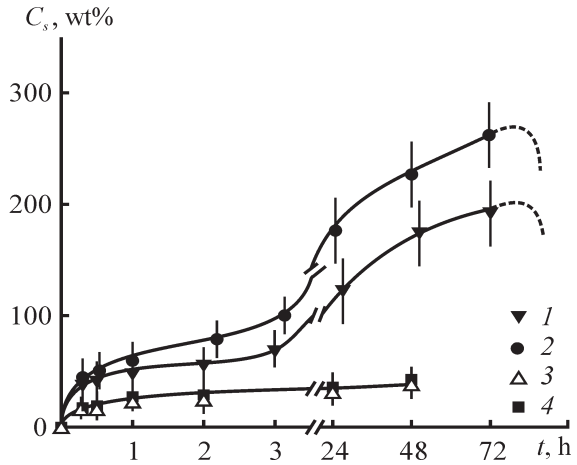


Fig. 1. Kinetic curves for the sorption of vapors of 0.5 N HCl (1, 3) and H_2O (2, 4) by polycationic (1, 2) and polybasic (3, 4) CTS-87 films at 22 ± 2°C. NaOH was used to convert CTS to the polybasic form. The dashed line shows the onset of film dissolution

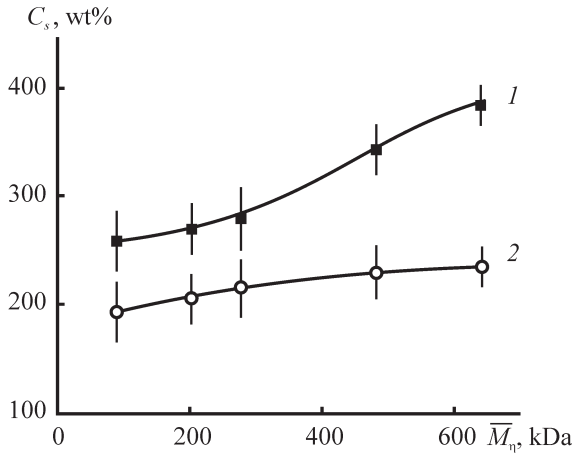


Fig. 2. Maximum degree of sorption of vapors of water (1) and 0,5 H HCl (2) by polycationic chitosan films as a function of the polymer's molecular mass; T = 22 ± 2°C

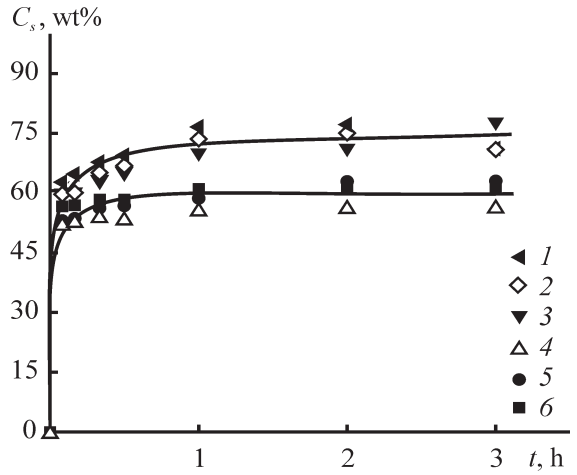
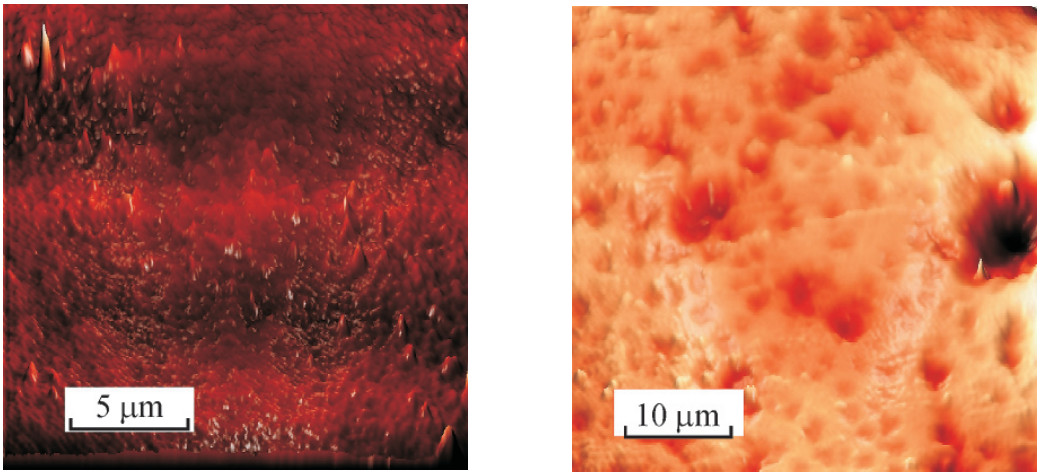


Fig. 3. Swelling kinetics of the films made of CTS-87 (1, 4), CTS-200 (2, 5), and CTS-550 (3, 6) and converted into the polybasic form with NaOH (1 - 3) and TEA (4 × 6) in water; T = 22 ± 2°C

As chitosan materials are promising for biomedical applications, the sorption and diffusion characteristics of the film samples under study were estimated at 37°C. The sorption curves for the differing chemical forms of chitosan were similar, as in our previous experiments. However, increasing the temperature somewhat reduced the rate and degree of sorption of sorbate vapors.

UV sterilization of the different chemical forms of chitosan films did not affect their sorption properties.

The differences in the chemical structure of chitosan were reflected in the surface structural characteristics of the film samples. The results of scanning probe microscopy showed that the surface structures of chitosan films in the different chemical modifications differed essentially in their morphological relief. For example, polycationic films had a densely packed structure with microspikes (Fig. 4 a), whereas in polybasic films, a porous structure with pore diameters of ~1–3 μm was observed (Fig. 4 b). There were bulges on the surface of the films of both types. With account taken of these differences in the surface relief, it was supposed that the morphological features of the film samples should have reflected on other physicochemical properties, e.g., the elastic–plastic characteristics.



a b

Fig. 4. A topographic image of the morphological surface structure of films made of CTS-87 in the polycationic (a) and the polybasic (b) form. Scanning probe microscopy. NaOH was used to make CTS polybasic

Chitosan conversion from polycationic to polybasic form almost did not change the character of deformation of the film samples. The tension curves of both forms of chitosan films displayed portions with elastic and plastic deformation (Fig. 5 a, curves 1, 2). However, alkaline treatment deteriorated both strength and elasticity of the films. Polycationic films, unlike polybasic ones, were characterized by higher values of ultimate tensile stress and elongation at fracture and also by higher values of the Young and elasticity moduli (Table 3). A similar character of σ variations for chitosan films with = 86 and 31 kDa in the polycationic and the polybasic form was noted in Ref [15].

Visually, the elasticity of the film samples increased when they were held in the sorption media (Fig. 5 b). In this connection, the elastic–plastic characteristics of polybasic chitosan films having absorbed various quantities of liquid water were studied. The shape of the deformation curves obtained for swollen films attested to the development of plastic deformation (in the mode of forced deformation) in these samples (Fig. 5 a, curves 3–7). The value of elongation at fracture for the films having absorbed water exceeded the elongation value of the initial chitosan films in any form by 10–20 times (Table 3) [16]. The use (with other conditions being equal) of an organic base to change chitosan from the polycationic form to the polybasic one resulted in a higher value of ε for the swollen film samples (see, e.g., curves 4–7). This makes the modified film sample capable of modeling a complex-relief surface. In each case, the values of ultimate tensile stress and the Young and elasticity moduli decreased in comparison with those for both forms of the initial films (Table 3).

The bactericidal properties of both chemical forms of chitosan films were studied by using the microorganisms *E. coli* and *S. aureus* (major infecting agents found in wound exudates) as examples. Polycationic film samples were found to possess bactericidal activity and to inhibit the growth of cultures of the gram-negative and gram-positive microorganisms. Polybasic samples were not inhibitory to *E. coli* or *S. aureus* under the experimental conditions used.

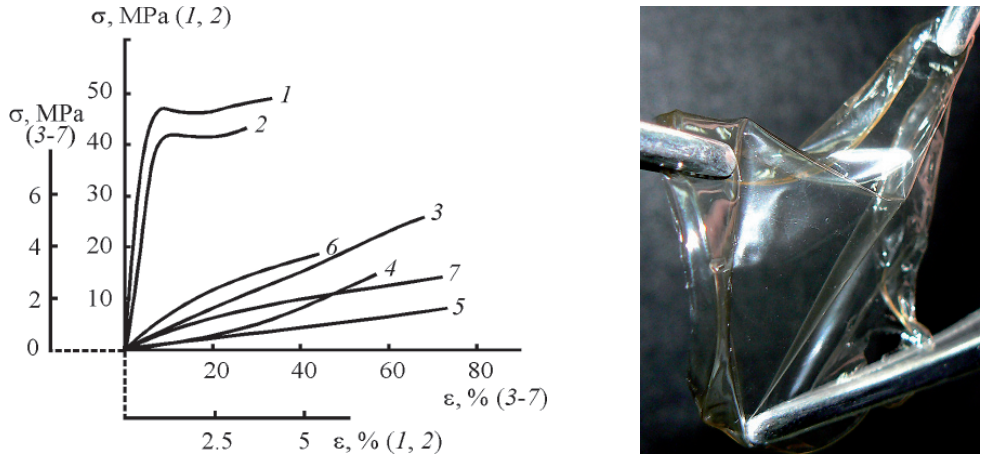


Fig. 5. (a) Elongation curves of the films made of CTS-87 (1, 3–5) and CTS-200 (2, 6, 7) in the polycationic (1, 2) and the polybasic (3–7) form, after the absorption of 60 (3), 90 (5, 6), and 95 wt% H_2O (4, 7). NaOH (3, 4, 6) and TEA (5, 7) were used to make CTS polybasic. (b) Photo of a film made of CTS-280 acetate after modification in a vapor medium formed by 0,5 N HCl at 20°C

Table 3

Deformation and strength properties of the chitosan films

Sample	Chemical form	Base	H_2O sorption degree C_s (wt%)	Ultimate tensile strength σ (MPa)	Elongation at fracture ε (%)	Young modulus E (MPa)	Elasticity modulus E_0 (MPa)
CTS-87	C	-	-	49 ± 4	4 ± 3	$1,2 \cdot 10^3$	$4,4 \cdot 10^3$
	O	NaOH	60	6,5 ± 0,5	69 ± 1	9,4	25
			95	3,6 ± 0,5	52 ± 5	6,9	4,0
		TEA	90	2,0 ± 0,5	78 ± 4	2,6	2,5
CTS-200	C	-	-	44 ± 3	3 ± 1	$1,5 \cdot 10^3$	$4,0 \cdot 10^3$
	O	NaOH	90	3,2 ± 1,2	45 ± 3	7,1	40
		TEA	95	2,8 ± 1	68 ± 5	4,1	10

Thus, it can be concluded that polycationic and polybasic chitosan films differ in the nature of sorption kinetics, strength and elastic properties, surface structure, and bactericidal activity. The totality of these properties satisfies the requirements placed upon wound dressings (film matrices).

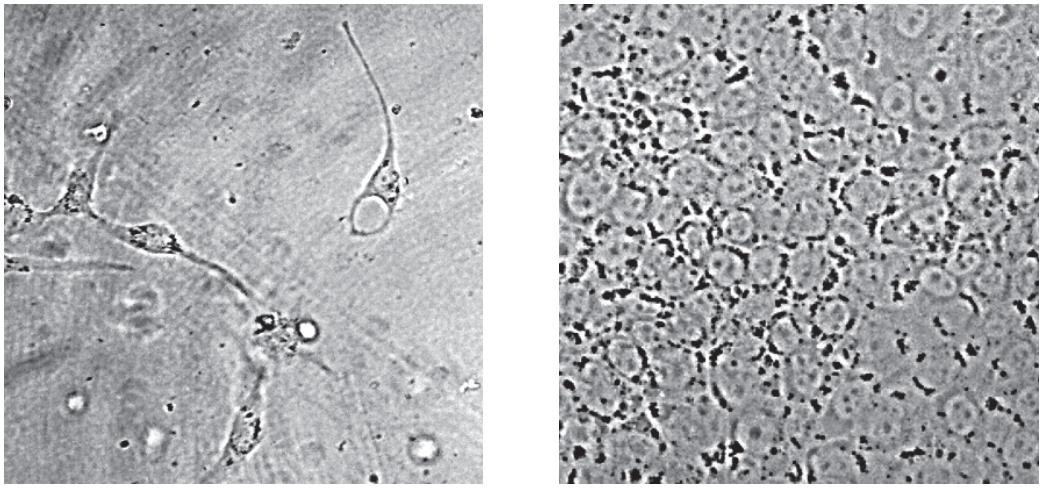
To assess the biocompatibility of the chitosan matrices, we examined the adhesion and proliferation of a model culture, MA-104, on films made of CTS-87 and CTS-200 in the polycationic form. As can be seen in Fig. 6, high adhesion and proliferation of the cell culture were observed as early as after 24 h of incubation. Depending on the molecular mass of the polymer, the formation of a cell monolayer was observed on day 3 or 4 of incubation. The best cell growth was recorded for the films made of CTS-200.

We investigated the effectiveness of using chitosan film matrices in the treatment of second- and third-degree burns. Various film modifications were applied, namely polycationic, polybasic, and polycationic after additional modification in water vapors (sorption degree, 90–100 wt%). Burns were treated by the closed method (films were fixed with bandages) in three groups, each consisting of 5 volunteer patients. Open wounds were inspected every 2–3 days. The effectiveness of the film action was evaluated by the character of the wound-process course, the degree of manifestation of the inflammation reaction, and the period of wound repair.

It was found that the films were convenient to use and could be easily and painlessly applied to a patient's wound. Their high moisture absorption ability and high air permeability enabled the modeling of the wound surface profile and a longer period of application to a wound, permitting the redressing frequency and the wound surface traumatization to be reduced.

Our studies showed that the use of chitosan film matrices to treat burn wounds was highly effective as compared with traditional treatment methods. The films sorbed wound exudates well. Polybasic and polycationic chi-

tosan films could be detached from the wound together with the bandage during redressing on day 2 or 3 and on day 5 or 6, respectively. When second-degree burns and intermediate third-degree ones were treated with the biodressing, complete epithelization occurred on day 5 or 6 and on day 15 or 16, respectively, no matter what chemical form of the matrix was used. In traditional therapy (a bandage impregnated with an antiseptic), second-degree burns and intermediate third-degree burns are fully healed on days 14 and 21, respectively, i.e., slower by 1,5–2 times. The treatment was accompanied by a 2–2,5-fold reduction in the bacterial infection level of the burn wound, as compared with what is observed in traditional therapy. No allergic reactions or irritating effects were observed.



a b

Fig. 6. Epithelium-like cells of the rhesus monkey kidney, MA-104, after 1 (a) and 7 (b) days of cultivation on a CTS-87 film in the polybasic form. Light microscopy; magnification, ×400

Thus, chitosan films can be regarded an effective wound dressing for the treatment of burns and other surface wounds.

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Materials of Conferences

FULL-DAY HOSPITAL – REPLACING FORMS OF PROVIDING MEDICAL CARE FOR CHILDREN IN REPUBLIC DAGESTAN

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Republic Dagestan (RD) can be described with a number of special climatic-geographic features, insufficient resources, low social-economic development and production type, a progressive demographic population type, low level of medical care that is especially expressed in the country, where 58,3% of the native population live. These differences have become significantly worse owing to war actions in the frontier Republic Chechnya (R.S. Galjiyev, 2005).

Problem of organization and provision of ambulatory-polyclinic care for children and teenagers stays one of the complex and unsolved in the system of medical care. This problem is especially urgent for RD that has a number of its national peculiarities: having many children, deep family traditions, low level of mother culture (especially in the country) (A.N. Gasanov, 2006). The republic keeps high birth rates – 19,4 per 1000 of population (RF-12,5), infantile death rate – 11,5 per 1000 of the born (RF-7,5). The share of babies of less than a year of age equals 15% (RF-3).

Considering the unfavourable trends in child's health condition in RD, we consider provision of available qualified medical care for a long-term perspective a problem of great significance. During recent years stationary-replacing forms of medical care have been developing: daytime hospitals (DH) and home-hospitals (A.A. Kalinisskaya, 2000, Kalininskaya, Dubinina Ye.Yi., 2011).

Republic Dagestan has accumulated a little experience of developing daytime hospitals. The provision of DH-beds in RD equaled 0,76 per 10 thousand of population in 2011 (RF-5,6).

In terms of experiment we have approbated an organization-functional model of DH on basis of the republic infantile consultative polyclinic (RICP in Makhachkala). Daytime hospital worked 5 days a week from 8:00 to 16:00. 10 of 15 beds were pediatric, on which sick children and teenagers with endocrine, gastroenterologic, cardiologic, neurologic diseases were placed (Makhachkala), and 5 beds – surgical (with an orthopedic, ENT-pathology, etc.).DH personnel included 1,5 positions of doctor, 2,0 positions of middle medical personnel, and 3,0 positions of lower medical personnel.

A whole number of diagnostic studies took place in DH. A special attention has been paid to children who were on a hospital record. In DH all patients were inspected by a doctor daily, he prescribed treatment, control laboratory-diagnostic studies, consultations with doctors of narrow special ties were given.

Patients received a course of intense therapy in DH since their initial admission, it was prescribed differentially and included everyday intravenous drop infusions, intravenous, intramuscular, and hypodermic introductions of medical solutions, taking tablet preparations, physiotherapeutic procedures, massage, exercise therapy, restoration treatment.

According to age composition, children and teenagers that took medical care in DH were divided as follows: under a year – 39,5%, from 1 to 14 years – 36,6%, from 14 to 18 years – 28,4%.

Among those who have finished their treatment in DH 31,7% were formed of children and teenagers with native abnormalities and defects of development, 15,7% – with heart-vascular pathologies (non-rheumatic carditis, rheumatism of inactive phase, juvenile rheumatoid arthritis), 13,7% – with pathologies of ear and mammiform sprout, 11,9% – with pathologies of nervous system, 9,6% – with bone-muscular pathology (scoliosis, flat feet, etc.).

Among children who took medical care in DH with heart-vascular diseases, 1/3 was with rheumatism, a little less – with juvenile rheumatoid arthritis, non-rheumatic carditis, etc. In class of breath organs diseases chronic bronchitis formed the major part. In class of urino-genital system infections of kidney and urinal channels prevailed.

The analysis of DH wok volume and character has shown that per each 100 of patients 58 children received intravenous drop infusions; 56 – intravenous injections; 94 – intramuscular and hypodermal injections; 10 – tablet preparations. All DH patients were exposed to laboratory inspections, 97% were inspected with US, 48% – with radioscopy, and 40% received restoration treatment.

An average treatment duration of DH patients equaled 11,7 days. It is slightly less than average treatment duration in specialized hospitals of daily presence (14,1 days). It is explained by the fact that DH takes children with less heavy and non-complicated pathologies.

Number of a bed working days per a year in DH equaled 301,9 days, a bed turnover – 25,8; average bed occupancy – 11,7 days. Economic reasonability to establish a DH is defined by a less number of medical staff, compared to a full-day hospital, exclusion of patients' feed costs and other costs.

Medical efficiency of treating patients in DH is proved by that 94% of sick children and teenagers were discharged with improvements, 5,8% of patients recovered, and condition only of 0,2% of patients stayed unchanged.

Daytime hospital for children on base of RICP is used for preventive treatment of sick children with chronic diseases, besides, a number of complications of main disease decreases. The taken analysis has shown that during the 3 years of DH operation a number of emergency medical calls for children with chronic pathologies has decreased by 23 %, frequency of full-day hospitalization has decreased by 12,8 %.

Our calculations have shown that DH treatment costs for kids is 2,3 times lower than that of full-day hospital.

Medical-social efficiency of DH organization is proved by social questionings of parents of sick children. All respondents has expressed a satisfaction with this form of work and considered it to be more suitable in a social scale. Questioning parents and medical workers implied studying respondents' suggestions on how to improve quality of DH services that allowed us to take improvements into organization of DH structural departments work.

The research has established that DH is a positive form of work from the position of medical-social efficiency. However, we should pay attention to DH work in 2 shifts that is important in economic terms, as treatments costs would be lower even lower in two-shifts work regime.

Resume. The works presents an analysis of work of daytime hospital (DH) on base of republican infantile consultive polyclinic (Makhachkala). Medical-social efficiency and economic reasonability of organizing DH for children and teenagers is shown.

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NEW TECHNOLOGIES IN TREATING PATIENTS WITH DENTAL IMPLANTATION

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The second part of the XX century can be described as the time of acute discussions and disputes between clinicists on reaction of tissue against introduction of an implant and definition of the safest level of its functional strain. The problem of functional strain under inter-bone implantation is urgent, as both approaches, delayed and early strain, have its positive and negative sides (V.N. Olesova, 1986, A.A. Kulakov, 2000).

Research objectives. Experimental-clinic approval of method of early functional strain under dental implantation.

Central scientific-research institute of stomatology and facial surgery has served as the basis for our research.

Clinical part of the work was carried out during treatment of 332 patients in age of 20–70 years, including 228 women and 104 men. Average age of male patients equaled 53 year, women – 49 years. All the studied have been split into two groups after placing implants: the 1st group (234 patients) was formed by patients who had been earlier exposed to functional strain, and the 2nd, control group (98 patients), were treated with traditional methods of implantation with teeth implants.

Operations of inter-bone implantation were carried out on both lower and upper jaw. Distribution of implants according to the selected scheme and their location is provided in table.

Distribution of implants according the selected system and localization

Implant location	Bioimal-implant	LIKO	Astra-Tech	Total
Lower jaw	221	27	25	273
Upper jaw	254	19	27	300
Total	475	46	52	573

Implants of domestic implantation system «Biomal-implant» have been placed.

While inspecting patients we considered a number of teeth lines defects, athrophy degree of bone tissue of alveolar sprout, volume and localization of the tooth line defect.

To define recommendations and limitations to carry out surgery of inter-bone implantation, pa-

tients were exposed to clinic-laboratory, radiological, and functional inspection.

During the initial inspection we considered ethiology of adention, as the cause of lack of teeth is an important characteristic that indicates a potential risk of complications and defines the treatment forecast. Diagnostic models of jaws and wax biting blocks were made before placing implants in order to define central occlusion. Diagnostic models were used to define implant position and show a patient the construction of the planned treatment method. Dynamic observations were carried out at the basis of clinic-radiographic and functional methods.

At the stage of preliminary inspection of patients who has visited the clinic, and also during the process of dynamic observation the main method of radiological study was orthopantomography (OPTG). OPTG was used at the first visit of a patient and also during control periods after tooth implantation. Data of this method provide us with a large volume of information on the condition of teeth, allow us to reveal the degree of vertical resorbtions of alveolar crest, define the location of major anatomic formations of lower jaw channel, upper jaw cavities, and the bottom of nasal cavities. Computer tomography (CT) was used as an auxiliary method.

Orthopantomographies were taken with facilities PM2002, «Kranex», in terms 60–65 kV, 7–10 mA, exposed during 10–12 seconds.

During the research we have analyzed the data of OPTG for all patients with early functional strain in early periods of study before implantation, and after 1,3,6, 12 months, peculiarities of bone tissue formation around the implant have been described.

The study of micro-circulation in area of dental implantation was carried out via method of laser doppler flowmetry (LDF) with an analyzer of capillary blood flow – LAKK-01. The condition of micro-circulation was evaluated according to the index of micro-circulation (M) that characterizes the level of capillary blood flow; parameter – σ that defines variability of erythrocyte flow and variation coefficient (Kv) that characterizes vasomotor activity of microvessels.

Ultrasound osteometry was carried out with echoosteometer EOM-02. Electromiography (EMG) of chewing muscles was carried out with neuromiostome. Evaluation of jaw alveolar part blood supply was taken with the method of rheography with the facility RPKA-02 (MEDASS). Besides, automated computer processing of main rheographic indexes (RI – rheographic index, IVT – index of vessel tone, FI – flexibility index, IPR – index of periphery resistance) were evalueted. Dynamic observations of LDF, EOM, EMG, RG were carried out before placing teeth implants, and after a day, and then after 3, 6, 12 months.

The taken experimental research has established that under simultaneous placing of screw implants with an early functional strain connection-tissue capsule grows fast around implants, compacts, and fiberizes, and then becomes thin. It testifies for a possible early rehabilitation of patients with partial and complete loss of teeth.

Under early functional strain in area of dental implants we observe formation of bone structures with their further differentiation that ends with compaction of new bone tissue. A presence of thin connective-tissue capsule around implants is a favourable factor that provides for softening in mechanic stress during early functional strain. According to the data of echoosteometry, echo-density of bone tissue grows gradually and restores in 6 months after inter-bone implantation new methodic.

Early functional strain of dental implants provides for a realization of chewing muscles. Normalization of coordinated relations in their work comes in 3 months due to an alteration in bio-electric activity of the very chewing muscles and temporal muscles. Dynamic of regional geodynamics indexed proves the adaptation to early functional strain and complete restoration of regional blood flow in the area of implants in 6 months.

Among patients of the main group a level of tissue blood flow, its intensity and vasomotor activity of micro-vessels has increased by 40–75 %. It testifies for a development of hype re mi a in microcircular bed that cut off in 3 months.

According to clinic-functional research, the method of early functional strain under dental implantation is more effective, compared to the traditional one. It is linked to a strengthening in reparative processes in bone tissue.

At the foundation of the research results, we can recommend gradual implantation right after placing an implant: making of temporary implant construction of plastic directly after placing an implant; making permanent orthopedic construction.

Evidence for early functional strain with the method of dental implantation is: preservation of the volume of bone tissue of alveolar jaw sprout; partial and complete loss of teeth; absence of interocclusion height disturbance; presence of keratinized gum; a patient's readiness to take part in postsurgery rehabilitation.

Contradictory evidence against early functional strain under dental implantation is: an expressed atrophy of alveolar sprout bone tissue; a mismatch between the axis of implant and the axis of metalceramic crown,; absence of keratinized gun; incorrect distribution of chewing strain over the implant, mostly horizontal; unsatisfactory hygiene of oral cavity.

Resume. The article represents results of research on approbation and evaluation of the efficiency of a new methodic of early functional strain under dental implantation.

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MEDICAL INNOVATIONS DURING AN ERA NANOTECHNOLOGY

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The development of medicine in the era of nanotechnology has been reviewed. The hallmark of this time is a broad use of rare and rare-earth metals. The molecular processes of nanotechnologies are similar to those of the origin of life. The genetic code of protobionts contained information about the maintenance of metal-ligand homeostasis and the composition and functions of cell walls and membranes under conditions existing 3,5-4 billion of years ago. Biological evolution resulted in origination of mechanisms:

1) a struggle in the form of antioxidant systems against the toxic effect of O_2;

2) harsh Ca^{2+} homeostasis in the form of I-containing Se-protein hormones.

Interdisciplinary medical bioinorganics is the basis for study of mechanisms of pathological processes. There has been formulated the law of substitution and its consequences for the explanation of the interaction of metals in metabolism. It is possible to predict new understanding of an etiology, pathogenesis and treatments of diseases.

1. The Era of Nanotechnology.

One of the creators of quantum electrodynamics *Richard P. Feynman* in 1959 regarding the supercompact encoding of a tremendous volume of information in biological systems turned out to be of great importance for the advancement of biology (as well as medicine). In his speech«There's Plenty of Room at the Bottom. An invitation to enter a new Field of Physics» at an annual American Physical Society meeting R. Feynman forecasted the Era of Nanotechnology in terms of manipulation of matter at the level of single atoms.

Humankind has passed through several periods in its progress – the Stone Era (> 4 thousand years Before the Common Era), the Copper Era(4-3 thousand years B.C.E.), the Bronze Era(before 13/11 centuries B.C.E.), and the Iron Era (before 1959 C.E.). One can easily note that the criterion for the determination of the epochs is the type of material (metal) that was used for making tools and weapons.

In this system of coordinates, the EraofNanotechnology differs from the Iron Era by its widespread use of rare and rare-earth metals. The elements that have hardly ever been used before are in extensive use. Computers work on alloys of Si, Ge, As, mobile phones and heterolasers – Ga, Al, As, In, P, the aviation and car industry – Ti, Al, Li, Ce, atomic power – U, Pu, Th, etc. The influence of these elements on the metabolism of organisms and the environment has not been studied enough.

2. The similarity of studying molecular nanotechnology and the origin of Life.

The spontaneous mechanism of adsorption of primary organic molecules on crystals in the prologue of life and the origin of self-replicating molecular machines in nanotechnologies, in particular as applied to the incipiency of enantiomorph ism, are the same. The application of nanotechnology to the research of the origin of life, and vice versa, can assure success in the creation of manageable synthetic life [1].

Chemical evolution, before biological, had occurred on the basis of chemical reactions, remaining in force to the present time. Biological evolution, followed the origin of protobionts, for various taxon's occurred in parallel response to *changes in environmental conditions.*

At the time of the origin of life, genetic information was inscribed under the conditions that existed 3,5-4 billion years ago. Among them the main ones were *an absence of oxygen in the atmosphere* and *the salt composition of the primary World Ocean*. It was different from the modern one (pH ~ 0,3 vs. 7,6-8,4 now, the total salinity ~2,5 % vs. 3,4-3,7 % now, a significant predominance of Na^+ and Mg^{2+}). The content of metals has gradually changed upwards in terms of K^+ and Ca^{2+} proportion in the modern World Ocean. Apparently, during the process of adaptation of the metabolism of living organisms to environmental conditions, yet unknown mechanisms of information coding from the receptors and ionic pumps of membranes of protobionts were engaged.

On the assumption of Curie's principle («dissymmetry creates the phenomenon») the development of protobionts could have not occurred without membranes. The hallmark of Life, as the mode of existence of protein bodies, is the processes of interaction with the environment. The origin of the organisms of various domains and taxon's was determined by the nature and functioning of the substances of the membranes as the only exchange mechanism of energy, information and matter between the protobionts and the environment.

Consequently, the correct theory can only be the theory of the origin of life that supposes the formation of membranes in protobionts. This is the «protein» theory of A.I. Oparin [2].

Coacervate droplets of a polypeptide nature gradually accumulated polymers of nucleotides, porphyrins, carbohydrates, steroids, fatty acids, pyridoxine, and molecules of other classes of organic substances. Presumably, their total number for implementation of vital functions must have been at least 29 [3]. Initially many processes in

these droplets could have proceeded with the help of the catalytic properties of rocks and clays (aluminosilicates), in particular, in the form of Lewis and Brønsted centers for spontaneous synthesis of polypeptides [4] and FeS-catalysts – «mackinawite» ([Fe >> Ni)S]), «greigite» ($NiS_2[Fe_4S_4]S_2Fe$), etc.

First protobionts were chemosynthetics. Later on, the catalytic properties were multiply intensified in enzymes of a protein nature. Inside of the protobionts, a *metal-ligand homeostasis* (MLH) must have come into existence and been sustained. It can be vividly represented by the well-known symbol of Chinese natural philosophy «yin – yang» – the unity of opposites. But instead of darkness and light in this case the «mineral and organic» parts of the living matter are the subject. Both parts are of equal value for life, despite of a multiple quantitative predominance of organic matter mainly comprised of the following atoms C, N, O, H, P, S.

The ligands for metal ions, such as tetrapyrrole (porphyrinic) structures, had a material significance. The chelates with Mg^{2+} (chlorophylls) turned out to be able to capture the energy of photons and transform it into chemical energy in the form of $NADPH_2$ and ATP. The oxygen release into the atmosphere was an indirect result of photosynthesis. The porphyrinic chelates with ions of transition 3d metals (Fe, Cu, Co, V*)* in the form of he mog lob in, cytochromes, hemocyanin, cyanocobalamin and others turned out able to participate in the electron transfer in the processes of oxidation-reduction. The composition of the membranes initially included the substances of *a carbohydrate and lipid nature* which, are inherent in plants and bacteria now as well. Chemical specificity of various large taxon's and domains in the process of biological evolution has been maintained by the substances of the membranes of cells [5]. This information was encoded in DNA. After the formation of O_2, the connective tissue based on collagen and membranes of a *protein* nature in animals were formed. The information from DNA is decoded thanks to the functioning of cell walls and membranes [6].

Within the space of 3 billion years the evolution processes occurred under the constant pressure of two environmental factors: an increase in the content of O_2 and an increasing concentration of Ca^{2+}in the Ocean water. The intracellular structures in the form of a multicomponent antioxidative system (AOS) for protection against the poisoning activity of O_2 came into existence. The high-powered system for MLH maintenance, especially concerning the cytotoxic Ca^{2+} ion, came into existence as well. For some unknown reason, this second system functions in the participation of *I*-containing *Se*-proteins. Presumably, these elements constitute a semi conductive heterostructure that is necessary for the functioning of the Ca^{2+} homeostasis system.

3. Biology and Life are Chemistry [7, 8].

In the modern meaning, chemistry is considered an integrated science, consolidating the *historically developed subdisciplines (inorganic, organic, physical chemistry). This division* is artificial because they are methodically and thematically connected to each other. Studying the matter from only one perspective invariably results in incomprehensive understanding of the studied phenomenon [9].

In 1950, a new interdisciplinary scientific field came into existence. It is called «Biological Inorganic Chemistry» (BIC). It is between chemistry, biology, physics, pharmacy, and the science of material. The quintessence of BIC consists in «the application of notions of coordination chemistry to biological problems» [10]. The influence of one or another metal on metabolism depends not only on the functional groups and properties of ligands that are important for the stability constant (K_{st}) of coordinated bonds (donor-acceptor bonds) (complexes, chelates). The primary metal ions coming from the medium interact too with other metals.

It has been found that the stability constants of the complexes of the metals from one period with one and the same ligand (ethylenediamine) increase from left to right [11]. For this reason, the framework law was named by us as the ***law of substitution*** *of left members of each period by right members of the period in the complexes with the same ligands*. Taking into account the cybernetic principle of feedback, the law of substitution has two consequences. **The first one**: *right members of the period can be substituted by left ones in the case of their superfluous entry into the organism*. **The second one**: *an uncontrolled abundance of some element causes a deficiency of the elements metabolically interacting with it* [12].

These consequences manifest themselves in the case of uncontrolled superfluous entry of metals with drugs or during smoking or with food into the organism. These side effects also arise in the case of extracting the necessary metals from the active centers of the enzymes or other metabolic reactions by the substances with *active ligand groups* (pharmaceuticals, antigens of pathogenic bacteria, fungi and viruses or auto antigens, in particular, in the case of collagen diseases).

Nutritional experts established some other rules of behavior of elements in a living system («rules of Mertz»). They allowed the discussion of the nutritional issues at the symposium «Between a rock and a hard place». For each essential trace element, there are two ranges of intake associated with adverse health effects: intakes that are too low and can lead to nutritional deficit and intakes that are too high and can lead to toxicity (13). In such a way, all elements can be toxic [14].

4. The most important mineral elements in Life.

Ca was called «the main inorganic messenger», and Zn – «the main inorganic hormone» [15]. 3d transition metals, particularly Fe and Cu, are functionally important for processes associated with O_2 and the structure of connective tissue. Other elements also play an important role in certain pro-

cesses of metabolism depending on the properties of the complexes [16]. The final influence of the individual metals on the disease depends on their actual interaction with each other [17, 18].

In physiological conditions theme talion sa re mainly the central atoms (CA) incomplexes (orchelates). CA determine a geometrical structure of the complex and its Entatic State, i.e. an electron structure adapted to its function. Inthe case of a change in the valence of the CA, e.g. in the case of its oxidation, the ion radius decreases along with the change of Entatic Stateand function of the complex.

Because oft he unique variety off unctions of Ca (structural, neuromuscular, enzymatic, and signa ling) the role of the system of concentration maintenance of Ca^{2+} at a low level took on a key significance for all processes of a life activity [19-22]. Violation of MLH is the beginning of pathological processes [22]. Now it is possible to predict new understanding of an etiology and pathogenesis of diseases and aging.

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LEVEL OF MONOCYTIC CHEMOATTRACTANT PROETEIN, TRANSFORMING GROWTH FACTOR β_1, AND FIBROBLAST GROWTH FACTOR IN BLOOD SERUM OF PATIENTS WITH DIABETIC NEPHROPATHY

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The objective of this work is to study a character of monocytic chemoattractant protein (MCP-1), transforming growth factor β_1 (TGF-β_1), and fibroblast growth factor (FGF) among patients with diabetic nephrpathy (DN).

Methods and materials. Two groups of patients with sugar diabetes of type 2 with different stages of DN, according to classification I.I. Dedov and M.V. Shestakova, 2000, were included into the investigation. Group 1 ($n = 50$) – with albuminuria, average level of microalbuminuria among patients of this group equaled 149,8 ± 5,2 mg/day. Group 2 ($n = 35$) – with proteinuria, daily proteinuria did not exceed 1,1 ± 0,3 g/day. Duration of SD of type 2 oscillated from 1 to 15 years among the studied. Average age equaled 41,0 ± 6,5 years. Blood samples of 20 healthy donors were used as a control. Serum concentration of MCP-1, TGF-β_1, FGF was defined by the method of immunoferment analysis. Statistical processing of the received data was made with programme complex Statistica 8,0 for Windows.

Results and discussions. Defining contents of MCP-1 under DN has shown its increase 1,7 ± 0,2 times ($p < 0,05$) in proteinuric stage of DN, compared to the control (109,2 ± 4,1 pg/ml) and 1,3 ± 0,3 times ($p < 0,05$) – compared to the same index of albuminuric stage. Defining contents of FGF among patients with DN with albuminuric stage has established its reliable increase 1,5 ± 0,2 times ($p < 0,05$), compared to the control group (2,9 ± 1,1 pg/ml). The highest level of FGF,6,6 ± 2,4 pg/ml, was registered in blood serum of patients with proteinuric stage of DN. We have registered an increase in serum concentration of TGF-$\beta_1$among patients with SD of type 2 with a progressing nephropathy. Thus, under proteinuric stage of DN level of TGF-$\beta_1$equaled 122,4 ± 3,5 pg/ml and was reliably higher than un-

der albuminuric stage of DN (112,4 ± 3,6 pg/ml) and in the control group (40,9 ± 6,9 pg/ml).

Resume. An increase in serum level of MCP-1, TGF-β_1, FGF, in a larger scale under proteinuric stage of disease, has been established under diabetic nephropathy.

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LEVEL OF LEPTIN AND ADIPONECTIN AMONG PATIENTS WITH PODAGRA WITH METABOLIC SYNDROME

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The objective of this work is to study an impact of adiponectin in blood serum of patients with podagra with metabolic syndrome.

Methods and materials. 58 men with chromic podagric arthritis in an inter stroke period, aged from 40 to 60 years (average of 48,9 ± 8,2 years) have been studies; metabolic syndrome has been established among 28 of them (48,3 %). Diagnosis of podagra corresponded to classification criterions of EULAR 2010. Diagnostics of metabolic syndrome (MS) has been established according to characteristics, developed by experts of National health institute of USA (Adnet Treatment Pane lIII). Control group was formed of 24 healthy donors. Contents of leptin and adiponectin were estimated by method of immune-ferment analysis. Statistical processing of the received data was carried out with using of programme complex Statistica 8,0 for Windows.

Results and discussions. The research has shown that an increase in levels of leptin in blood serum up to 14,2 ± 1,2 ng/ml ($p < 0,05$), compared to the control group (4,9 ± 0,54 ng/ml) has been registered among all patients with podagra. We should outline, that contents of leptin among patients with podagra with MS exceeded that of patients without MS of 32,8 ± 2,2 % ($p < 0,05$).

A decrease in serum concentration of adiponectin (16,2 ± 4,8 mcl/ml) by 1,6 ± 0,2, compared to the control, was established among patients with podagra with MS, and by 1,2 ± 0,2 ($p < 0,05$) – compared to this index among patients with podagra without signs of MS.

Resume. Presence of MS among patients with podagra is attended by a reliably higher level of leptin in blood serum. Higher contents of adiponectin is registered among patients with podagra, compared to this index of patients who combine podagra and MS.

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THE GROWTH FACTORS AND INTERLEUKINE-1 (IL-1) URINARY EXCRETION AT THE ARTHRITIC NEPHROPATHY

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The main paper's **aim** has been the growth factors urinary excretion study: transforming growth factor β_1 (TGFβ_1), the vasculo-endothelium-derived growth factor – A (VEGF-A), and the interleukine – 1β (IL-1β) at the patients with the gouty nephropathy.

The Materials and Methods. The 59 men with the gout, gouty with the tubulo-interstitial nephritis, at the age from 40 to 50 years (e.g. the average age has been made up 42,2 ± 5,8 years or 508,2 ± 60,8 months) have been involved under the medical observation. So, all the medically observed sick men have already been divided into 2 main groups, according to the glomerular filtration rate (GFR) values: I group ($n = 30$) – GFR > 90 ml/min/1,73 m^2 (e.g. the chronic kidney disease – CKD – the Stage 2 on K/DOQI, 2002); the II group ($n = 29$) – GFR – 60–89 ml/min/1,73 m^2 (e.g. CKD – the 2 Stage). The podagra diagnosis has been met the EULAR, 2010 classification criteria. The gouty with the tubulo-interstitial nephritis diagnosis has been established, on the basis of the history, the clinical and laboratory studies. The control group has been consisted of the 20 healthy donors and the volunteers (e.g. men) at the age from 40 to 50 years (e.g. the average age has been made up 41,8 ± 4,6 years or 492,8 ± 48,6 months). Thus, the TGF-β_1, VEGF-A, IL-β_1 urinary excretion determination at the patients with the gouty tubulo-interstitial nephritis has been carried out and determined by the immune – enzyme analysis method.

The Results and Their Discussion. The growth factors urinary excretion determination: TGFβ_1 and VEGF-A at the patients with the gouty interstitial nephritis has been shown the following results. Significantly higher TGFβ_1 urinary excretion has been determined at the patients with the CKD 2 Stage (e.g. 30,4 ± 0,3 pg/ml, $p < 0,05$), having exceeded the patients with the CKD 1 Stage and the control group in 1,4 ± 0,2 (e.g. $p < 0,05$) time and 2,2 ± 0,3 (e.g. $p < 0,05$), respectively. The VEGF-A urinary excretion increase with the CKD progression has been determined. The VEGF-A higher level has been established at the patients with the gouty tubulo-interstitial nephritis with the CKD 2 Stage (e.g. 120,4 ± 4,4 pg/ml, $p < 0,05$).

The IL-1β urinary excretion higher level has been shown at the patients with the arthritic nephropathy with the CKD II Stage. The IL-1β content in the urine in 2,8 ± 0,2 (e.g. $p < 0,05$) has been exceeded the reference value, and in 1,4 ± 0,2 time –

the indicator at the patients with the CKD 1 Stage at the patients in this group.

The Conclusions. It is taken its place the $TGF\beta_1$, VEGF-A, and IL-1β urinary excretion increase with the CKD progression at the patients with the gouty tubulo-interstitial nephritis.

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THE ANALYSIS OF THE LIVER TISSUE ROTARY PULSE TRAVELING AND MAGNETIC FIELDS

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«Golden Section», that is, division into shares of a 0,618 and 0,382, seen in many publications as normal in the body. Deviation from it as indicating the presence of disease.

This article analyzes the morphological changes in the liver of mice exposed to magnetic fields from the standpoint of the «golden section». The experimental data suggest that the law of the «golden section» is applicable not only in normal conditions, but under severe pathological processes. This indicates the tendency of a biological substance to equilibrium in mature irreversible pathological process.

The purpose of the study. The aim of the study was to analyze the severity of the morphological changes in the liver of mice exposed to magnetic fields of different modes from the standpoint of the «golden section». Reviewed the results of the study of the morphological effects of the control actions extremadamente low-frequency, rotating magnetic fields (EMF) and impulse traveling magnetic fields (IBMP) to mammalian tissue.

Materials and Methods. To verify compliance with the law «golden mean» for a number of indicators or deviation from it was carried out in five groups of laboratory animals:

Group 1 – control group of intact mice;

Group 2 – the experimental group of mice that were exposed to a traveling magnetic field pulse (IBMP) with a pulse duration of 0,5 seconds;

Group 3 – the experimental group of mice that were exposed to a rotating magnetic field (EMF) with a frequency of 6 Hz, the direction of rotation of the field to the right, the magnetic induction 4 mT, combined with an alternating magnetic field (VMF) at 8 Hz, at a value 4 mT magnetic induction;

Group 4 – experimental group of mice that were exposed to an alternating magnetic field (VMF) at 8 Hz when the magnetic induction 4 mT;

Group 5 – the experimental group of mice that were exposed to EMF with a frequency of 6 Hz, the direction of rotation of the field to the right, the magnetic induction 0,4 mT, combined with an alternating magnetic field (VMF) with a frequency of 8 Hz, the magnetic induction 0,4 mT.

The results of research. Analyze from the standpoint of the «golden section» relations between some morphometric parameters of liver tissue. Analysis were the following parameters: the size of the central vein, the area of the cytoplasm in the area of necrosis and the area of the central vein, the area of necrosis and the area of the central vein as indicators, reflecting the state of hemodynamics at the microcirculatory level in the liver tissue. The values given in Table 1, show that the «golden section» is most characteristic of the fifth group, which has the greatest pathological changes.

The ratio between the area of the cytoplasm in the area of necrosis and the area of the central vein satisfies the law of «golden» for the second (0,410 and 0,590), fourth (0,397 and 0,603) and fifth groups (0,368 and 0,632). The same result is obtained for the ratio between the area of necrosis and the area of the central vein. For the second group, the ratio is 0,389 and 0,611 for the fourth – 0,359 and 0,631, for the fifth – 0,349 and 0,651. The relation between the size of the central veins close to the «golden» numbers for the fifth group (0,595 and 0,605).

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ORGANIZATION FORMS OF PREVENTATIVE WORK IN STOMATOLOGY

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Numerous studies that have been taken in Russia and abroad have proved convincingly that introduction of preventive methods into practice decreases levels of diseases' spread significantly.

Social questionings have shown that only 21,3% of the respondents had a partially correct opinion on methods and mean of oral cavity hygiene, and the rest 79,2% – incorrect. Majority of respondents (96,7%) have mentioned that before, while buying a toothpaste, they considered a lower price rather its characteristics. No one of the questioned used dental elixirs of gels.

65,0% of the questioned brushed their teeth regularly two times a day, however, only 81,3% of the total number of the questioned sent more than 1 minute brushing teeth, instead of recommended 2,5–3 minutes.

The objective of a dental hygienist is to develop and introduce individual programmes of hygienic training, instruction of population and taking actions to prevent dental diseases.

During the research process we have outlined three groups of major actions that are realized by a dental hygienist: preventative, training, and treating.

• ***Preventative actions:***

– Inspect a patient and define his hygienic indexes.

– Take local applicative or injection anaesthetization.

– Remove accretions of dental tartar and thin raid with special equipment.

– Grind and polish necks and available areas of roots after the removal of dental tartar.

– Define hygienic indexes.

– Use fluorine preparations to improve the process of remineralization of enamel and dentine such as gels, lacqers, and rinsers. Deep fluoridation.

• **Training actions:**

1. Instruct a patient on methodics of individual hygiene of oral cavity and healthy way of life that includes:

– Information that a quality of care after oral cavity defines the success in treating parodontosis diseases, preservation of healthy teeth, fillings and restorations;

– Instructing a patient on anatomic structure of a tooth and gum, its physiology and functional peculiarities;

– Demonstrating sequence of moves with means of individual care and order of gum massage on a jaw phantom;

– Selecting means of individual care and recommendations on choosing a toothbrush, toothpaste, means for inter-teeth gaps and rinsers;

– Recommendations on healthy diet, usage of chewing gum to prevent caries;

– Providing a memo on care for teeth and oral cavity. At the end of the first visit a patient must discover a motivation to treat and keep individual hygiene of oral cavity.

2. Control of the efficiency of knowledge on problems of oral cavity hygiene and effectiveness of brushing teeth (with definition of hygienic indexes) takes place during the second and 9if necessary) further visists.

• ***Treatment-preventative actions:***

– Anti-inflammatory treatment: applications, gum bands, films, etc.

– Physiotherapy treatment: hydric massage of gums, depoforesis, vacuum-therapy, etc.

– Filling immature fissures with temporal filling materials.

– Hermetization of fissures (invasive and non-invasive methods). All methods of fluoridation.

– Medical examination and rehabilitation of patients with decompensated form of caries, diseases of mucous tissue of oral cavity, parodontosis.

– Hygienic preparation for surgery on parodontosis, implantation, and taking rehabilitation measures during post-surgery period.

– Teeth whitening.

– Treating hyperesthesia of teeth.

– Examination of occlusion. Reveal of preliminary contacts. Selective re-polishing of teeth.

Dental hygienists are trained from dentists at the foundation of center of qualification increase for middle medical workers.

The cabinet is located in an adult dental polyclinic, and dental hygienists treat patients of all age groups, providing medical service for each member of a family. Apart from dental facility, the cabinet is equipped with 3 additional water sinks with mirrors, placed above, that is necessary to train patients to brush their teeth and take care after their oral cavity. A continuously active exhibition of objects and means of hygiene is located on the walls and in a special cupboard.

The analysis of visit rate of cabinet of prevention and hygiene of oral cavity has shown that 63,2 % of visitors were women.

Besides, the part of female visitors in all age groups prevails over the part of men.

Of total number of visits initial ones has formed 60,5 %, second – 39,5 %, while 50,5 % of visits were formed of preventive measures, 26,9 % – treatment-preventive measures, 22,6 % – training measures.

In the structure of treating-preventive measures the part of visits on fissures hermetization equaled 26,9 %; on teeth whitening – 31,8 %; control definition of hygienic indexes – 39,5 %; other measures – 1,8 %. Knowledge on methodics of individual hygiene of oral cavity (training measures) was given to all children and teenager visitors.

Availability of a dental hygienist, dynamic inspection, permanent correction of a prevention plan, individual approach towards each member of a family plays a favourable part in dental health of all family members.

Majority of patients (98 %) have been satisfied with a dental hygienist's work. Besides, 59,5 % have outlined that they learned something new about the condition of their dental health (presence of caries spots, gingivitis, parodontitis, etc.) and were sent to a dentist for treatment.

The received results testify the necessity to intensify preventive work in dentist's activity, increase people's motivation to preserve their dental health. These problems can be solved by a dental hygienist.

Resume. The article presents organization forms of a dental hygienist's work at basis of dental polyclinic, provides the volume of work, evaluates medical-social efficiency of such specialist's work.

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IMPACT OF THERAPY UPON CYTOKINE PROFILE AMONG PATIENTS WITH HYPERTENSIVE TYPE OF CHRONIC GLOMERULONEPHRITIS

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The objective of this work is to carry out a comparative estimation of an impact of anti-hypertension therapy upon the contents of anti-inflammatory cytokines (factor of tumour necrosis – α – FTN-α, interleukin-1b, IL-1b, IL-6, soluble receptor of IL-6) in blood serum of patients with hypertensive type of chronic glomerulonephritis (CGN).

Methods and materials. 96 patients with hypertensive type of CGN with disease period of 1 to 10 years without disturbance of kidney function (GFR > 60 ml/min) have been under observation. The average age of patients equaled 44,3 ± 5,8 years. Diagnosis CGN was established according to anamnesis and clinical-laboratory research. On average, daily proteinuria did not exceed 0,5 ± 0,2 g/day among the studied patients. Average speed of glom erular filtering equaled 83,5 ± 2,2 ml/min. Arterial hypertension (AH) among patients with CGN was defined according to recommendations of Russian scientific society of cardiologists (2010). Control group was formed of 30 healthy donors aged from 35 to 50 years. Contents of FTN-α, IL-1b, IL-6, IL-6 were studied via method of immune-ferment analysis. Patients with nephrogenic arterial hypertension received zenophenoril in dose of 15-30 mg/day, felodipine 10-20 mg/day, or combination of them, depending on a degree of arterial hypertension, as hypertensive therapy. According to recommendations of Worldwide organization of healthcare, the purpose of hypertensive therapy was to achieve target level of arterial pressure (systolic arterial pressure < 14 mm of murcury, diastolic arterial pressure < 90 mm of mercury). Evaluation of indexes of immune state was carried out two times: at the first visit and in 6 months after therapy. Statistic processing of the received data was carried out with programme complex Statistica 8,0 for Windows.

Results and discussions. Defining initial level of anti-inflammatory cytokines showed a reliably higher content of them among patients with CGN of the III degree of AH. Among patients of this group serum concentration of FTN-αwas 4,1 ± 0,3 times ($p < 0,01$), IL-1b – 3,9 ± 0,5 times ($p < 0,01$), IL-6 – 3,5 ± 0,4 times ($p < 0,01$) higher than control indexes (FTN-α – 32,4 ± 3,6 pg/ml, IL-1b – 35,8 ± 4,1 pg/ml, IL-6 – 15,8 ± 3,9 pg/ml). Besides, among patients of this group level of FTN-αwas 1,4 ± 0,2 times ($p < 0,05$), IL-1b – 1,5 ± 1,2 times ($p < 0,05$), and IL-6 – 1,4 ± 0,3 times ($p < 0,05$) higher than those of patients with CGN of the II degree of AH. Lower serum concentration of the studied cytokines was revealed among patients with the I degree of AH (duration of CGn less than a year). The research results have revealed an increase in content of IL-6 in all analyzed groups of patients. Maximum level of LI-6 (1546,2 ± 11,4 mg/l) was found in blood serum of patients with CGN of the II degree of AH that was 1,5 ± 0,4 ($p < 0,05$) times higher than this index of the control group (1008 ± 18,3 mg/l) and exceeded this index of patients with the I and II degree of AH by 36,5 ± 1,2% ($p < 0,05$) and 22,4 ± 0,8% ($p < 0,05$) correspondingly.

Defining serum concentration of anti-inflammatory cytokines among patients with nephrogenic arterial hypertension against the therapy has provided the following results. Among patients with CGN of the I degree of AH level of anti-inflammatory cytokinemy has decreased significantly. It is proved by the decrease in average concentration of FTN-α – 2,2 ± 0,1 times ($p < 0,05$), IL-1β – 1,9 ± 0,2 times ($p < 0,05$), IL-6 – 2,1 ± 0,2 times ($p < 0,05$); IL-6 – 1,2 ± 0,2 times ($p < 0,05$), compared to the initial data. A similar dynamics of the studied indications was achieved with usage of felodipine without any reliable differences between the compared groups: level of FTN-αdecreased 2,1 ± 0,2 times ($p < 0,05$), IL-1β –1,7 ± 0,2 tines ($p < 0,05$), IL-6 – 2,3 ± 0,3 times ($p < 0,05$); IL-6 1,4 ± 0,3 times ($p < 0,05$). The results of therapy with felodipine (20 mg/day) under the II degree of AH showed a decrease in level of FTN-αby 29,5 ± 4,5% ($p < 0,05$), IL-1β – by 30,2 ± 3,2% ($p < 0,05$), IL-6 – by 12,6 ± 2,1% ($p < 0,05$), IL-6 by 9,8 ± 1,2% ($p < 0,05$), and did not have any statistic differences with the level of anti-inflammatory cytokinemy that was defined after using preparation zophenopril (30 mg/day) among patients of a similar group. Prescribing combination of anti-hypertensive preparations felodipine + zophenopril to patients with CGN of the II group of AH was attended by a significant decrease in anti-inflammatory cytokinemy: level of FTN-αdecreased 2,6 ± 0,3 times ($p < 0,05$), IL-1β – 2,3 ± 0,2 times ($p < 0,05$), IL-6 – 2,6 ± 0,8 times ($p < 0,05$), IL-6 – 1,6 times ($p < 0,05$). Among patients with the II degree of AH in 6 months after using combination of zenophenopril (30 mg/day) and felodipine (20 mg/day) has shown a reliable decrease in serum concentration of anti-inflammatory cytokines: contents of FTN-αdecreased 1,4 ± 0,5 times ($p < 0,05$), IL-1β –1,3 ± 0,3 times ($p < 0,05$),

IL-6 –1,4 ± 0,3 times ($p < 0,05$), pIL-6p – 1,4 ± 0,6 times ($p < 0,05$).

Resume. Contents of anti-inflammatory cytokines in blood serum are increased under hypertensive type of CGN, and it increases along with a severity of arterial hypertension. Zophenopril and felodipne have a similar anti-inflammatory effect under CGN. Using zophenopril in combination with felodipine is attended by an increase in resolving effect of a therapy over inflammatory cytokinemy under hypertensive type of CGN.

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DYNAMICS OF CONTENTS OF GROWTH FACTORS, CYTOKINES OF PRO-INFLAMMATORY EFFECT IN SYNOVIAL FLUID AMONG PATIENTS WITH OSTEOARTHRITIS AGAINST THERAPY

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The objective of this work is to study an impact of zinaxin upon contents of growth factors: vascular endothelial growth factor A (VEGF-A), fibroblast growth factor (FGF), and pro-inflammatory cytokines (interleukin-1b, IL-1b, IL-6, factor of tumour necrosis α – FTN-α) in synovial liquid of patients with osteoarthritis (OA) against treatment with zinaxin.

Methods and materials. We have studied 65 patients with OA. Among those – 18 men (27,7%) and 48 women (72,3%). An average age oscillated from 46 to 68 years. Diagnosis OA was established according to diagnostic criterions EULAR (2010). A control group was formed of 20 healthy donors. Synovial liquid for examination was received via puncture of ancles. LevelofIL-1b, IL-6, FTN-α wasde fined byaimmune-fermenine method using test-systems «Protein contour» (Sankt-Petersburg), VEGF-A – by Bender Med systems Gmbh (Austria) andFGF – by Biosource Gmbh (Belgium). Study of contents of pro-inflammatory cytokines and growth cytokines in synovial liquid among patients with OA was carried out before therapy and in 6 months after treating them with zinaxin. Statistical analysis of the received data was carried out with programme complex Statistica 8,0 for Windows.

Results and discussions. The results of defining initial level of pro-inflammatory cytokines in synovial liquid among patients with OA have shown a reliable increase in concentration of IL-1b 1,8 ± 0,2 times ($p < 0,05$), IL-6 2,2 ± 0,3 times ($p < 0,05$), FTN-α 2,3 ± 0,4 times ($p < 0,05$), compared to the control, level of IL-1b in which equaled – 15,4 ± 6,1 pg/ml; IL-6 – 6,2 ± 1,8 pg/ml; FTN-α – 32,6 ± 4,4 pg/ml. Defining level of VEGF-A in synovial liquid under OA showed an increase in its concentration by 7,7 ± 0,7 ($p < 0,01$), compared to the control (15,6 ± 3,6 pmole/ml). Within our research we have also studied contents of FGF in synovial liquid of patients with OA that showed an increase in level of FGF 1,4 ± 0,3 times, compared to the control (5,1 ± 0,6 pg/ml, $p < 0,05$).

Studying dynamics of laboratory indications in 6 months after the taken therapy with zinaxin showed a decrease in average level of:IL-1b – by 43,8 ± 1,9% ($p < 0,05$), IL-6 – by 45,9 ± 1,4% ($p < 0,05$), FTN-α – by 35,9 ± 1,8% ($p < 0,05$), VEGF-Aby 28,4 ± 1,4% ($p < 0,05$), FGF by 26,4 ± 1,2% ($p < 0,05$), compared to the initial data.

Resume. An increase in level of pro-inflammatory cytokines (IL-1b, IL-6, FTN -α) and growth factors (VEGF-A, FGF) in synovial liquid is registered among patients with OA. Zinaxin has a resolving effect over contents of IL-1b, IL-6, FTN-α, VEGF-A, FGF in synovial liquid among patients with osteoarthritis.

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CEREBRAL MICROBLEEDS AS A MARKER SEVERITY CEREBROVASCULAR AND NEURODEGENERATIVE DISEASES WITH COGNITIVE IMPAIRMENT

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The aim of the study was to determine the location and number of CMB in patients with cerebrovascular and neurodegenerative diseases (Alzheimer's disease and dementia with Lewy bodies) and to study the contribution CMB and accompanying vascular changes of the brain on the cognitive impairment. We observed 48 patients (mean age 73,3 years, 29 (60%) male) by means MR tomograph and neuropsychological methods. The total number of patients with CMB were 40% (19 patients). The total number of CMB – 220, of which 161 cortical localization. Of the 23 patients with AD, 10 (44%) patients had occipital cortical CMB (65%) and parietal (19%) localization. Most CMB 202 (92%) was observed in patients with leukoencephalopathy Fazekas 3 point (high) when they were accompanied by severe atrophy of the hippocampus. Thus, vascular process is universal and additional negative factor inducing different clinical forms of dementia.

Abbreviations
CMB – cerebral microbleeds
MRI – magnetic resonance imaging
CAA – cerebral amyloid angiopathy
AD – Alzheimer's disease

Introduction. Cerebral microbleeds (CMB) are defined as small round hypointense spots on T2* – weighted gradient-recalled echo (GRE) magnetic resonance imaging (MRI) and are believed to represent hemosiderin deposits that can remain in macrophages for years following a microhemorrhage. CMB can be detected in cerebral microangiopathy of different origins: cerebral amyloid angiopathy and hypertensive arteriopathy.

Cerebral amyloid angiopathy (CAA) – a disease of leptomeningeal and cortical arteries of the brain, characterized by the deposition of amyloid in the vessel walls of small arteries and capillaries (media and adventitia). The amyloid changes the architecture of the vascular wall up to the formation of a «vessel in vessel» and microaneurysms, in addition to the vessel wall is marked fibrinoid necrosis, hyaline degeneration of the vessels with the lumen obliteration. Amyloid deposits are distributed irregularly. The cortical arteries are affected mainly, especially in the occipital lobes. CAA can be an independent disease, but is often combined with Alzheimer's disease (AD).

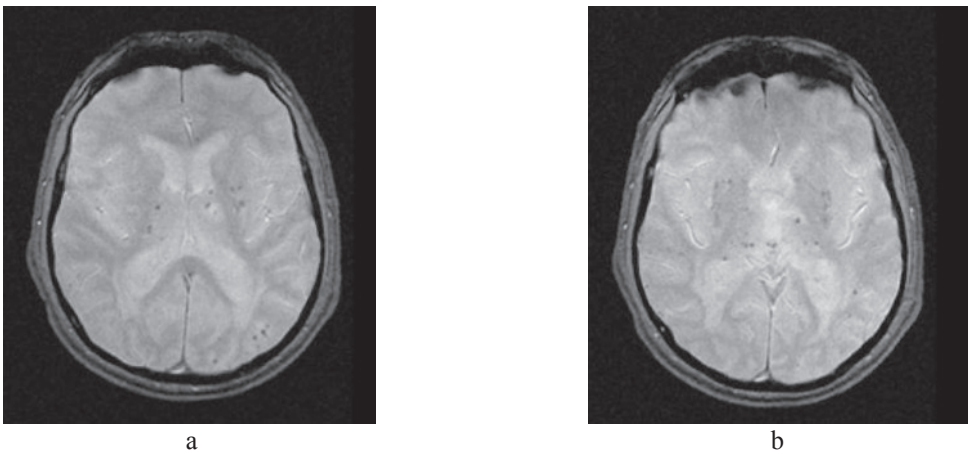
Based on various sites CMBs in neurodegenerative and cerebrovascular diseases we can view CMB for differential diagnostic value. Thus, cortical CMB were observed in cerebral amyloid angiopathy and deep CMB were observed in hypertensive microangiopathy.

MRI plays a central role in the diagnosis of CMB. MRI T2-weighted sequences*-gradient echo (GRE) is an opportunity to find the «old» and «fresh» CMB, observed in this mode as gipointensivnyh spots, and can not be seen using other imaging techniques.

The aim of the study was to determine the location and number of CMB in patients with cerebrovascular and neurodegenerative diseases (Alzheimer's disease and dementia with Lewy bodies) and to study the contribution CMB and accompanying vascular changes of the brain on the cognitive impairment.

Materials and methods. We observed 48 patients (mean age 73,3 years, 29 (60%) male) with cerebrovascular and neurodegenerative diseases with cognitive impairment on the basis of clinical hospital named S.P. Botkin, Moscow. MRI was performed on a MR tomograph with a magnetic field of 1,5 Tesla «Signa Excite» company GE (USA, 2006), the thickness of the slice gwas 5 mm. To assess the associated changes were used visual Fazekas scale (Fazekas, 1998) and Sheltens (Scheltens). CMB were analyzed with mapping microbleeds anatomical rating scale (MARS) (Gregoire SM, 2009) and rating scale brain microbleeds (BOMBS). Neuropsychological testing included Montreal Cognitive Assessment scale (MoCA), Addenbrooke's Cognitive Examination (ACE-R), Clock Drawing Test, fluency test, visual memory test (SCT).

Results. The total number of patients with CMB were 40% (19 patients). The total number of CMB – 220, of which 161 cortical localization. Of the 23 patients with AD, 10 (44%) patients had occipital cortical CMB (65%) and parietal (19%) localization. Patients with cerebrovascular disease had deep (subcortical) CMB only in cases of severe vascular leukoencephalopathy 2-3 points (7 cases, 64%). Most CMB 202 (92%) was observed in patients with leukoencephalopathy Fazekas 3 point (high) when they were accompanied by severe atrophy of the hippocampus. Patients with CMB had significantly lower scores of memory (by 2,1 points), attention (2,9), and visual-spatial functions (3,9) of neuropsychological profile than patients without CMB (Fisher's exact test $P < 0,01$).



a b

Example of 72-year-old patient with symptomatic Alzheimer's disease and cerebrovascular disease with multiple cortical (a) and deep (a, b) CMBs (axial images 1,5 T MRI T2*-weighted images GE)

Conclusions. Based on the obtained results it can be concluded that the vascular process is universal and additional negative factor inducing different clinical forms of dementia. Cognitive decline in patients with cerebrovascular disease and cerebral amyloid angiopathy associated with numerous CMB with 1,5 Tesla MRI, but the multiple CMB is an independent predictor of cognitive decline.

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ESTIMATION OF NORMAL NITROTYROSINE LEVEL IN HUMAN BLOOD PLASMA

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Now a day many papers are dedicated to investigation of oxidative stress as a main pathogenesis component of different human diseases [1]. This pathological state is associated with misbalance between lypoperoxidation intensity and antioxidant reserves. On the other hand oxidative stress mechanisms include some additional substances, such as nitrosative stress products, lipids and chlorine-contained bioradicals, but pathological and physiological role of these components are not studied fully [2, 3]. In addition, there on many informative methods and parameters, estimating level of oxidative and nitrosative stress.

Nitrotyrosine, forming as result of nitroxylation of blood proteins and oligopeptides, is the one of stable end products of nitrosative stress [3]. That is why this parameter can be its informative laboratory marker, but real physiological level of investigated substance is discussed [1-3].

The *aim of this paper* is estimation of nitrotyrosine concentration in blood plasma of healthy people.

Material and methods. We studied samples of conserved blood serum of 15 healthy people (blood donors). Estimation of nitrotyrosine level was executed with special ELISA kit (Hycult Biotech) [2]. Spectrophotometric investigations were carried out with «PowerWave XS» apparatus (USA). From the experiment moment donors' blood plasma was stored at standard refrigerator temperature (0-4 °C). Refreezing of blood samples was accomplished with typical protocol during 2,5-3 hours. Calibration curve was founded by use of standard calibration procedure with diluted testing solution for rated formula getting. Final level of blood serum nitrotyrosine was calculated with last one.

Statistic processing of the data was accomplished by the programs Microsoft Excel 2003 and Primer of Biostatistics 4.03. The descriptive statistics data is shown in the article.

Results. It was stated, that physiological plasma concentration of nitrotyrosine in blood serum of healthy people is 9,38 ± 2,69 nM. This parameter reference interval in from 5,13 to 14,5 nM. These data from our experiments can refine published information about physiological interval, including 3-40 nM plasma nitrotyrosine as normal level [2]. Indicated specialties of substance level may be caused by used preservative.

It is interesting, that there are two groups of patients with low (over 5 nM) and high (over 13,5 nM) level of blood serum nitrotyrosine. We supposed there are different nitroxylation level of tyrosine and tyrosine-contained proteins in blood plasma of healthy people. It can be associated with various concentrations substrates for nitrogen reactive species effect.

Conclusion. So, nitrotyrosine level in blood plasma of healthy human is very low, but it illustrates presence of nitroxylation processes in investigated biological substrate under physiological conditions. On our opinion, registration of plasma nitrotyrosine level can be a marker of nitrosative stress in vitro and in vivo. Different agents (exogenic nitric oxide, some prooxidants etc.) or pathological conditions (intoxication, metabolic disorders, traumas and others) may caused stimulation of nitroxylation processes in vivo, leading to NO-dependent molecular and cellular damage without compensation mechanisms.

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REGULATION OF A DENTIST'S WORK IN TERMS OF OPERATION WITH DENTAL ASSISTANT IN FOUR HANDS

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A weak link of dentistry is the lack nurses, their special knowledge and skills. It leads to an irrational use if a dentist's labour. A need for a special training of specialists with secondary medical education, including «dental assistant» arises (V.V. Sadovskiy, V.I. Starodubov, A.A. Kalinskaya, and others, 2006).

As an experiment, we have approbated an organization-functional model of a doctor's work and a dental assistant that includes: work algorithm, setting realized volumes and labour costs of the dentist and his dental assistant in four hands, normalization of work of these specialists.

During the research we have taken work normalization of a dental therapeutist and dental assistant in four hands according to the recommendations of Scientific-research center of N.A. Semashko (V.M. Shipova and others, 1987).

Chronometric estimations of work time costs of the dentist and dental assistant have been analyzed by separate work operations that were differentiated depending on a diagnosis, number of tooth roots, number of visits, and also types of activity of the dentist and his dental assistant in terms of work with four hands.

Table 1 provides the structure of work time costs of the dentist and dental assistant in terms of work with four hands.

Table 1

Structure of time costs of the dentist and his dental assistant (% of the total)

Types of activity	Dental therapeutist		Dental assistant	
	minutes	%	minutes	%
Basic activity	6685	84,4	8450	91,5
Auxiliary activity	252	3,2	168	1,8
Documental work	508	6,4	330	3,6
Work talks	16	0,2	84	0,9
Personal time	213	2,7	164	1,8
Idle time (waiting for a patient)	246	3,1	44	0,4
Total	**7920**	**100,0**	**9240**	**100,0**

Research materials testify for a relative load of the doctor and his dental assistant with treatment-diagnostic work of 84,4 and 91,5 % of the time.

We should outline that time costs of the doctor and dental assistant for work with medical documents are small, and it is linked to the fact that passport part of a patient's medical card was filled by registry of the clinic Tooth formula in the medical card of a patient, the list of everyday work of the dentist was filled by the dental assistant. The doctor only filled the fields of medical card that relate to the diagnostic and treatment of a patient.

Average time costs of dental assistant per a visit, considering coefficient of repeat, equaled 46,4 minutes (Table 2). Time costs of the dentist and dental assistant in terms of work with four hands are provided in Table 3.

The received average time costs of the dentist and his dental assistant per a visit were taken as a basis to define a volume of specialists' work load during a day. According to labour law (resolution of the Government № 101 of 14.02.2003 «On the duration of work time of medical workers depending on the occupied position») the week norm of work time of a dentist equals 33 hours or 6 hours 36 minutes a day (396 minutes), dental assistant – 38,5 hours or 7 hours, 42 minutes a day (462 minutes).

While projecting norms for a dentist we consider the so-called coefficient of work time usage for the direct treatment-diagnostic activity that equals 0,923 (the order of Federal fund of obligatory medical insurance of RF № 72 of 12.10.1995 «On methodic recommendations while calculating tariffs for ambulatory-polyclinic treatment»).

Everyday load of a dentist who works with four hands equals:

$$\frac{396\ \text{min} \cdot 0{,}923}{51{,}9\text{min}} = 7{,}04.$$

While working with four hands an average planned number of visits for dental therapeutist and dental assistant can equal 7.

Resume. The article presents some results of normalization of labour and calculation of work load in terms of work with dental assistant with four hands.

Table 2

Time costs of dental assistant per a visit (considering coefficient of repeat)

Type of work operation	Average time per an element (min)	Coefficient of repeat	Average evaluated time (min)
I. Preparing materials for work operation and independent work			**25,61**
– anaesthesia, including premedication	5,8	0,52	3,0
– preparing endodontic instruments	7,5	0,73	5,45
– preparing treatment laying	3,0	0,2	0,6
– preparing isolation laying	2,8	0,5	1,4
– preparing paste to fill a channel	6,2	0,43	2,6
– preparing pins to fill channels	3,7	0,38	1,4
– preparing anchoring pins	2,75	0,06	0,16
– preparing chemical composite	2,1	0,2	0,4
– preparing photopolymer	1,5	0,38	0,57
– preparing matrix	1,3	0,22	0,28
– preparing grinding system	2,6	0,7	1,8
– preparing polishing system	1,9	0,7	1,3
– color definition	0,9	0,6	0,54
Hygienic preparation of tooth for treatment	3,0	0,85	2,55
Radiography of teeth and oral cavity	5,0	0,4	2,0
Fixing temporary filing	3,0	0,02	0,06
Placing temporary protective band, medication treatment of paradontal recesses	12,5	0,04	0,5
– taking physiotherapy procedures	10,0	0,10	1,0
II. Joint work with dentist			**20,79**
– talking to a patient (questioning, advice, prescription)	2,44	1,0	2,44
– isolation from moisture	3,2	1,0	3,2
– drying	4,5	1,0	4,5
– helping to fill with chemical composite	10,9	0,32	3,45
– helping to fill with photopolymer, light-striking	18,0	0,4	7,2
Total			**46,4**

Table 3

Time cost of the dentist and his dental assistant per a visit in terms of work with four hands

Type of work operation		Average time costs of the dentist (min)	Average time costs of dental assistant (min)
1		2	3
Functional inspection of oral cavity		1,3	–
Talking to a patient (questioning, advice, prescription)		5,1	2,44
Anaesthesia and waiting	preparation	–	3,0
	implementation	4,25	–
Hygienic preparation of tooth for treatment		–	2,55
Isolation from moisture, cleaning from raid		1,5	3,2
Formation of cavity, opening tooth cavity	Preparing ondodontic instruments	–	5,45
	Formation of cavity	5,8	–
Amputation, extirpation		1,7	–
Treating root channel		4,3	–
Defining channel length		1,0	–
Medication processing of the cavity		0,6	–
Drying		1,2	4,5

End of Table 3

1		2	3
Filling channels with paste, using pins	Preparing paste	–	2,6
	filling	3,4	–
	Preparing pins	–	1,56
	Placing pins	2,0	–
Radiographic control		1,1	2,0
Defining color		0,32	0,54
Placing matrix	preparing	–	0,28
	placing	0,7	–
Placing treatment laying	preparing	–	0,6
	placing	0,43	–
Placing isolation laying	preparing	–	1,4
	placing	1,7	–
Filling	Preparing photopolymer, chemical composite	–	0,97
	Chemical composite	3,3	3,45
	Photopolymer	4,8	7,2
Etching solid tooth tissue		0,8	–
Placing adhesive system		0,5	–
Grinding	preparing grinding system	–	1,8
	grinding	3,3	–
Polishing	preparing polishing system	–	1,3
	polishing	2,8	–
Placing temporary filling		–	0,06
Placing temporary protective band, medication treatment of paradontal recesses		–	0,5
Taking physiotherapy procedures		–	1,0
Total		**51,9**	**46,4**

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IMPROVEMENT OF FORMS AND METHODS OF THE FINANCIAL STIMULATION

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The analysis of the special features of the development of Russian economy testifies about necessity of the rational participation of state in the economy with the market self-regulation. Of all possible versions of the guarantee of this combination with the assigned purposes and the resource limitations most acceptable is the model of strategy of the financial regulation of the social sphere, as basis of which comes out state-private partnership.

The formation of developed market relations on the innovation basis in the social sphere is to a considerable degree connected with the solution of the problem of effective financial regulation in the aspect of agreement and realization of the interests of its subjects, since the prevailing system of administrative relations, until now, to the insufficient degree considered promising economic interests and need for their realization, which entailed incomplete calculation and realization of the stimulating potential of strategy of financial regulation in the social aspect as the important tool of economic development in the present stage.

Systems approach makes it possible to design the integral system of the formation of the priorities of financial regulation in the social sphere, the totality of forms and methods, capable of ensuring dynamic qualitative economic increase, restructuring of the economy on the contemporary scientifically-

technological basis, economic safety and solution of the complex of social questions.

Therefore for increasing the effectiveness of human capital becomes critically important the redistribution budget fund, and also of other financial flows in favor of financing, first of all the branches, which operate the processes of the growth of human capital (science, formation, culture, public health), whose purpose – maintenance at the worthy level of human capital of the country.

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REACTIONS OF VEGETATIVE NERVOUS SYSTEM AND THEIR SPECIAL FEATURES IN YOUNG BADMINTON PLAYER

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At the present time functional state of athletes going in for badminton demands special attention to the current control of the leading organism systems in connection with big precompetitive and competitive loads. Under such conditions constantly changing playful situations regulate the mobility of nervous processes, including physiological mechanisms of the adaptation of the autonomous nervous system strain. The analysis of the available scientific-methodical literature shows that there are not so many papers devoted to the influence of this sports event on the vegetative nervous system (VNS) indices. Moreover researches which have been done are of the fragmentary character.

The present research is aimed at the process of studying peculiarities of reactions of badminton players' VNS during the year macrocycle.

The research was held at the «Sports Children and Youth School of Olympic Reserve (SChYSchOR) №9», the city of Krasnodar and «ChYSSch № 2», the city of Korenovsk, Krasnodar Region. 35 male badminton players aged 17-21 having their sports qualification as the 1-st grade-Master of Sports were examined.

Those who took part in the research were badminton players-volunteers; it was proved by their written consent.

The examination of athletes was held at one and the same time (in the morning), the conditions were identical.

The character of the irritability of the sympathetic and parasympathetic VNS sections was evaluated according to the orthostatic and clinostatic probes, Daninyi-Ashner' method; the correlation of the irritability of sympathetic and parasympathetic was defined according to the Kerdo's vegetative index [G. Makarova, 2002], besides Hildebrant's coefficient was also defined [A.M. Wein, 2003].

The research of these VNS indices was held for many times in the process of preparatory, competitive and transitional periods of year macrocycle.

In the result of the researches undertaken indices mentioned above gave the possibility to define normotonie – 21 badminton players (60%), parasympathotonia – 12 players (34,3%) and sympathicotonia – 2 players (5,7%).

So, it should be taken into account that normotonie was established in most part of investigated players. Normotonie itself is the reflection of the balance of vegetative mechanisms of the regulation. Because of all this it should be noted that the parasympathetic VNS section plays its function more intensively in one third of badminton players. Perhaps it is connected with the specification of training and competitive loads because the most part of players from this group had a higher sports qualification.

With it all it was possible to fix the following picture in different mezocycles: when the quantity of mezocycles lessened before a competitive period the quantity of parasympathetic reactions in badminton's players grew, their peak load was registered in the middle of the competition. During the transitional period the activity of this VNS section lessened.

So, without a doubt parameters of the vegetative status may be used in sports selection and the optimization of the training process.

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STRATEGIC MANAGEMENT OF INNOVATION DEVELOPMENT OF RUSSIAN BUSINESS STRUCTURES THROUGH THE USE OF FORESIGHT

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Strategic management is the development of an innovative methodology for the development of the society in the XXI century. One of the most effective formats is foresight research study. The use of foresight studies will allow business organizations to improve their competitiveness through the formation of «advanced» strategies to adapt to new technology and limited resources, prediction of demand and, consequently, reduce the risks. The article covers the basics of strategic management of innovation development of Russian business structures through the use of foresight.

Keywords: strategy development, strategy for the development of innovation, foresight, strategic management

Urgency of the study's topic is determined by the necessity to find and work out effective methods for management of business entities' competitiveness in some sectors of the Russian industry due to the intensified struggle for the market share and reduced number of small- and medium-sized businesses as a result of merger, consolidation or bankruptcy.

The study's **objective** is to work out theoretical provisions and practical recommendations for implementing foresight at the level of business organizations in order to enhance their competitiveness and secure innovation development of the national economy.

To achieve the objective, the following **tasks** were set and solved:

1. To revise the notion 'foresight' and demonstrate its difference from forecasting and planning, as well as to analyse the mechanism of the foresight's implementation.
2. To ground application of foresight as a tool for strategic management of innovation development of production industry businesses.
3. To define the algorithm for development of foresight adapted to be used by business entities in Russia.

The study's **subject** is foresight as a tool of the innovation economy and a system of methods for expert estimate of strategic lines of socioeconomic and innovation development, as well as for identification of technology breakthroughs, which can impact economy and society in medium- and long-term prospects.

The work on the article involved the following **economic research methods**: statistical and economic analyses, deduction, induction and logic.

The research results and their discussion. Competitiveness of a business entity under the current economic conditions considerably depends on the level of strategic planning and forecasting. Implementation of foresight significantly changes the essence of the company's innovation strategy. «Successful modernization of the economy and social sphere imply that development and implementation of the socioeconomic policy involves working out of effective mechanisms of cooperation between society, business and state aimed at consolidation of all parties' efforts, as well as consideration of interests of business and different social groups» [1].

To know driving forces of the future means to obtain the opportunity to develop not only the promising lines, which can produce the greatest effect, but also the lines, which influence the formation of new trends. A special role in this process belongs to long-term studies of development of science, technology and education because these lines along with natural processes establish 'a solid basis' of our future unlike cultural and political process, where the role of strong individualities is higher although almost impossible to be predicted in advance.

Thus, Napoleon's conquests in the middle of the 18th century were almost impossible to predict unlike the economic effect from a steam engine.

Foresight is one of the most effective instruments of such researches. The key peculiarity of foresight projects is their orientation at defining possible variants of the future and active development of its most preferable scenarios. As the future is considerably determined by present activities, the choice of the most preferable scenarios should be supported by relevant measures to ensure the most favourable development path [2].

A famous science-fiction writer Herbert Wells was the first to use the term 'foresight' in 1930. In his speech on BBC, he offered to create a special profession of a 'foresight professor,' who, like a historian, would analyse and find application for future technology inventions.

However, till the 1980s, the term was mainly used in its primary meaning: forecasting. Many scientists admit that, unlike the fore-

cast, foresight has a more wide profile covering both the process and result of creating the future's vision [3].

The foresight methodology ensures system forecasting, which considers key factors determining development of the science, education, economy and social sphere.

The methodology is based on a task-oriented identification and implementation of expert knowledge. It often concerns the representation of expert knowledge experts didn't use before but thought it as possible. The foresight methods to be developed should incorporate projective technologies, collective simulation of if-situations and expert estimation of somebody else's outlooks resulting in new limits and forecasts.

The lines of the foresight studies are constantly developing: from forecasting in the technology sphere to social global-scale outlooks. At present, these studies become, first of all, a tool for reaching a consensus in elite negotiations.

Foresight studies are oriented not only at gaining institutionalized strategies, i.e., actually, new knowledge, but also at the development of informal horizontal networks of professional communication. To our minds, at present, foresight studies create a new type of think tanks, which serve as project peer-to-peer structures for generating innovation ideas [4].

Thus, foresight as a tool is scenario forecasting of the socioeconomic development, which generates possible variants of the development in the economy, industry and society in the 10–20-year prospect. It should be borne in mind that foresight differs from forecasting and planning being their evolutional continuation. Foresight is based on reaching a consensus between concerned parties, which is its key and primary task. Foresight is also characterized by systematization, different opinions of experts, active formation of the future and concentration at the long-term prospect.

An algorithm for creating foresight as a tool for strategic management of innovation development of businesses can be represented as a sequence of stages. The first stage, pre-foresight, is aimed at the search of concerned politicians, representatives of small-sized business and large companies by the foresight-study initiator; at this stage the estimated cost of the study is calculated, an expert group is created and foresight parameters are defined. The second stage, foresight itself, implies expects' activity and working out of the strategy for all concerned social groups. The third stage, post-foresight, is verification of the study by means of extrapolation of parameters developed; at this stage conferences are held and a new foresight program is prepared.

Theoretical and practical value of the study: it contributes to the development of the foresight theory implementation in the company and enables better understanding of the notion and essence of foresight and its role in enhancing the company's competitiveness, as well as more accurate grounding of lines of the business entity's innovation strategy development.

Key points of the study may be used by market participants to improve management processes within business structures.

Conclusion. The study considered the innovative foresight approach to the development of modern business organization's competitiveness.

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Materials of Conferences

EDUCATION AS AN ECONOMIC RESOURCE OF THE STATE

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Education is one of the most significant subsystems of social arena of a state that provides intellectual potential of the society and, therefore, economic and scientific-technical progress. Economic growth of a country is usually equaled to professional characteristics of its labour.

Nowadays Kazakhstan faces challenges and necessities to reform. The country transfers to the way of innovative economy, international competitiveness, globalization. President of Republic Kazakhstan Nursultan Nazarbayev has outlined that «… the country moves to post-industrial world where the triad «education-science-innovations» rules… We consider knowledge as economic resource of a state, a factor of production. Me gradually modernize out national education system, thus making it closer to international standards».

«Any country develops through education. All developed states invested into the improvement of education system for a powerful economic breakthrough» – speaks the Minister of education of Republic Kazakhstan.

But any modernization implies changes in the present condition as well putting a new foundation for the future. These are not only political and economic changes, but also forming people with a new thinking who can work in new conditions.

If we study the worldwide competition process, we can put is simply as follows: the country that produces a better commodity provides leadership and prosperity to itself. Later prosperous countries has come to the idea that it is better to possess machines and equipment to produce good, and it has become a more important, prior goal, as producing goods is was no longer a problem. As countries were developing they came to an understanding that even equipment is not the most promising resource, and a country that supplied itself with technologies becomes a leader. «…such countries as Japan, China, South Korea, Singapore, Malaysia prosper due to the mastership in executing their ideas and technologies, their persistence and hard work»[1]. Thus, competition for technologies has become the third stage of competition. At the same time leaders come to understanding that competition for knowledge or, in other words, educational system, is even more promising idea. And so, leading countries compete not only for technologies, but for education systems and for attracting talented youth into it. Later they, like a chain, will create a necessary technology, necessary equipment, and commodity for their country.

We fall behind the world leaders as nowadays our economy solves problems of industrialization and transition towards post-industrial world, in other words, forms a foundation of the third level. We do not create a technology itself yet. However, our institutions, as they get involved into research programmes, can quickly adopt headmost ideas and start forming their own scientists who are able to create new technologies in available areas.

Are universities ready to carry out these goals? Regretfully, we have to state that nowadays many institutions are mainly educative organizations rather than a place of generating new knowledge through studies and science. Knowledge tends to age in institutions that prior educative function. It is similar to a moral wearing of equipment. Besides, knowledge is copied and spread like on a conveyor. Providing an institution with new qualitative knowledge stays a secondary problem. We can also feel insufficient use of new methods of transferring knowledge though encouraging, motivating students to gain knowledge independently and think alternatively.

Let us recall the etymology of the term «student»: it comes from Latin word «studiare» that means «to study», «to examine» through searching and adding knowledge. Unfortunately, the present situation in transiting knowledge in the educational process devaluates the initial purpose of studentship and academic environment. Educational paradigm of translating aging knowledge and deficit in transferring new knowledge from scientific-research environment is put onto a way of mass stamping of diplomas. As a result, graduates of many institutions remain uncompetitive at the labour market and are not ready to respond to challenges of global economy.

But, at the same time, we observe low efficiency in activity of the majority of scientific-research centers and laboratories, weak commercial significance of the carried research, insufficient relations with Kazakhstan and leading foreign laboratories, centers, industrial enterprises and companies.

Modernization of economy that is claimed by the president means not only development of new industries, is implies development of new forms of social life.

In this case the role of a university as a social institution changes. Now it forms new settings, value guidelines and life standards, and university and scientific education has to change first. Universities always form new generations of educated people, they have to «push» time forward continuously. Universities, as «agents of world reformation» create the future. It is an axiom, proved by the whole experience of development of the humanity. There must be a clear realization of the fact that a genera-

tion that lives today is formed by us, and is something in the development level of our country does not satisfy us, then we, as a university, are responsible for it and, what is the most important, have to change ourselves.

Nowadays we witness a process of intense development and renewal of knowledge. We come to a situation when youth knows more and it is more receptive to new forms of life (technological, informational, social networks, etc.). And this situation will only become more obvious. That is why the realization of an institution's role is absolutely necessary for the spread of effective forms of social life, spread of new life forms, and harmonic modernization. An institution needs to become a place, physical and virtual space that is able to provide harmonic link «education-science-innovations».

Explorative approach in education methodologies has already proved its efficiency in the leading universities of Great Britain and Europe, that implement general methods: discovery-based learning technique, problem-based learning, and case studies. Successful universities of West and Europe actively unite processes of research and education at all levels so that students with interesting ideas could consult with the leading experts of their field without leaving their university.

A distinctive characteristic of the leading world universities is that they are large economic subjects that provide employment and social business of a significant part of their local population. For example, annual budget of universities Stanford and Manchester Metropolitan in about $1 billion, Texas university – $3 billion.

The most demonstrative fact of educational activity according to the programme of Massachusetts technological university is that even students of bachelor programmes are paid for their researches. For many specialties researches form a part of even larger project when a student needs to work directly with his scientific chief up to 10 hours a week during a semester, and he gets about $ 1000. Carnegie Mellon University sponsors explorative work of 250 bachelor students annually. Every year more than 450 students speak with a report during the whole-university symposium «Meeting of minds» in May. Researches of bachelorship in California technological institute take place simultaneously in a number of different research centers. Within programmes of Young explorers of summer bachelorship students work under the leadership of experienced tutors, and then present their works.

Since the moment of their emergence universities were considered as «reformers of the world». They are able to form new directions of human thought. And these new ideas that excess the limits of academic walls with students, transform economic, political, and scientific reality.

If graduates are to become social leaders in modern conditions, they need to be provided with high-quality education at all stages of education and prepared for efficient actions at the world economic arena with an extremely high competition level. Solving this problem requires studying foreign experience on actual problems of education quality and creating international educative programmes that could provide students with the skills of international interaction and experience of communicating with scientists of the leading foreign universities.

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INTERNATIONAL TOURISM – CONDITION AND PROSPECTS

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This article discusses the history of development and the current state of international tourism originating, according to the author, since the expeditions of T. Cook in 40-ies of the XIX century. The author of the article highlights the growing role of domestic and international tourism in the economies of the various regions of the globe, tracks the positive and negative factors influencing the development of international tourism.

Today's Kazakhstan, possessing unique natural resources and the original culture of the nomadic people has a huge untapped potential for tourism development in the international market.

The beginning of modern international tourism has been put in 40th years of XIX century when English businessman T. Cook has organized in the country some excursions and travel, and then to 1885 and the first foreign trip to Paris on the World's fair. A year the constant organized travel of Englishmen to Europe, and to 1868 – in the USA later begins. In 1882 Cook's organization arranges the first round-the-world travel. New business has started to bring in to the owners quite good incomes, to it began to show interest and other businessmen. Gradually in the different countries the travel agencies which are engaged in the organization of excursions and travel to all parts of the world are formed. Achievements in the field of transport in the beginning of XX century were reflected and in tourism development. For travel and excursions have started to use steamships, the railways, and already then and motor transport. Speed, range, comfort of movement

constantly grew. At the early stage foreign travel were destiny of representatives of aristocracy and bourgeoisie as these social groups had sufficient for these purpose incomes. [2; 12]

The international tourist business becomes today more and more difficult as in it interests of the various state and commercial enterprises and services are crossed. By data statisticians of the international tourism for 1995 relative density of incomes of tourism in a total sum of receipts from 20 exports of goods and services made: in Spain of 60%, Austria – 40, Switzerland – 18, Italy – 11% etc. Leading position of Europe in the international tourism is defined not only quantity of foreign visitors and the sum of currency incomes, but also capacity of material base of foreign tourism which in a certain measure surpasses possibilities of the tourist industry of other areas of the world, in particular, means of passenger transport, hotel placing, excursion and entertainment objects. The main role in the international tourism in Europe belongs to a tourist exchange between the European people. On a share of the European states it is necessary about 90% of all foreign tourism in Europe. Foreign tourism is now one of the most dynamical branches of economy of France, Germany and Spain. [7; 198]

Boosted by improved economic conditions worldwide, international tourism has recovered faster than expected from the impacts of the global financial crisis and economic recession of late 2008 and 2009. International tourist arrivals were up by 6,7% compared to 2009, with positive growth reported in all world regions. Worldwide, the number of international tourist arrivals reached 935 million, up 58 million from 2009 and 22 million more than the pre-crisis peak level of 2008 (913 million).

While all regions posted growth in international tourist arrivals, emerging economies remain the main drivers of this recovery. This multi-speed recovery, lower in advanced economies (+ 5%), faster in emerging ones (+ 8%), is a reflection of the broader global economic situation and is set to dominate 2011 and the foreseeable future. [11; 4]

In my opinion, the recovery in international tourism is good news, especially for those developing countries that rely on the sector for much-needed revenue and jobs. The challenge now will be to consolidate this growth over the coming years amid a still uncertain global economic environment.

Asia (+ 13%) was the first region to recover and the strongest growing region in 2010. International tourist arrivals into Asia reached a new record at 204 million last year, up from 181 million in 2009. **Africa** (+ 6% to 49 million), the only region to show positive figures in 2009, maintained growth during 2010, benefiting from increasing economic dynamism and the hosting of events such as the FIFA World Cup in South Africa. Results returned to double digits in the **Middle East** (+ 14% to 60 million) where almost all destinations grew by 10% or more. [10; 55]

In **Europe** (+ 3% to 471 million) recovery was slower than in other regions due to the air traffic disruption caused by the eruption of the Eyjafjallajokull volcano and the economic uncertainty affecting the euro zone. However, the sector gained momentum from the second half of the year and some individual countries performed well above the regional average, but this was not sufficient to bring overall results above the losses of 2009. [10; 56]

The **Americas** (+ 8% to 151 million) rebounded from the decline in 2009 brought on by the economic hardship suffered in North America and the impact of the influenza A(H1N1) outbreak. The return

to growth in the US economy has helped improve the region's results as a whole, as did the increasing regional integration in Central and South America and the vitality of Latin American economies. Growth was strongest in South America (+ 10%).

Subregional results clearly reflect this multi-speed recovery. A few subregions such as North and Sub-Saharan Africa and South-East Asia were not impacted by the global crisis and reported continuous growth throughout 2009 and 2010. Among the subregions affected by the crisis in 2009, North-East and South Asia, North and South America, and Western Europe saw growth in arrivals in 2010 fully compensate for previous losses and exceeding pre-crisis peak levels. The Caribbean and Central America are just back at 2008 levels, while in Central and Eastern Europe, and Southern and Mediterranean Europe growth was still insufficient to make up for the lost tourist flows of 2009. In contrast, Northern Europe did not return to positive growth in 2010. [1; 12]

Growth in international tourism receipts continued to lag somewhat behind that of arrivals during 2010, as is the trend during periods of recovery. Among the top outbound tourism markets in terms of expenditure abroad, emerging economies continued to drive growth: China (+ 17%), the Russian Federation (+ 26%), Saudi Arabia (+ 28%) and Brazil (+ 52%). Of the traditional source markets, Australia (+ 9%), Canada (+ 8%), Japan (+ 7%) and France (+ 4%) rebounded, while more modest growth at 2% came from the USA, Germany and Italy. On the opposite side of the spectrum, expenditure abroad from the UK was still down by 4% in 2010.

2010 in review. International tourism demand held up well in 2010, despite persistent economic uncertainty in some major markets, the natural disasters suffered in some countries, political and social unrest in others, the serious disruption of air travel following a volcanic eruption in Iceland last April and the problematic weather conditions in parts of Europe and the USA in December.[4; 2]

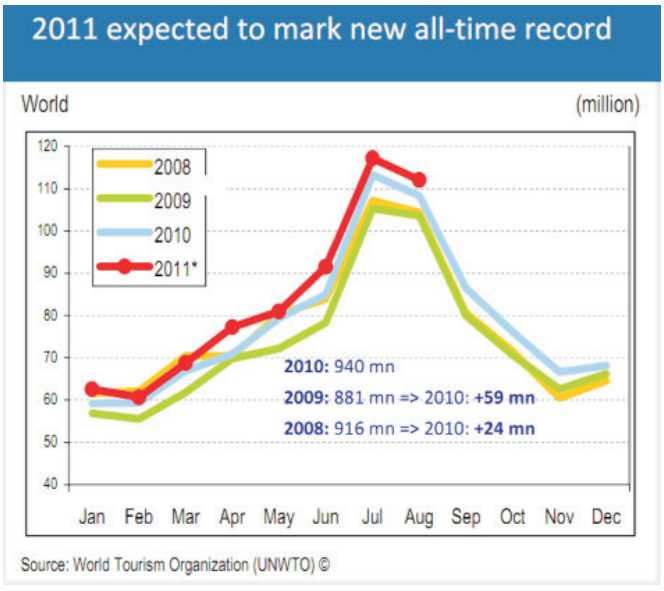
In my opinion, tourism has once again proven to be a highly resilient sector. Nevertheless, we need to work closer and better towards increased integration and cooperation between all players involved in the tourism value chain to increase our competitiveness and respond more effectively to challenges such as the ones that emerged from the closure of European air space last April.

2010 also saw the rise in importance of mega-events – sport, culture and exhibitions – in terms of their extraordinary ability to attract visitors and position host countries as attractive tourism destinations. Notable examples include the Winter Olympics in Canada, the Shanghai Expo in China, the FIFA World Cup in South Africa and the Commonwealth Games in India. [5; 13]

Confirming these trends, the over 300 experts from around the globe who constitute the UNWTO Panel of Experts evaluated 2010's overall performance very positively and much above their expectations at the beginning of the year. The Panel maintained this positive outlook for 2011.

In the first half of 2011 International tourist arrivals are estimated to have grown by 4,5%, consolidating the 6,6% increase registered in 2010. Between January and June of this year, the total number of arrivals reached 440 million, 19 million more than in the same period of 2010.

Growth in advanced economies (+ 4,3%) has maintained strength and is closing the gap with emerging economies (+ 4,8%), which have been driving international tourism growth in recent years. This trend reflects the decreases registered in the Middle East and North Africa, as well as a slight slowdown in the growth of some Asian destinations following a very strong 2010. [11; 4]



To my mind, sustained growth registered in tourism demand in such challenging times clearly makes the case for the sector and reinforces our call to consider tourism as a priority in national policies. Tourism can play a key role in terms of economic growth and development, particularly at a moment when many economies, for the most part in Europe and North America, struggle for recovery and job creation.

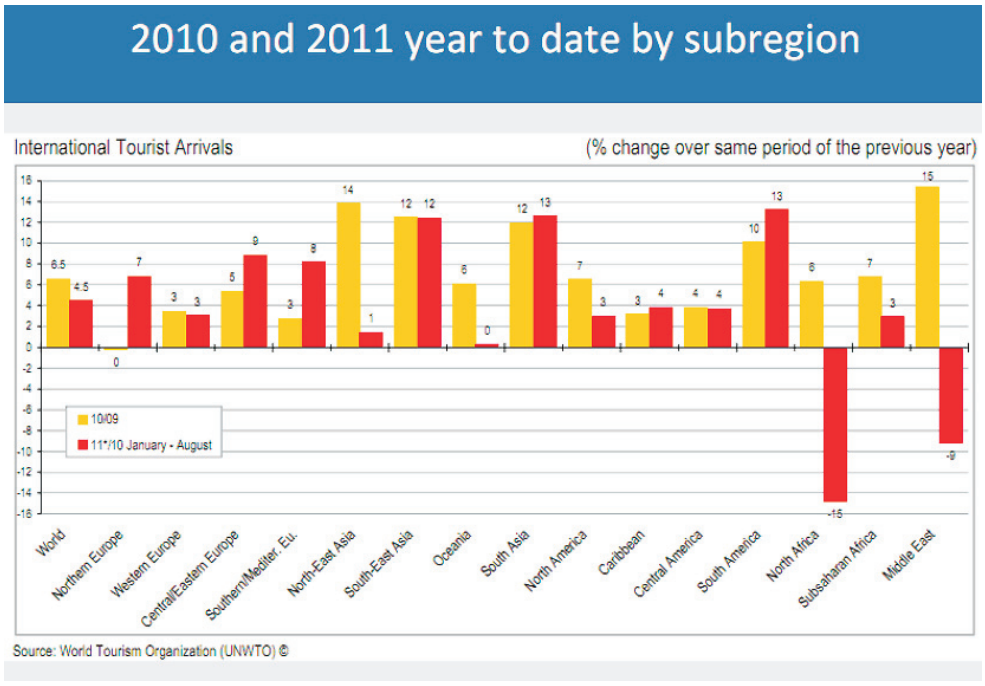
All world (sub) regions showed positive trends with the exception of the Middle East and North Africa. Results were better than expected in Europe (+ 6%), boosted by the recovery of Northern Europe (+ 7%) and Central and Eastern Europe (+ 9%), and the temporary redistribution of travel to destinations in Southern and Mediterranean Europe (+ 7%) due to developments in North Africa (–13%) and the Middle East (–11%). Sub-Saharan Africa (+ 9%) continued to perform soundly. [10; 240].

The Americas (+ 6%) was slightly above the world average, with remarkably strong results for South America (+ 15%). Asia and the Pacific grew at a comparatively slower pace of 5%, but this more than consolidates its 13% bumper growth of 2010.

Results from recent months show that destinations such as Egypt, Tunisia or Japan are seeing declines in demand clearly reverting. "We are very encouraged to see demand picking up in such important tourism destinations and call for continued support to these countries which are today fully ready to receive travellers from all over the world.

Continued growth amid increasing uncertainty

So far, the growth of international tourism arrivals is very much in line with the initial forecast issued by UNWTO at the beginning of 2011, 4% to 5%, for the full year 2011, a rate slightly above the 4% long-term average.



As international tourism receipts were more affected by the 2008-2009 crisis and recovered somewhat slower than arrivals in 2010, this year should also see their further improvement. [5; 26]

Following an encouraging first half of 2011, growth in the remainder of the year is expected to soften somewhat as recent months have brought increased uncertainty, hampering business and consumer confidence.

We must remain cautious as the global economy is showing signs of increased volatility. Many advanced economies still face risks posed by weak growth, fiscal problems and persistently high unemployment. Simultaneously, signs of overheating have become apparent in some emerging economies. Restoring sustained and balanced economic growth remains a major task.

In the light of all aforesaid, it would be desirable to notice that as well as all economy, tourist branch — rather mobile system or maybe even more mobile, than or to store other branches for tourism services can't be made in advance for the future, and the consumer decision refuse acquisition of this blessing can to come unexpectedly under the influence of any unforeseen circumstances. And, nevertheless the country having the developed tourist infrastructure and putting development of tourism as national significant priority, aspires to develop

and consistently to carry out complete to the policy in this sphere, to create sufficient safety factor, to resist to unfortunate trends and unexpected turns of a world conjuncture.

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CYCLES IN ECONOMICAL AND BIOLOGICAL PROCESSES AND POSSIBLE INFLUENCE OF OFF-SITE FACTORS ON THEM

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In the paper, an analytical review of studies of various cycles in economic processes. It is shown that economic processes obey the same laws as other physical processes on Earth. Discussed by the authors relationship cycles in economic processes to the behavior of solar activity. Provides an extensive bibliography on the problem under discussion.

From 1797 up to the latest modern crisis the World economy has come through a chain of economical cataclysms [Zyryanov, 2009] – financial crisis of 1797-1800, financial crisis of 1819-1824 (20 years later), financial crisis of 1837-1843 (18 years later), financial crisis of 1857-1860 (20 years later), depression of 1873-1896 (20 years later), financial crisis of 1893-1896 (20 years later), financial crisis of 1907-1908 (14 years later), *great depression* of 1929-1939 (22 years later), oil crisis of 1973-1975 (44 years later), crisis of 1987-1991 (14 years later), crisis dot.com of 2001-2003 (24 years later), and, at least, today` s World economical crisis.

Statistical analysis of this information shows that brightly expressed 22-year cyclicity is typical for the cataclysms mentioned above [Libin, 2009]; it is well comparable with other processes on Earth including solar activity behavior.

There is the whole series of theories which connect everything that occurs on the Earth with solar activity cycles, for example, in his theory of ethnogenesis Leo Gumilev pointed to synchronism of *passionarity impulses* with solar activity extremums.

In 1804 William Herschel (English composer, musician, mathematician, optician and astronomer, founder of stellar astronomy, member of London Royal Society and St. Petersburg Academy of Science) paid attention to a connection between wheat prices and solar radiation (depending on a number of spots on its surface) on the basis of huge material collected as a result of many year observations. He noted that during the whole century bread prices changed in compliance with the solar activity maximums. So, Herschel became a founder of a new science – heliobiology.

In 1880 William Stanly Jevons, one more great English scientist (one of the pioneers of using mathematical methods in economy), worked out an original theory of an economical cycle in his article *The Solar Period and the Price of Corn*. According to Jevons` theory, *years of rich crops* repeats every ten or eleven years and «it is difficult to believe that trade crises are connected with periodic weather change touching all parts of the World and appearing, probably, as a result of increased hot waves got from the Sun in every ten years on the average». Jevons also supposed that behavior of different groups depended on cyclic phenomena on the Sun as well. It helped him to explain economical cycles not only in the agriculture where they are connected with direct influence of solar activity on crop capacity but also in industry.

Jevons` suppositions were rather reasonably explained – as a number of spots on the solar disk influence the weather, consequently, it influences crops as well. The latter in their turn influence trade condition. That is why Jevons confirmed that the day would come *when in the London City they will look for the Sun condition as attentively as they looked for the condition of the English Bank before*.

Henrich von Schwabe, a German astronomer, was the first who discovered ten-year periodicity of sunspot appearance in 1843. And in 1848 Johann Rudolf Wolf worked out a methodology of sunspot calculation – the received number is called the Wolf number – $W = k(f + 10g)$, where f is a number of all separated spots observed on the solar disk at the given moment, and g is a number of groups formed by them. This index very successfully reflects contribution to solar activity (SA) from not only spots themselves, but from the whole active area, mainly occupied by faculae. (That is why W numbers conform well to the more modern and more precisely defined index denoted as F10.7, a value

a radio-frequency radiation flux from the whole Sun on 10,7 sm wave). In 1952 Wolf specified periodicity of sunspot appearance as 11-year arithmetical means of their period, although in reality the cycles last from 8 to 14 years (between minimums) and from 7 to 17 years (between maximums).

Alexander L. Chijzhevsky, a Russian scientist, paid attention to synchronism of solar activity and processes occurring on the Earth in the beginning of 20`s of the last century [Chijzhevsky, 1976, 1990, 1995]. Chijzhevsky defined the life as a living thing's capability to let through a flood of cosmic energy, and considered that the biosphere is the place of transformation of cosmic energy emphasizing by it that life is a more cosmic phenomenon, then an Earth's one. Discovering of the cosmic factor's influences on biological, science and social processes is one of the most important contributions to the modern science approach.

He wrote in his work *An Earth's Echo of Solar Hurricanes*, *«Eruptive activity on the Sun and biological phenomena on the Earth are co-effects of one common reason – the great electromagnetic life of the Universe. This life has a pulse, its periods and its rhythms…Life is not the result of a chance game of only the Earth's powers. It is created by influence of the Cosmos creative dynamics on the Earth's inert material. It lives with dynamics of these powers, and each organic pulsation conforms to the cosmic heartbeat, this enormous complex system of the Universe material objects. During a very long period of time of cosmic powers influence on the Earth, definite cycles of phenomena which are correctly and periodically repeated in space and time have strengthened. Everywhere on the Earth we find cyclic processes which are the result of cosmic power influence. In this endless number of cyclic processes one can hear world's pulsation, a great dynamics of nature, different parts of which resound one with another consonantly and harmoniously».*

It was found out later that climatic processes – glaciers, warming, recurrence of typhoons and earthquakes, precipitation – are also connected with the Sun. Degree of the Arctic and Antarctic ice coverage, variations of ocean levels, the Gulfstream pulsation, a sea thermal regime are connected with 11-year, 22-30-year and 100-year cycles. Alexander Chijzhevsky also discovered coincidence of solar maximums with periods of pandemic and epizootic and also of accelerated reproduction of some biological species, for examples, locusts.

The largest frequency of pandemic and epizootic was really observed in the second millennium A.D. during the 30-80s of the 14th century when locust plague in Central Europe lasted with a 10-12 year periodicity in 1333-1341, 1353-1363, 1373-1388 and resulted in mass crop failure and hunger. A peak of natural cataclysms fell on the year 1348 when, according to von Megensberg`s description [Kuzmenko, 1999], a wave of some awful earthquakes with destruction of tens of cities and hundreds of temples swamped the whole Europe from South to North, from East to West. According to Vinario, an Italian scientist, a contemporary of those events, *forests were burning, rivers burst their banks and plague killed millions of people on different continents* with a 11-year periodicity of pandemic outburst.

As a result of many researches in economics and sociology some processes were noted, their phase alteration tells us if not about their cyclicity, but about a wavy character of their behavior. First of all an industrial 7-12 year cycle was found out. In this cycle K. Marks separated four phases which changed each other consequently – crisis, depression, revival, recovery. This cycle was called ***a business (classical) cycle of Marks-Juglar.*** (K. Juglar, a famous economist, analyzed fluctuations of interest rates and prices in France, Great Britain and the USA and found coincidence of them with cycles of capital investments, change of the gross national product (GNP), inflation and employment. There are 11 Marks-Juglar cycles in the period since 1787 to 1932. By the way, insurance market operates cyclically with a period of 7-10 years).

J. Kitchin`s cycles are cycles of inventory movement with a period from 2 to 4 years.

Simon Kuznets, a Nobel Prize winner of 1971, contributed to the cycle theory in the economy, analysis of production and price dynamics and cyclical oscillations and seasonal changes in industry and trade. He discovered interconnected oscillations of national income, consumer expenses, gross investment to production equipment, to buildings and installations with long-term intervals of fast growth and deep recessions. His works corresponding to new economical demands gave a grounding for the gross national product (GNP) and its constituent parts estimation by the Federal Government of the USA, influenced further researches of economical growth, permitted to work out the only methodology of national income and the GNP calculation for all World countries. **Kuznets` s cycle** or **long swings** possessing the largest amplitude in building has a 20-year cycle.

N.D. Kondratyev (1892-1938) [Kondratyev, 1928, 2002], a Soviet economist, shot in the Suzdal prison, created an economical theory of long waves, large conjuncture cycles (40-60 years). In the World economics he is famous, first of all, as the author of the *long wave* conception in which he developed an idea of plurality of economical cycles. Besides well-known medium-term cycles (8-12 years) Nikolai Kondratyev discovered *58-64 year oscillations* of economical activity, which are called now after him. Kondratyev wrote, «The real process of economical activity is single. But if analyzing and decomposing this process to the simplest elements and forms we admit the existence of different cycles in this dynamics, together with it we must admit that these cycles interlace with each other somehow and exert this or that influence on each other».

Kondratyev`s cycle or *large conjuncture waves* were received from the analysis of statistical materials (price dynamics, rate of interest, salary, foreign trade figures, production outputs of the main industrial production types) for 1780-1920 of such countries as England, France, Germany, the USA and also in whole of the World agriculture. For the analyzed period Kondratyev separated two full large cycles (from 1780s to 1840s and from 1850s to 1980s) and the beginning of the third one (from 1900s). As each cycle consisted of recovery and recession he *could essentially predict the Great Depression of 1929-1933 some years before its beginning.* Besides, Kondratyev found interconnection of economical cycles with cyclic processes in other spheres of societies.

Today, besides Schwabe-Wolf' s cycle, we know ***Gansky`s 72-year cycle, Rubashev` s 600-year cycle, Gnevyshev-Ol` s 22-year pair cycle. K. Jensen separated 17-year freight cycle*** – Holland shipwrights played serviceable life of their ships up to it [http://www.ogoniok.com/archive/1998/4580/45-56-61].

There is a great number of other cycles – super long 390-year and 1800-year cycles, 169-180 year cycle, 80-90 and quasi-two year and also economical 36-40 year ones.

Synchronism of solar maximums with war and revolution periods was discovered. It was only necessary to clear up the mechanism of interconnection of society and a human organism with the Sun [Chijzhevsky, 1932].

The Sun is not a solid body; it rotates so that some parts always move relative to the others. In such systems constant generation of the most powerful magnetic fields takes place. These are magnetic fields on the Sun which interacting with each other cause what we call solar activity. Moreover, solar magnetic fields interact with terrestrial ones. As a result we receive what we call magnetic storms. Just they but not the Sun influence biological and technical systems of the Earth. But the more complicated the system, the weaker the impulse destroying it is and the more difficult it is to estimate consequences of such influence. For the period of 11-year solar cycle about 500 magnetic storms happen. Flashes of solar activity are especially dangerous for those who suffer from cardiovascular diseases. Reaction of managers, drivers, operators becomes weaker. Amplitude of magnetic fluctuations increases from south to north latitudes, and, for example, railway accidents happen more often in the Arkhangelskaya region.

In 1989 a magnetic field left Canadian capital Ottawa and Quebec without electricity for 8 hours. In 1997 a solar storm cut off television satellite Telstar 401 of AT&T Company. Next year a storm destroyed work of satellite Galaxy IV which managed automatic cash terminals and aviation tracking systems. In 2000 Japan satellite Asko damaged by a solar storm failed and sank in the Pacific Ocean. Magnetic fields tell on work of mobile phones, arouse failures in the Internet, automatic systems, disturb high-frequency aviation radio communication. On Russian railways there have been accidents connected with failures of automatic devices.

It is interesting that there were no economical crises during periods of increasing solar activity. We should say that similar action of solar minimums and maximums is not something new. So, for example, detailed dendrochronological observations [Dergachev, 2000] fixed not only substantial increase of tree growth during solar maximums but its intensification, although a less one, near 11-year solar cycle minimums. Such peculiarities are connected with the fact that geoactive areas on the Sun cause magnetic storms and other changes in the sphere of the Earth appear during sunspot maximums and minimums as well.

Fast growth of the World economy since the second part of 20th century has led to absence of brightly expressed minimums of the GNP values in the given period of time, which, however, does not mean absence of cyclicity. In the given period of time cycles can be separated according to decrease of the GNP growth rate. Extreme characteristic of solar activity value does not have to lead to sudden change of economical growth indicator; its influence can be manifested with some delay, and the existence of economic crises on descending parts of solar activity cycles can be connected with that.

There are rather reliable data about dynamics of the GNP specific value of the most powerful economical empire of the second part of the 20th century – the USA. The analysis of given data shows that solar maximums are followed by slowdown or fall of American economy growth rate. A maximal yearly average W number for the 20th century falls on 1957. In the same year the GNP specific value of the USA fell [Zyryanov, 2009]. In the second half of the 20th century economy growth retardation during solar maximum was noted practically for all leading economical states of the World. After solar maximum of 2000 in all these countries we observed economy recession or, at least, its growth retardation.

It is necessary to note that in the second part of the 20 century a global economic cycle is not of a sinusoidal character – a relatively short-term economic recession (about 2-5 years) is followed by a much longer period of its growth.

Coincidence of some solar activity cycles (11-year, 22-year, 100-year, 400-year and 900-year ones) in the beginning of 21st century led to the most powerful Sun influence on the Earth, substantial increase in electric activity of the atmosphere (which resulted in more frequent thunderstorms and tornadoes in areas close to the equator, and people became more sensible to magnetic fields than before) and sudden intensification of all helioclimatic, heliobiological and helioeconomical connections.

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ABOUT THE FIRMNESS OF THE UNIVERSAL VALUES AND THE CONTRIBUTION TO WORKING OUT OF THE INTERDISCIPLINARY APPROACH IN ELENA RUMYANTSEVA'S WORKS

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The formation of the more perfect paradigm of the social development in the modern system of the alignment of forces is realized mainly among the high-ranking politicians. And they involve the capitals under this political platform and on this basis influence change of the public consciousness through popularization of the ideas through mass media and the state institutes. The given process is included today into the contradiction with those riches of the knowledge which collected centuries-old stories of the human consciousness and were comprehended in works of world famous persons.

By E.E. Rumyantseva (born 1966) it is published more than 50 books and more than 250 scientific articles, including more than 80 articles in the magazines from the list VAK (http://viperson.ru/wind.php?ID = 654178&soch = 1). On the all significant works published since 1992, there are available numerous (more than 17 thousand) references in the lists of the references in the theses for the candidate and doctoral degree on the more than 20 scientific specialities in the all Russian Federation cities that testifies from its outstanding contribution to the history of a domestic science development and a propagation of the approaches and the knowledge maintaining to the criticism and the long-term scientific disputes within 20 years. In the first of the all this is concerned of the outstanding contribution to the propagation of the highly professional knowledge in her «New economic encyclopedia», sustained 4 editions for 2005-2012. It is quoted or used as the base of a knowledge propagation in the Russian Federation on the scientific specialities in the field of economy 08.00.01, 08.00.05 (on all specializations), 08.00.10, 08.00.12, 08.00.13, 08.00.14, 05.13.10 and other sciences – pedagogics, the rights, philosophies, political science, stories, sociology, philology, geography, engineering science.

How Elena Rumyantseva fairly allocates in her works, the system of the modern knowledge lags behind today use of the saved up the world intellectual heritage and settles in a conjuncture plane, political shocks, a race for power and a superprosperity, including property redistribution, and in the past century – for the new territories capture and an enthralled the people.

The science development as the process of the knowledge of the objective truth necessary for all mankind, for each known thinker whether it be the politician, the civil servant, the scientist or the millionaire is some kind of the sacrament and simultaneously test, the suffering causing admiration of the persons, the spent researches perceiving results, mainly not self-interested, as internal self-return and a civil feat of the researcher.

In our opinion, Elena Rumyantseva is already managed to prove in the works that the modern world of a science is inseparable from practice and from outlook, systems of the valuable categories of the citizens making a basis of the movement to defined, is possible out of a legal regulation to the development purposes. From here – questions of the advantage and the protection of the rights and freedom of the citizens, restoration of the eternal moral values that was the main theme of its researches last years (the trilogy «Happiness Economy», «Moral laws of economy», «If it is the Love in the World…», the monographies devoted to a combination of the matters of the law, morals and economy, to the questions of a counteraction of the corruption, working out of approaches to an estimation of the efficiency of economic policy and its directions, and also the analysis of the world heritage of economic thought under primary sources). We consider that the given approach has the international character and is a point of issue at the international level.

The list of the most significant books of Elena Rumyantseva from the point of a view of the knowledge propagation by the international public, their recognitions at interstate level and uses by working out of the international legal certificates is resulted more low:

«Methodology of the working out of priorities of an agrarian policy of Russia» (228 p., 1996; ISBN 5-900818-19-5);

«The mechanism of mass housing construction development without budgetary financing» (1999; ISBN 985-6320-50-X);

«A technique an the productivity estimation of the agrarian reforms. Calculations on 51 country of the world» (84 p.,1999; ISBN 985-6320-51-8);

«The ways of the food safety achievement of Union State and the CIS (the mechanism of the coordination of an agrarian policy of the states-participants)» (336 p., 2001; ISBN 985-6320-87-9);

«Strategy of the poverty overcoming» (288 p., 2001; ISBN 985-6320-88-7);

«Investments and business projects» (796 p., 2001; ISBN 985-6320-93-3; 985-6320-95-X);

«The finance of the organizations. Financial technologies of operation of business» (459 p., 2003; ISBN 5-16-001566-3, 978-5-16-001566-8);

«The unhealthy goods» (392 p., 2005; ISBN 5-94010-354-5);

«A property estimation» (111 p., 2005; ISBN 5-16-002475-1);

«The self-instruction manual on working out of business plans» (154 p., 2005; ISBN 5-16-002472-7);

«A housing-and-municipal complex: problems of the theory and management practice» (160 p., 2006);

«Moral laws of economy» (96 p., 2009; ISBN 978-5-16-003695-3);

«Happiness economy» (96 p., 2010; ISBN 978-5-16-003880-3);

«Moral economy»: the manual for comprehensive schools: In 3 parts. (2009. ISBN 978-5-85693-364-1);

«The economic policy analysis: the theory and the Russian practice» (174 p., 2009, ISBN 978-5-7729-0452-7);

«Corruption: the war against people, freedom and democracies (the book about our life)» (104 p., ISBN 978-5-16-004104-9);

«Moral economy: the Manual for development in schoolboys of flexible economic thinking» (193 p., 2010, ISBN 978-5-16-004271-8);

«A world economic science in persons» (with the appendix of a compact disc with 18 works of great economists, 4 books of the author in electronic form and 60 scientific articles of the author) (456 p., 2010, ISBN 978-5-16-003757-8);

«Whether there is on light a Love...» (37 p., 2010, ISBN 978-5-16-004481-1);

«50-days travel in the Italy and Portugal: we sow reasonable, kind, eternal» (132 p., 2011, ISBN 978-5-16-004774-4);

«The policy based on the knowledge» (444 p., 2011, ISBN 978-5-16-005072-0);

«Corruption as the alternative of the democracy» (78 p., 2012, ISBN 978-3-8473-9286-6);

«The right, morals, economy in conditions of counteraction of corruption» (102 p., 2012, ISBN 978-3-8473-9182-1);

«On a way to true: A. Smit, J.S. Mill, K. Marx, N.D. Kondratev, A.V. Chayanov, A.A. Bogdanov, L.I. Abalkin, F.A. Hayek, A. Sen» (506 p., 2012, ISBN 978-3-8473-9419-8);

«Efficiency of a financial policy of Russia in 1992-2012» (298 p., 2012, ISBN 978-3-8473-9519-5).

The work is submitted to the International Scientific Conference «The cultural heritage of Russia and the contemporary world», The United Kingdom (London), 20-27 October 2012, came to the editorial office on 18.10.2012.

Materials of Conferences

SYNTHESIS AND BIOLOGICAL ACTIVITY 1-METHYL-4-(2- TIOPIKOLINAMIN)-PIPERIDIN

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The article deals with the possibility of synthesis from waste of sulfur of oil industry of new biologically active connection 1-methyl-4-(2-tiopikolinamin) piperidin. On the basis of theoretical and experimental studies, the structure of the synthesized substance was proved and also its high growth stimulating activity related to vegetables (beets, carrots) and its ecological safety was revealed.

Nowadays one of the most priority places in the system of chemical assurance of agricultural plant cultivation production along with fertilizing and security facilities is occupied by growth stimulators. It's extremely important to find nontoxic highly effective preparation. In connection with toughening of ecological requirements the priority is given to low consumable, low toxic growth stimulating substances and preparations [1-3].

During many decades a number of scientific team groups have been working on creation of effective low toxic growth stimulating and crop capacity improving of agricultural plantings preparations. Among the variety of organic compounds the special place is occupied by heterocyclic, nitrogen-containing substances, which have a number of valuable biological features. One of the most important groups that deserves attention is hexamerous heterocyclic compounds, which contain piperidine cycles in its structure. They enter into the composition of many natural substances. Their application allows to regulate the most important processes in the plant organism purposefully, to realize potential facilities of the kind that are founded in genome by nature and selection more completely [4-5].

The aim of this work is the synthesis of sulfur-containing derivative piperidine series with the use of sulphuric wastes of oil industry and its compound, structure and biological activity examination.

Materials and methods of research. For the ascertainment of synthesized derivatives of piperidine, namely for identification of multiplication bond factor and composition of functional groups, there was used infrared spectroscopy. Infrared spectrums recorded on the device Specord-IR-75 in and around 4000-400 $см^{-1}$.

Toxicity of preparations was tested on white mice with the body weight of 17-22 g and rats with the body weight of 200-250 g, which were kept in conditions of vivarium according to norms of laboratory animals' feeding and keeping. Daily animal observation was carried out during 14 days. Animals that didn't perish during first 24 hours after preparation introduction were observed till the full recovery of behavior and appetite (not less than 72 hours). There were set the character and evidence of visual symptoms of poisoning, the speed of its coming and regression, lethality.

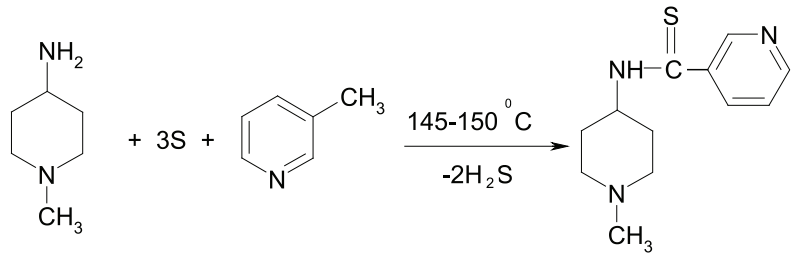
Solutions of preparation in different concentrations of 0,1 ml of water were introduced orally once into the stomach with the needle. To control animals there was introduced an analogical amount of sterile solution of known preparation of ciprofloxacin [6].

Experimental animals were divided into four equal groups, each group contained 10 animals. One group was control. Every group was observed, there was registered every incident of death and clinical demonstrations of toxic reactions on introduced doses of researched preparations.

On the base of preliminary experiments there were selected doses of the least and the greatest effect. By the minimal dose there wasn't observed the death of animals, and by the maximal dose there were 100% of deaths of experimental animals. After the ascertainment of minimal and maximal dose of preparations for the further experiments there were selected intermediate doses that are close to 50% of animal deaths.

Results and their discussion. **The process of synthesis of 1-methyl-4-(2-tiopikolinamin) piperidine.** Into the flask that was supplied with mechanical mixer, thermometer and reverse refrigerator there was put the mixture of 5 g (0,045 mole) of 1-methyl-4-aminopiperidine, 4,1 g (0,045 mole) of α-picoline and 4,3 g (0,135 mole) of sulphur. The reaction was carried out during 15 hours by the temperature of 145-150°C, with the control of thin-layer chromatography on the floating layer of aluminium oxide with the use of dissolvent from the mixture of benzol-acetone with their correlation of 5:1. After the end of reaction there was carried out an extraction of product with the use of chloroform as leach. For extract drying there is used calcined magnesium sulphate. After extract process the dissolvent is distilled off and the derived product 1-methyl-4-(2-tiopikolinamin) piperidin is weighed.

An implemented reaction of 1-methyl-4-(2-tiopikolinamin) piperidin synthesis progresses by the following scheme (practical output of product ≈75,5 %):



1-methyl-4-amino- sulphur ß-picoline piperidine 1-methyl-4-(2-tiopikolinamin) piperidine

While implementation of this reaction the taken mole correlation of initial substances is: 1-methyl-4-aminopiperidine: sulphur: 2-picolin = 1:3:1 considering admixtures corresponded to above mentioned reaction. The process of reaction was controlled with the use of thin-layer chromatography. Duration of reaction is 15 hours.

Empirical formula of synthesized compound according to the facts of element analysis can be presented as $C_{12}H_{17}N_2S$. Tiocompound has pale yellow colour, is well soluble in water, the temperature of melting is 115-117 °C.

On the base of facts of infrared spectroscopy there was proved the presence of connections C = S, C-N, N-C = S at the 1-methyl-4-(2-tiopikolinamin) piperidine.

An acute toxicity of preparation was estimated on the basis of indicator of LD_{50}, and also by the changing of clinical condition of animals during 4 days. The control of comparison is ciprofloxacin with the known value of toxicity of LD_{50} 176,2 ± 9,21 и 98,3 ± 8,6, accordingly, for mice and rats. Experimentally stated facts are showed in the Table 1.

Table 1

Acute toxicity of preparation

Preparation	LD_{50}, mg/kg	
	for mice, (M ± m)	for rats, (M ± m)
1-methyl-4-(2-tiopikolinamin) piperidine	225,3 ± 18,62	125,3 ± 14,6
Ciprofloxacin (standard)	176,2 ± 9,21	98,3 ± 8,6

As it's seen from the table 1, the toxicity of synthesized derivative piperidine is 1,3 times lower in comparison with standard – ciprofloxacin.

Thereby, as it follows from the experimentally stated facts 1-methyl-4-(2-tiopikolinamin) piperidine can be related to substances that have no pronounced toxicity.

An influence of 1-methyl-4-(2-tiopikolinamin) piperidine on the growth, harvest and the quality of beet and carrot. It was considered to be scientifically-practically interesting to study the influence of this synthesized compound on widely used crops – sugar beets and carrot. Usually a considerable influence of stimulator is observed from the very first stage of plant development, that's why the influence of researched compound was studied by force of carrying out of preplant treatment of seeds.

As it's known, the considerable role for the further development of any plant representative have deep changes that are in the seed embryo, which lead in the end to the changes of biological processes on the cell level duration. While this, the activity of ferments increases, the process of photosynthesis fastens, the content of carbohydrates in leaves increases and the produce ability becomes more active. In addition the acceleration of seed germination allows to avoid an oppressed action of weed to some degree.

On the base of experimental researches there is showed the possibility of change of plant harvest with the biologically-active substances. Change of growing processes depends on concentration of used preparations, and if while the low concentrations there is observed an accumulation of grow processes, than while the large ones, on the contrary, there is observed inhibition that means oppression. Results of experimental facts by the studying of the influence of different concentrations of researched compound on the energy of germination of carrot and beet, which were received while preplant treatment of seeds, are presented in Table 2.

Table 2

Energy of sprouting (numerator) and germination (denominator) of carrot and beet seeds while the treatment with the solutions of 1-methyl-4-(2-tiopikolinamin) piperidine

Concentration of preparation, %	Energy of sprouting and germination, %	
	carrot	beet
0	42/71	63/70
10^{-4}	55/91	63/92
10^{-3}	62/100	73/100
10^{-2}	50/89	67/83
10^{-1}	34/77	35/60

Maximum energy rise of seed sprouting of carrot and beet is observed in the interval of preparation concentration from 0,001 to 0,0001 %. While the preparation concentrations of 0,01 % the seed germination of researched plants becomes comparable to the control, and the inhibition of growth processes was stated higher this concentration. Preplant seed wetting in the compounds of 1-methyl-4-(2-tiopikolinamin) piperidine raise the energy of sprouting. The most optimal preparation concentration, which influences sprouting and germination of seeds, is concentration of 10^{-3} % Table 2). This concentration also influences the biochemical characteristics of carrot and beet while their complex treatment in the whole phase of development (Table 3-4).

While the wetting of seeds with the use of optimal concentration (0,001 %) of 1-methyl-4-(2-tiopikolinamin) piperidine solutions there was observed the active growth of roots and petioles of beet and carrot germs in comparison with control. Preplant treatment of seed material with the synthesized derivative of piperidine had a considerable influence on morphology not only of table beet, but also of carrot.

Plants that have grown from the seeds, which were treated with 1-methyl-4-(2-tiopikolinamin) piperidine, grow and develop better, enter the phase of root fall-off earlier, fascicular and economic ripeness occurs earlier too. More intensive increase of plant tops and assimilable surface of the leaves has a positive influence on root crop development (Table 4).

Table 3

Influence of 1-methyl-4-(2-tiopikolinamin) piperidine in the phase of root crop formation on the content of components in beet and carrot leaves, %

Types of preparation treatment of vegetables	Dry substances	Sugar	Chlorophyll
Control – complex treatment with water			
beet	12,0 ± 0,1	2,2 ± 0,05	25,9 ± 0,2
carrot	9,4 ± 0,1	3,5 ± 0,05	21,9 ± 0,2
Preplant seed treatment			
beet	12,7 ± 0,1	2,6 ± 0,05	33,0 ± 0,2
carrot	9,9 ± 0,1	3,7 ± 0,05	23.7 ± 0,2
Treatment only in phase of root crop formation			
beet	12,0 ± 0,1	2.7 ± 0,05	30,7 ± 0,2
carrot	10,1 ± 0,1	3,7 ± 0,05	22,9 ± 0,2
Complex treatment (preplant and in phase of root crop formation)			
beet	12,9 ± 0,1	2,9 ± 0,05	33,7 ± 0,2
carrot	10,5 ± 0,1	4,2 ± 0,05	24,0 ± 0,2

Table 4

Influence of 1-methyl-4-(2-tiopikolinamin) piperidine on the biometrical characteristics of root crops of beet and carrot

Variant	Length, cm	Diameter, cm	Index of root crop
Control (water)			
beet	10,8 ± 0,1	5,9 ± 0,2	1,83
carrot	14,0 ± 0,7	3,3 ± 0,1	4,23
1-methyl-4-(2-tiopikolinamin) piperidine			
beet	11,6 ± 0,2	6,8 ± 0,2	1,70
carrot	16,5 ± 0,7	4,0 ± 0,2	4,12

Thereby, while the beet and carrot seeds treatment with the solution of 1-methyl-4-(2-tiopikolinamin) piperidine there occurs an increase of plants' root system, square of leaf surface, acceleration of photosynthesis processes. At the same time photosynthesis as the base of plant grow and de-

velopment, accumulation of chemical compounds, and consequently of biomass, can be connected with other physiological characteristics, including the change of chemical composition. An increase of volume and mass of roots and root crops leads to the intensification of their absorbing ability and synthetic activity, and also of processes of ion and nourishing substances mass transfer along the plant, what promotes intensive growth of sprout and formation of the new organs.

Conclusion

1. There was developed a new way of receiving of the biologically active compound of 1-methyl-4-(2-tiopikolinamin) piperidine on the basis of sulphur waste of oil and gas products utilization. Its compound, structure and toxicity were stated.

2. There was revealed the stimulation of leaf-forming process, improvement of root crops' structure and increase of plant harvest by preplant treatment of seeds with 1-methyl-4-(2-tiopikolinamin) piperidine, and also positive influence of this tio-compound on the quality of carrot and beet.

3. New synthesized derivative of piperidine – 1-methyl-4-(2-tiopikolinamin) piperidine is ecologically safe and can be recommended as the regulator of growth for beet and carrot.

The work was carried out with the financial support of Kazakhstan Ministry of education and science by the budget program 055-101.

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Materials of Conferences

CONCEPTUAL PRINCIPLES OF THE ENSURING SYSTEM THE GEOLOGICAL SAFETY OF THE LARGE CITIES

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Developed the Concept of the geological security of a large city, its realization is offered on the basis of the following principles:

1. Gradual solution of geological-ecological and engineering-geological problems; the establishment of short-, medium – and long-term goals and tasks; planned, consistent with gradually increasing the detail study of the geological environment of the city on the basis of the engineering-geological and geoecological mapping.

2. System approach to the mapping involves research on different hierarchical levels and scales: an overview and regional – outside the city (1:200 000), the city and the suburbs (1:100 000) town (1:50 000), district (1:25 000), microdistrict (1:10 000) quarter (1:5 000).

3. Priority – the identification of geological risk and solution of the tasks on its reduction at the sites of potential geological hazards (the principle of «hot spots»).

4. Priority is development and implementation of measures to ensure the geological safety for the territories of the enterprises and objects of the critical or clearly unfavorable geological situation (the principle of «concentration of efforts on local problems»).

5. Optimization is ensured by the minimally sufficient volume of research and data (quantitative aspect) and the correct choice of the objects of research, observation points and routes (qualitative aspect).

6. Complex approach involves the study of all the components of the geological environment, with application of a wide range of methods, with a priority on engineering-geological mapping.

7. The objectivity of the works implementation is ensured by the construction of the accurate cartographic model of the geological environment, which should fairly and adequately reflect the engineering-geological, hydrogeological and geoecological conditions.

8. Criteria and ecological compatibility of mapping – is ensured by objective criteria and indicators of the state of geological environment on the basis of a system of ranking the degree of engineering-geological complexity and environmental standards.

9. The efficiency and dynamism assumes unification, the systematization of the data, creation of information banks; modeling on the basis of a continuously updated electronic database, to reflect the current state of the geological environment.

10. The versatility of the system of provision of geological safety – is the ability to perform the functions of providing information, analysis, assessment, forecast.

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GEOLOGICAL-ECOLOGICAL PROBLEMS OF THE LARGE CITIES AND THE CONCEPT OF THE GEOLOGICAL SAFETY

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The main and common problems for geological safety of the large cities are: development of geological processes (flooding, swamping, erosion, landslides, suffosion, karst, etc.); increase seismic danger, especially in the geodynamic active zones with a high degree of fracturing; chemical pollution of all natural environments and the accumulation of waste; the problem of underground spaces of cities, etc. On an example of the Perm, the largest industrial city of the Western Ural (800 sq. km. – the third in size city in Russia after Moscow and St. Petersburg), developed the Concept of the geological safety of the city, which shows the ways of overcoming of geological and environmental problems. The main purpose of the Concept – formation of the system of provision of geological safety at the complex development of the city, the creation of a scientifically grounded system of the forecast geological hazard reduction of geological and other risks, rational use of underground space, the decision of questions of ecology, creation of geologically safe environment for present and future generations of people.

There were developed principles and criteria for the creation of unified geo-information system of the geological environment of the city, containing the database of the engineering-geological, hydrogeological and geo-ecological information, compiled an Atlas of special geological maps. Developed a Program of geological study to 2030, with the system of program activities:

1) theoretical and organizational fundamentals of creation of the system of geological safety: theoretical, legal and methodical maintenance; cartographical provision and creation of the required

mapping framework of the geological environment; geoinformation provision, creation and maintenance of a database; the study and estimation of geological and natural-technogenic conditions and factors;

2) monitoring of subsurface area: organization of a system of monitoring regional – municipal level; monitoring within the existing industrial zones and sites of urban development (territorial and object level);

3) a complex of engineering-geological and geo-ecological mapping and research activities carried out consistently in the scale of: 1:50 000, 1: 25 000, 1:10 000.

The most important targets of the Concept: increase the level of protection of the population and engineering of the objects of various levels of responsibility the territory of the city of geological hazards; reliable prediction of places manifestations and timely warning of negative consequences from the geological processes and phenomena with minimum cost and with maximum economic, social and environmental effects.

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ECOLOGICAL FRAME OF URBAN DISTRICT OF VORONEZH (RUSSIA)

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Present situation in urban areas planning in Russia doesn't satisfy requirements of urban agglomerations sustainable development. The main problem are standards of urban areas designing in last decades. The standards rely on the efficient functioning of the separate areas (industrial areas, residential areas), but not on urban area efficiency in whole. This is also typical for urban district of Voronezh. Conservation of biodiversity of cities may be possible if ecological frame will develop. Ecological frame is the sum of ecosystems with individual regimes of land use. The ecosystems create spatial-organized infrastructure which supports ecological sustainability of areas, prevent the loss of biodiversity and degradation of natural landscapes.

The city of Voronezh was founded in 1586 as an embattled city. For 426 years the city and its landscapes changed dramatically. Today we faced some serious problems: how to preserve and augment historical-cultural, biological, landscape and architectural-spatial originality of the city. The problems may be solved by using designing citiy's ecological frame and its efficient work [3].

The master plan of the city was created in 1970. The plan determined the stage of a scientific approach using for urban landscapes creating. The approach based on a ratio of public areas (including green areas) and restricted areas. They have to form an integrated ecological system and become the most important factor of stabilization and improving of environmental conditions. Environmental and recreational functions of natural territorial complex are determined to be essential. Natural territorial complexes consist of green and protected areas. Out of all natural territorial complexes the most accessible for visiting are parks and public gardens. These areas are subjected to a great recreational pressure [7, 8].

Modern ecological frame of the city of Voronezh is a multistructural system. It integrates elements of different age, functional purposes and types of green infrastructure. Its node points are areas of selection and introduction of arboreal-shrub flora and protected areas of Voronezh [4, 5]; old public gardens and parks; relatively young urban gardens and parks; embankments, avenues and boulevards; gardens in residential areas; large cemeteries; woodlands within a city. These elements are the most important node points of Voronezh ecological frame map (figure). Their areas, position relative to industrial and residential areas and biodiversity help us to understand what kind of frame we have now and how we should develop it.

A detailed analysis of all the elements and their properties gave us a base for a critical assessment of the current state of the ecological frame. The main complains are:disunity of its component parts, disparity of their functional purpose, dilapidation and neglect of many node points of the ecological frame. The main ecological corridor in the city is Voronezh reservoir. The right bank of the reservoir is high and the left bank is low. A developed net of ecological corridors are typical only for north and central parts of urban district of Voronezh. All the rest parts of the city suffer from lack of relations with green areas of different categories of land use.

Currently we are working out new ways of improving properties of ecological corridors and developing city ecosystem of higher quality. In order to organize the high quality city ecosystem some legal, spatial and territorial, architectural and economic activities are needed. They are as followed:

1) creating of new recreational areas within the city;

2) rehabilitation and creation new parks instead of old and lost ones, especially in a new densely build-up areas;

3) conservation and development the existing public and restricted areas;

4) creating new green areas between motorways for each administrative district;

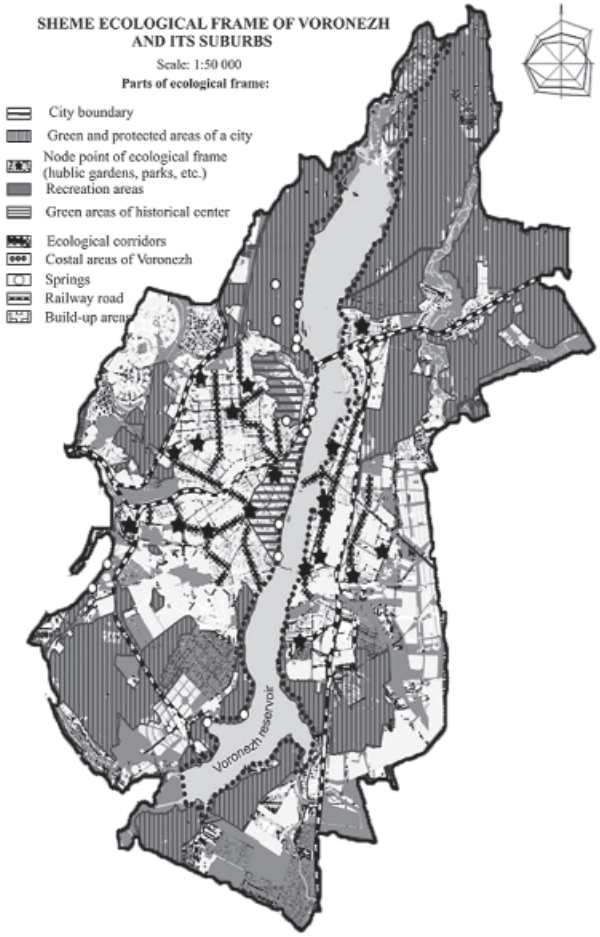
5) creating of «territorial links» in order to integrate central node points with reserve peripheral areas

6) revegetation and cultivation of regions which are difficult of access;

7) using of bridges, roofs of houses, fences etc. as a potential green corridors;

8) transformation of the Voronezh reservoir valley for recreation purpose;

9) creating new efficient mechanisms of cooperation between local authorities and dwellers [7]; environmental justice for ecological frame structure.



Some of developments were already tasted in action.

We collected information and materials for creating new ways of effective functioning of the ecological frame. The case studies in this field and a detailed forecast is only part of the project. For successful functioning the environmental frame needs to be methodically financed. Flexible environmental justice should also be created. In perspective we believe that public-private partnership in this area will develop successfully.

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Materials of Conferences

A RETROSPECTIVE ANALYSIS OF THE GEOCHEMICAL COMPOUND OF BOTTOM SEDIMENTS (FOR EXAMPLE, THE POOL R. PAHRA)

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Unique marker for environmental situation are bottom sediments, in other words they can be called «information medium» dynamics of pollutants, which requires the need for monitoring and analysis of changes of compound according with the target of ecological geochemistry [2]. Retrospective of compound of bottom sediments registers the vector of anthropogenic pressure within the studied systems. Analysis of the changes done by the example of basin Pakhra for identification the results of relationship between an anthropogenic impact and dynamics of compound of bottom sediments in 20 years.

The basin is suffer a pressure from various man-made objects, and therefore it is interest to the complex geo-ecological researches.

A retrospective analysis was based on data from the chemical compound of sediments in 1984 [4] and 2005 [1].

Comparative analysis of the content of heavy metals in the sediments indicated that for 20 years there was a noticeable decline in parameter of overall pollution and indicators of health and toxicological hazards in the sediments of rivers basin. Pakhra [1, 4]. During this time under the course of the restructuring and the crisis of 1998 much has changed in the industrial basis of the city. A decline of industrial development observed and many businesses were closed. If we analyze the compound of geochemical associations, we may be noted that an abruptly change in the parameters of man-made pollution is associated with widespread sharp drop of mercury and silver in sediments, which is directly associated with a strong decline in the demand of these heavy metals in many areas of industry and agriculture [3]. Also decrease the parameter of overall pollution and the number of chemical elements in the geochemical association fixed decline in functioning of the pig farm «Kuznetsov», the close of the landfill Shcherbinskya.

Relative to the forecast can be said that the basin of river Pakhra will again be under the influence of discharges reviving and expanding Company «Kuznetsovsky plant». Substantial burden on the degree of pollution of the river environment will widespread transition of people to mercury containing lamps lighting and load increase from the growing volume of transport on the environment.

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Materials of Conferences

GEOECOLOGICAL ASSESSMENT OF MODIFIED GEOSYSTEMS OF BUILDING MATERIALS QUARRIES IN WESTERN SIBERIA

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Remediation of sandpits in Russian northern taiga and forest tundra is considered as a process of modified geosystems formation caused by combination of natural self-regeneration and anthropogenic introduction. Results of physical and chemical monitoring show intensity of geochemical processes in sandpits of different age. Methods of bio-indication were used to find out technological scheme of reclamation that allows to reduce time lag and costs of natural-technogenic geosystems formation. The results of research are recommended for use at the municipal level of territorial administration in case of remediation process formation and environmental planning. The reclaiming of anthropogenic geomorphological areas are directed to the formation of manageable artificial intrazonal geosystems, different from the initial succession stage.

Development of oil and gas bearing industry, building of settlements in Western Siberia has brought a great number of sandpits and demanded exploration of new ones. The result of violent extracting of sandpits is a problem of mined-land reclamation. In this way an actual line for research is a comparative analysis of reclamation efficiency for anthropogenic geomorphic landforms of oil-production such as dredged and dry-excavated quarries, well pads and sludge pits. The main term of mining is to return to land-owner the disturbed area recovered up to assigned conditions according to the land-use category. Working regulations and methods of reclamation are broad-based and do not consider specific character of the explored area nature. Whatever, particular features of North's environment requires close scientific study of succession processes in land reclamation.

Practical basis for theoretical statements of geosystematic approach in technogenic ecosystems management is formed with investigation of modern technological diversity of different-aged sandpits, which considered in diverse natural, climate and geoecological patterns of geodynamic system formation associated with impact of natural and anthropogenic factors in changing conditions of temperature and hydrological balance. It may help to avoid a great negative impact of industrial activity on the environment, enhance the efficiency of manufacturing process, reach a new quality level of area management due to optimization of natural processes, and create conditions for harmonizing a number of elements of industrial geosystem with the help of implementing differential technical methods in sandpit exploration at a realignment stage [1, 2, 4].

The aim of our research was to work out technological methods optimizing the reclaiming process and increasing the environment comfort based on a complex geological analysis of soil condition and functioning of model sandpit areas for projects managing geosystem functioning.

The tasks stated to reach the aim were as follows: to reveal the stages of succession processes and objective geosystemic properties (disantropy, dissipation, organization, complexity, productivity, emergency, stability) basing on the dynamics to optimize the reclaiming process; to carry out a joined analysis of the results of the complex methods used to estimate the conditions of sandpits in order to rate the effect of anthropological processes, together with the natural process of regeneration; to estimate the thermal, hydrological, geochemical, and succession processes in multi-aged sandpits employing different renovating technologies; to work out a mechanism of prognostic modeling of anti-genetic complexes and methods of research to find out the operating regime for managing modified anthropogenic geosystems.

The object of our study is a number of sandpits in north-taiga and tundra climatic zones, as well as the efficiency of reclaiming activity due to compound methods of assessment and operating impact anti-genetic complex.

The research material was collected by the author from 2010 to 2012 during the complex study of sandpits in Tyumen Region, Khanti-Mansiyskiy and Yamalo-Nenetskiy autonomous okrugs.

To solve the study tasks we conducted route observations of 62 sandpits and made a component description of the environment and pollution indicators of the research territory. Geoecological research was carried out in accordance with the present regulatory documents.

To analyze the level of chemical pollution we tested soil in every meter up to 6 meters downwards. We also selected material to reveal high level of soil toxicity in laboratory and took groundwater to state chemical pollution level. Radiometric research were held in two stages: screening the territory to reveal radiation and defining the volume of dosimetric control at measuring the power of gamma radiation, which didn't exceed 0,6 mSv/h. Local radioactive abnormalities were not stated. The natural soil radionuclide activity was from 41 to 140 Bq/kg. According to the presence of natural nuclides the soil class is the first.

To estimate radon danger and state the number of radionclides (according to согласно СП 11-102-97) we sampled the ground at the 0,0-0,2; 3,0 and 6,0 meters.

The groundwater sampling was carried out according to the State Standard 51592-2000 «Water. General sampling demands». In bacteriological terms the waters are decent. However, groundwater at different depth has high pollution level, with the tendency to greater pollution the deeper groundwater.

Soil sampling for chemical pollutants testing was done in layers according to sanitary-epidemiological norms to soil quality 2.1.7.1287-03. The research revealed a number of typical chemical pollutants, as well as particles of formaldehyde, fluorine and cobalt. The analysis defined the category «clean».

We also studied the biological productivity of geosystems with the use of bioindicative methods in complex assessment of the environment and methods to describe successional stages at key areas. The basic study material, except authors' personal field and laboratory research, was obtained form the archives of industrial organisations, literary and cartographical resources.

On the basis of documentary study of the operational and reclaiming methods for sandpits, the author made a typology of geosystems using comparative-geographic, landscape-typological and cartographical methods. Together with the statistical methods we also employed the so-called method of purpose tree to reveal the main parameters of paradynamic complexes and methods of SWOT-analyses to state the risk and perspective of anthropological geosystem operation.

The literature study showed that most researchers and facts stated in the regulatory acts and methodic of reclaiming view it as a number of measures to recover the soil to its initial state after anthropological influence, so that it regains to its natural conditions and most suited to its primary nature management [3, 5, 7]. As most researchers agree, it is practically impossible because the geological environment, soil, hydrological regime and biocoenosis are breached. A used-up sandpit is usually turned into a refuse dump for solid waste, a building site or a water body [6, 8, 9].

The new approach together with the traditional one should comprise the acknowledgement of precious experience of creating a different from zonal type anthropogenic system an effective management. The key factors should be the bioproductivity and complex component structure.

The results of recovering forest geosystem with the initial flowery components showed that brining in peat was ineffective for reclaiming soil covering because of the biological productivity of lower zones. But developing meadow vegetation leads to much greater biological formation comparing to zonal indexes [8, 9]. This fact confirms the refusal to employ traditional methods of reclaiming and the need to shift to the new ones – creating man managing complexes with exotic species and sinanthropus. We also resumed that peat could be substituted by compost and domestic waste with the following transformation into cereal and podded formations.

The reason for prairie and forest confrontation is the hydrological regime, blocking the movement of forest formations to the south. The results of deeper sandpits study showed that there were some changes to the unflattened scarps because of the water storage; move of the surface flow through the sandpit walls and increase its intensity due to the porosity of the underlying maternal rock. Water filtering leads to banks drainage and optimal conditions for roots nutrition during the flood period. The hydrological regime change leads to deformation of geochemical cycles and activation of geochemical exchange, what influences the soil formation process. Large amount of waters at a small territory results in thermal regime change, the warm period in autumn and vegetation period last longer, phonological phases shift. Biocenosis structure becomes more complicated, as number of species rises and leads to intrazones phytocenosis formation.

The reclaiming method without smoothing the slopes can be recommended for northern taiga and forest-tundra in Western Siberia, and can be used for working out technical recommendations and regulatory norms for reclaiming misbalanced territories. It may enhance the process of reclaiming, increase the profitability and decrease the cost of reclaiming at the final stage. As a result the sandpit environment will be optimized fastening geochemical cycles and rising bio-diversity.

On the basis of our research we come to the following conclusions:

1. The reclaiming of anthropogenic geomorphological areas are directed to the formation of manageable artificial intrazonal geosystems, different from the initial succession stage.

2. Setting the reclaiming methods should bear the zonal character, tacing into account the optimality of anthropogenic transformations and the efficiency of natural regenerating processes in cryogenic zone conditions.

3. Refusal to smooth sandpit slopes increases the efficiency of drainage process of neighboring geosystems due to water and thermal regime activation and the acceleration of the successional process.

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Materials of Conferences

CURRENT PROBLEMS OF EDUCATION RELATED WITH ENTREPRENEURIAL ACTIVITY

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Problems of education that are linked to entrepreneurship in formed republics of Soviet Union require a special approach. We think it is necessary to include the problem of teaching subject on entrepreneurship starting with the last terms of school.

What is the result?

First of all, teenagers who finish school, receive a certain idea of entrepreneurship, particularly, private property.

Secondly, obtaining theoretical knowledge on entrepreneurship in school helps teenagers in selecting their future profession and planning their lives.

Thirdly, entrepreneurship is an independent labour that forms an income, studying a subject on an independent work forms a respective approach toward one's property.

Fourthly, in some countries young people, students take part in unrests and destroy, burn shops, cafes, restaurants, offices, and other objects of entrepreneurship.

Fifthly, states that introduce entrepreneurship in school, avoid the described problems and help its citizens to solve problems of employment and making a living after school.

On the described topic: «A significant part of the populations «experienced a school of forced unemployment». Many expressed an ability to … change labour qualification independently, became businessmen… with a purposeful support from the state» [5].

Studying history of entrepreneurship and formation of private property in school would be mastered by students of high grades with interest, because it would teach them how to form private property with labour.

For example, in history, linked to Roman private right there is an expression: «… Nerva-son says that owning things has emerged from natural possession» [6, p 169]. Therefore, a question arises: When, how, and from where did the term «owning» emerge? Roman jurists Marcus Antistius Labeo and Julius Paulus who lived in the I century AD «etymologically expressed a word «owning» – possessio from sedere – to sit, sit down, and the very word «possession» described as position – a settlement (on earth)» [6, p. 190-191].

Therefore, if «earth is a natural object», then «settling of earth is natural possession of a territory». And «possession of a territory» in future is receiving a product via farming ground. The result is the received product and it defines «…emergence of property for a thing from natural possession». Thus, the first sign of the ownership, «possession» is based on the idea of «settling on a territory, owning territory, processing soil».

This idea is developed by a doctor of juridical science, professor S.Z. Zimanov as follows: «Meaning of word «land» is supposed to be considered as a territory, located in a certain area (geographic concept) and as a territory or a lot that gives a certain product (productive concept). And property, as a result of «owning» refers to the latter definition [3, p. 105].

Therefore, land can be referred to the idea of possession – possesio, or, via owning a land as a productive object – fructus.

What comes to the second characteristic of ownership – «using», or the «right to use», then the «Old civil right to express the idea of «owning» was referred to the term «usus», enriching it with an outcome of products – «ussfructus» [6, p. 168]. In other words, making profit of utilizing land through usufructus – utility product (a property) forms the second characteristic of ownership – «utilization».

Further, as a result, these two characteristics – owning and utilization, liked to land and utility product, become dependent on the term «dominium – dominating» over an object, [6, p. 191], in other words, the third characteristic of ownership – «managing» – arise.

So, if we see that the «definition of property» according to the history of Roman private right has got its origin from the idea «possess», it will become another evidence to that the idea «managing» has got its origin from the idea of «owning», according to domination over land. Anyway, it is obvious that an authority to manage an object and has formed from owning it and dominating over it.

To resume this idea, we can conclude that Roman reformer of the II century AD Julian developed the idea of dominium – domination over an object, property in rem – proprietary interest. If we speak of a specific objective right, this idea can be defined as a property itself – proprietas, and is called dominus proprietas – an owner of private property [6, p. 191]. Therefore, «property is a right for an object, in other words, proprietary interest».

Several juridical systems exist in the world and regulate entrepreneurial relations. One of them is Roman-German (civil) right, the second – English-American general right. Civil right solves cases that are linked to entrepreneurial relations according to «implementation of civil law similar to a right or to a law» [1].

The basic «characteristics of American delicate right (civil right of E.A.) are based on a legal case

(laws only enrich and correct judicial law; codexes describe the procedure of judicial law)» [4, p. 153].

In our idea, such approach develops entrepreneurship in countries that act according to legal case and is linked an urgent solving of cases on property that belongs to an entrepreneur. Moreover, English-American general legal system property, as in continental civil law, is not limited by the three characteristics of it, «owning, using, managing». Some researches prove that «… in English-American jurisprudence there are eleven characteristics of property, and each of them gives approximately a thousand and a half different types of property in its various meanings» [7, p. 21].

Such alterations in characteristics of property are most likely linked to political and social-economic changes in a state authority system. For example, in times of Soviet Union professor L.I. Dembo acknowledged that «private property for land has been liquidated, and, therefore, it is necessary to introduce a competence of state control over property instead of the competence of owning land» [2, p. 17].

Professor G.A. Aknesenok suggested «to introduce the fourth characteristic of managing – state ownership of land with preserving the competence to own «[2, p. 18-19]. In response to this idea of professor G.A. Aknesenok, doctor of juridical science I.V. Pavlov and candidate of juridical science A.S. Krasnopolskiy have come to a concept that states: «managing land is not different from disposing it, managing one type of disposing that is involved by the right to dispose, in other words, a characteristic of property» [2, p. 19].

Therefore, an owner, through management, overseeing, control, and other mechanisms of domination of property, obtains an authority to «define a fate of property in a legal way». So, for any entrepreneur property and entrepreneurship are inseparable values.

All that we have provided as an example is linked to entrepreneurship, or independent labour that must be studied and introduced to children in school.

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LEXICAL BASES OF THE TERM «AN INTERNAL MONOLOGUE»

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The term «internal monologue» is used in a number of ways, sometimes quite contradictory. The following terms are used in English to describe the studied phenomenon: interior monologue, direct interior monologue, indirect interior monologue, inward monologue, stream-of-consciousness, soliloquy, internal monologue. The most frequently used terms are interior monologue, introduced by E. Dujardin, and stream-of-consciousness, suggested by a psychologist V. James. However Englich-speaking literature, especially during recent years, prefers the term steam-of-consciousness. The term «internal monologue» has become popular in Russian.

The dynamics of the development of terms can be studied from dictionaries. There is only a term «monologue» in New English Dictionary and New Oxford Dictionary. It represents a dialogue with oneself from the first person. Dictionary of literary terms by H. Shaw provides the most complete interpretation of terms, it divides terms stream-of consciousness and interior monologue. Interior monologue is a form of reproduction that transfers ideas, emotions, feelings. Its range is quite wide, it can include non-speech level. Steam-of-consciousness is a technical method that transfers feelings that are not formed logically, occasionally or on purpose. It is especially effective in state of sleep or waking. Steam-of-consciousness is described as way to present an internal monologue, in which time and space limits are destroyed, by the dictionary of literary terms. Later dictionaries of literary terms edited by J.A. Cuddon and K. Beckson define only the term stream-of-consciousness as a method to describe a chaotic flow of conscience. In fact, terms stream-of-consciousness and interior monologue function as synonyms, or the latter is not used at all, and the first one is selected is a complete one.

The definition of terms on our domestic dictionaries is also ambiguous. «Dictionary of linguistic terms», editedby V.M. Lesin interprets internal monologue speech as an «inner speech», and qualifies it as a «dialogue with oneself». «Dictionary of linguistic terms», editedby G. Mazuro introduces a term «free indirect speech» (discourse indirect lible), and characterizes it as a phrase that tends to change mood.

As we can see, there is no clear definition of terms in domestic and foreign linguistics. Determination of the phenomenon is attended by a wide term-making. We should outline that none of the provided terms does not reflect the complete idea of internal monologue speech that is linked to reproduction of internal speech of literature characters, and it is likely impossible, as there is no term, definition of which can allow for all cases and special features.

It is hard to tell who was the first to discover the existence of a silent internal voice. Ancient thinker of Greece knew of it. Socrates draw his attention to it, and his student, Greek philosopher Plato described the idea idealistically in his «Dialogues» as a dialogue of soul with itself. «Dialogue to oneself» was used more successfully and chronologically earlier (14-15th century) in dramaturgy. Monologue (Greek – a lone dialogue) is defined as a dialogue of a character with himself in drama or as a address to public in dictionaries. A special contribution into the development and formation of dramatic monologue was made by W. Shakespeare.

One of the forms of internal monologue speech is the internal monologue, or speech to oneself that is structurally close to dramatic monologue. This type of internal monologue speech is realized with external speech. Internal speech takes it outside, preserving its specific grammatical peculiarities, it becomes external speech, obtains a sound cover, but in its psychological meaning it stays internal speech – an internal thinking, a dialogue with oneself or with an imagined opponent which can't give a complete communication and understanding. Such communication is possible in dramatic monologue. Grammatically-interval speech deflects usual forms of dialogue and coherent speech and is most frequently expressed in repeated words and expressions that obtain a special meaning in minds of characters. Internal speech that partially fulfills the function of external speech, reflects an intimate psychology of characters, emotional states in their psychological sincerity. Literary-artistic method, internal monologue, emerged later than internal monologue speech or stream-of-consciousness. According to R. Hamphry, it is a fortunate combination of internal speech and external impact.

According to the take research and from the point of solving problems of future investigation, we can constate that in its wide philological scale internal monologue speech is first of all a linguistic phenomenon, a way to transfer speech that is typical for different kinds of art: literature, dramaturgy, cinema. In a literary-artistic masterpiece internal monologue speech is a stylistic method, a way to transfer internal speech of a character

that is realized via linguistic and extra-linguistic contamination of author's subjective perspectives, which quantitative and qualitative degree varies significantly within modifications of internal monologue speech. The concept internal monologue speech is comparable to phenomenon and features of different categories, first of all, linguistic, literary, social.

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MODEL OF INTERACTION OF THE LAYER OF ICE AND NON-RIGID ROAD PAVEMENT WITH ADDITION OF THE RUBBER CRUMB

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Within last years the application of rubber granules as rubber -concrete filler is considered to be an advanced direction in road construction. Such kind of technology decreases the value of roadway covering and settles the issue of used car tyres utilization as well [4, 5]. Besides, field experience revealed a number of positive features of asphaltic surface: enhanced wear and cold resistance, increasing of service life, reduction of noise emission, shortening of breaking distance [6].

The purpose of this study is to determine mean stresses in the elements of ice, a loose road surface and tire under the action of the pressure of the wheels passing vehicles.

1. It is under consideration the area of wheel contact spot with rubber-concrete road covering, on the surface of which there is an ice layer. Spot size significantly exceeds rubber particles size, (NRRP) layers between them and thickness of ice layer. According to this fact evaluating the mode of deformation in the area of pressure spot for rubber-concrete-ice system, following assumptions will be reasonable:

a) There is no principle size for rubber particles, and its distribution in rubber-concrete covering is on average uniform ;

b) Ice thickness doesn't exceed average linear dimension of typical rubber-concrete volume;

c) Materials of structural elements (rubber, asphalt, ice) are isotropic an elastic;

d) Pressure of p wheel is constant on the contact spot;

e) Stress and deformation fields are uniform in all structural elements;

g) Structural elements become deformed together without breakaways before destruction.

In line with submitted assumptions it can be regarded that in the area of spot contact and wheel, the rubber-concrete – ice system appears as representative volume.

In accordance with assumption of physical fields uniformity, then average values are meant by stress and deformations. Two fragments can be emphasized in representative volume: rubber-ice (1) and NRRP -ice (2).

Keys:

σ_{11}, σ_{22}, σ_{33}, σ_{23}, σ_{13}, σ_{12}– average stress in representative volume;

ε_{11}, ε_{22}, ε_{33}, ε_{23}, ε_{13}, ε_{12} – average deformations in representative volume;

$\sigma^t_{11}, \sigma^t_{22}, \sigma^t_{33}, \sigma^t_{23}, \sigma^t_{13}, \sigma^t_{12}$ – average stress in t volume;

$\varepsilon^t_{11}, \varepsilon^t_{22}, \varepsilon^t_{33}, \varepsilon^t_{23}, \varepsilon^t_{13}, \varepsilon^t_{12}$ – average deformations in the same volume.

Thus super index indicates the volume, in which averaging has been carried out:

$T = p$ – rubber particles;

$t = a$ – NRRP elements;

$t = l1$ – ice elements contacting with rubber particle;

$t = l2$ – ice elements contacting with NRRP elements;

$t = (1)$ – fragment (1) rubber-ice;

$t = (2)$ – fragment (2) NRRP -ice.

There are stress and deformations matrixes

$$\{\sigma_{ij}\} = \{\sigma_{11}, \sigma_{22}, \sigma_{33}, \sigma_{23}, \sigma_{13}, \sigma_{12}\}^T;$$

$$\{\varepsilon_{ij}\} = \{\varepsilon_{11}, \varepsilon_{22}, \varepsilon_{33}, \varepsilon_{23}, \varepsilon_{13}, \varepsilon_{12}\}^T;$$

$$\{\sigma^t_{ij}\} = \{\sigma^t_{11}, \sigma^t_{22}, \sigma^t_{33}, \sigma^t_{23}, \sigma^t_{13}, \sigma^t_{12}\}^T;$$

$$\{\varepsilon^t_{ij}\} = \{\varepsilon^t_{11}, \varepsilon^t_{22}, \varepsilon^t_{33}, \varepsilon^t_{23}, \varepsilon^t_{13}, \varepsilon^t_{12}\}^T,$$

where index «T» means flip operation.

The object is issued: to define structural elements (micro stress) $\{\sigma^p_{ij}\}, \{\sigma^a_{ij}\}, \{\sigma^{л1}_{ij}\}, \{\sigma^{л2}_{ij}\}$ dependence on p wheel pressure.

Two averaging levels are assigned in representative volume: on the first level, averaging is carried out in each of fragments (1) and (2), regarded as two-component rubber-ice and NRRP -ice environments; on the second level, averaging is carried out in the whole representative element which regarded as two component environment containing (1) and (2) fragments.

Suggested idea of averaging method in [1] for two component environment is used while calling it into action in each level.

2. The averaging process for (1) and (2) fragments is under consideration. Conditions of

equilibrium and ice and rubber displacement compatibility in (1) fragment can be recorded as follows:

$$\begin{cases} \sigma^{(1)}_{22} = \xi\sigma^{l1}_{22} + (1-\xi)\sigma^p_{22}, & \sigma^{(1)}_{11} = \sigma^{l1}_{11} = \sigma^p_{11}, \\ \sigma^{(1)}_{33} = \xi\sigma^{l1}_{33} + (1-\xi)\sigma^p_{33}, & \sigma^{(1)}_{13} = \sigma^{l1}_{13} = \sigma^p_{13}, \\ \sigma^{(1)}_{23} = \xi\sigma^{l1}_{23} + (1-\xi)\sigma^p_{23}, & \sigma^{(1)}_{12} = \sigma^{l1}_{12} = \sigma^p_{12}, \end{cases}$$

$$\begin{cases} \varepsilon^{(1)}_{11} = \xi\varepsilon^{l1}_{11} + (1-\xi)\varepsilon^p_{11}, & \varepsilon^{(1)}_{22} = \varepsilon^{l1}_{22} = \varepsilon^p_{22}, \\ \varepsilon^{(1)}_{13} = \xi\varepsilon^{l1}_{13} + (1-\xi)\varepsilon^p_{13}, & \varepsilon^{(1)}_{33} = \varepsilon^{l1}_{33} = \varepsilon^p_{33}, \\ \varepsilon^{(1)}_{12} = \xi\varepsilon^{l1}_{12} + (1-\xi)\varepsilon^p_{12}, & \varepsilon^{(1)}_{23} = \varepsilon^{l1}_{23} = \varepsilon^p_{23}. \end{cases} \quad (1)$$

$$\xi = \frac{\delta}{1+\delta}, \quad \delta = \frac{h}{a}. \qquad (2)$$

Parameter ξ – relative volume ice content in each of structural elements (1) and (2).

Mentioned equations reflect composition rule: component impact is proportional to its volume concentration; in this case equations placed in first columns of (1) and (2) systems, correspond to Reis's averaging, then to Foiht's averaging [2, 7].

In accordance with supposed assumptions state equations of ice and rubber materials are as follows:

$$\begin{cases} \varepsilon_{11}^{l1} = \frac{1}{E^l}\sigma_{11}^{l1} - \frac{\nu^l}{E^l}\sigma_{22}^{л1} - \frac{\nu^l}{E^l}\sigma_{33}^{l1}, & \varepsilon_{23}^{l1} = \frac{1}{G^l}\sigma_{23}^{l1}, \\ \varepsilon_{22}^{l1} = \frac{1}{E^l}\sigma_{22}^{l1} - \frac{\nu^l}{E^l}\sigma_{11}^{л1} - \frac{\nu^l}{E^l}\sigma_{33}^{l1}, & \varepsilon_{13}^{l1} = \frac{1}{G^l}\sigma_{13}^{l1}, \\ \varepsilon_{33}^{l1} = \frac{1}{E^l}\sigma_{33}^{l1} - \frac{\nu^l}{E^l}\sigma_{11}^{l1} - \frac{\nu^l}{E^л}\sigma_{22}^{l1}, & \varepsilon_{12}^{л1} = \frac{1}{G^l}\sigma_{12}^{l1}. \end{cases} \qquad (3)$$

$$\begin{cases} \varepsilon_{11}^{p} = \frac{1}{E^p}\sigma_{11}^{p} - \frac{\nu^p}{E^p}\sigma_{22}^{p} - \frac{\nu^p}{E^p}\sigma_{33}^{p}, & \varepsilon_{23}^{p} = \frac{1}{G^p}\sigma_{23}^{p}, \\ \varepsilon_{22}^{p} = \frac{1}{E^{lp}}\sigma_{22}^{p} - \frac{\nu^p}{E^{\,p}}\sigma_{11}^{p} - \frac{\nu^p}{E}\sigma_{33}^{p}, & {}_p\varepsilon_{13}^{p} = \frac{1}{G}\sigma_{13}^{p}, \\ \varepsilon_{33}^{p} = \frac{1}{E^p}\sigma_{33}^{p} - \frac{\nu^p}{E^p}\sigma_{11}^{p} - \frac{\nu^p}{E^p}\sigma_{22}^{p}, & \varepsilon_{12}^{p} = \frac{1}{G^p}\sigma_{12}^{p}. \end{cases} \qquad (4)$$

where E – Young's modulus; G – shear modulus; ν – Poisson number of ice (l) and rubber (p).

By the use of (1)–(4) equations, stresses in ice $\{\sigma_{ij}^{l1}\}$ and rubber $\{\sigma_{ij}^{p}\}$ elements can be expressed through $\{\sigma_{ij}^{(1)}\}$ stresses, functioning in (1) fragment in the whole:

$$\{\sigma_{ij}^{l1}\} = [P^{l1}]\{\sigma_{ij}^{(1)}\}; \ \{\sigma_{ij}^{p}\} = [P^{p}]\{\sigma_{ij}^{(1)}\}. \qquad (5)$$

Matrix $[P^{l1}]$ и $[P^{p}]$and have dimensions of 6x6, the elements involved are

$$p_{21}^{l1} = p_{31}^{l1} = \frac{B_1}{A_1 + A_2};$$

$$p_{21}^{p} = p_{31}^{p} = \frac{-\xi B_1}{(1-\xi)(A_1 + A_2)};$$

$$A_1 = \frac{1}{E^l} + \frac{\xi}{(1-\xi)E^p};$$

$$p_{22}^{л1} = p_{33}^{л1} = \frac{(A_1 + \nu^p A_2)B_2}{A_1^2 - A_2^2};$$

$$p_{22}^{p} = p_{33}^{p} = \frac{1}{1-\xi} - \frac{\xi(A_1 + \nu^p A_2)B_2}{(1-\xi)(A_1^2 - A_2^2)};$$

$$A_2 = -\frac{\nu^l}{E^l} - \frac{\xi\nu^p}{(1-\xi)E^p};$$

$$p_{23}^{л1} = p_{32}^{л1} = -\frac{(\nu^p A_1 + A_2)B_2}{A_1^2 - A_2^2};$$

$$p_{23}^{p} = p_{32}^{p} = \frac{\xi(\nu^p A_1 + A_2)B_2}{(1-\xi)(A_1^2 - A_2^2)};$$

$$B_1 = \frac{\nu^l}{E^l} - \frac{\nu^p}{E^p};$$

$$p_{44}^{l1} = \frac{G^l}{\varsigma G^l + (1-\varsigma)G^p};$$

$$p_{44}^{p} = \frac{G^p}{\varsigma G^l + (1-\varsigma)G^l};$$

$$B_2 = \frac{1}{(1-\xi)E^p}.$$

The remaining elements of the matrices $[P^{l1}]$ and $[P^{p}]$ and are equal to zero.

Further, having excluded from the equations (1)–(4) components of pressure and deformations in ice and rubber elements using the relation (5), we will receive the effective equation of a condition of a two-component fragment (1):

$$\{\varepsilon_{ij}^{(1)}\} = [S^{(1)}]\{\sigma_{ij}^{(1)}\}. \qquad (6)$$

Here the matrix $[S^{(1)}]$ size is 6×6, its elements are:

$$s_{11}^{(1)} = \frac{\xi}{E^л} + \frac{1-\xi}{E^p} + 2\left(\frac{\xi\nu^p}{(1-\xi)E^p} - \frac{\nu^л}{E^л}\right)\frac{B_1}{A_1 + A_2};$$

$$s_{12}^{(1)} = s_{13}^{(1)} = -\frac{\nu^p}{E^p} - \frac{\xi(1-\nu^p)B_1B_2}{A_1 + A_2};$$

$$s_{22}^{(1)} = s_{33}^{(1)} = B_2 - \frac{\xi B_2^2}{A_1^2 - A_2^2}((1+(\nu^p)^2)A_1 + 2\nu^p A_2);$$

$$s_{21}^{(1)} = s_{31}^{(1)} = -\frac{\nu^p}{E^p} - \frac{\xi(1-\nu^p)B_1^2}{A_1 + A_2};$$

$$s_{23}^{(1)} = s_{32}^{(1)} = -\nu^p B_2 + \frac{\xi B_2^2}{A_1^2 - A_2^2}(2\nu^p A_1 + (1+(\nu^p)^2)A_2);$$

$$s_{44}^{(1)} = \frac{1}{\xi G^{л} + (1-\xi)G^p}; \quad s_{55}^{(1)} = s_{66}^{(1)} = \frac{\xi}{G^{л}} + \frac{1-\xi}{G^p}.$$

he remaining elements of the matrix $[S^{(1)}]$ are zero.

For pressure and deformations in NRRP and ice elements in a fragment (2) the same equations, as well as (1)–(4) for rubber and ice in a fragment (1) are fair. Therefore they can be received, if in (1)–(4) to replace indexes of sizes under the scheme:

$$(1) \to (2);\ l1 \to l2;\ p \to a.$$

As consequence, from (5) we receive dependences of pressure in asphalt elements $\{\sigma_{ij}^a\}$ and ice $\{\sigma_{ij}^{l2}\}$ through pressure $\{\sigma_{ij}^{(2)}\}$, operating on a fragment (2) in whole, in a kind,

$$\{\sigma_{ij}^{l2}\} = [P^{l2}]\{\sigma_{ij}^{(2)}\};$$

$$\{\sigma_{ij}^{a}\} = [P^{a}]\{\sigma_{ij}^{(2)}\}, \qquad (7)$$

and from (6) – the effective equation of a condition of a two-component fragment (2):

$$\{\varepsilon_{ij}^{(2)}\} = [S^{(2)}]\{\sigma_{ij}^{(2)}\}. \qquad (8)$$

3. For representative volume as the two-component environment consisting of fragments (1) and (2), the equations of balance and compatibility of deformations are fair

$$\begin{cases} \sigma_{11} = \rho\sigma_{11}^{(1)} + (1-\rho)\sigma_{11}^{(2)}, & \sigma_{33} = \sigma_{33}^{(1)} = \sigma_{33}^{(2)}, \\ \sigma_{22} = \rho\sigma_{22}^{(1)} + (1-\rho)\sigma_{22}^{(2)}, & \sigma_{23} = \sigma_{23}^{(1)} = \sigma_{23}^{(2)}, \\ \sigma_{12} = \rho\sigma_{12}^{(1)} + (1-\rho)\sigma_{12}^{(2)}, & \sigma_{13} = \sigma_{13}^{(1)} = \sigma_{13}^{(2)}, \end{cases} \qquad (9)$$

$$\begin{cases} \varepsilon_{33} = \rho\varepsilon_{33}^{(1)} + (1-\rho)\varepsilon_{33}^{(2)}, & \varepsilon_{11} = \varepsilon_{11}^{(1)} = \varepsilon_{11}^{(1)}, \\ \varepsilon_{23} = \rho\varepsilon_{23}^{(1)} + (1-\rho)\varepsilon_{23}^{(2)} & \varepsilon_{22} = \varepsilon_{22}^{(1)} = \varepsilon_{22}^{(1)}, \\ \varepsilon_{13} = \rho\varepsilon_{13}^{(1)} + (1-\rho)\varepsilon_{13}^{(2)} & \varepsilon_{12} = \varepsilon_{12}^{(1)} = \varepsilon_{12}^{(1)}. \end{cases} \qquad (10)$$

where ρ is the relative volume concentration of rubber in rubber-concrete, defined as

$$\rho = \frac{a}{a+b}.$$

From the equations (6), (8)-(10) we will express pressure $\{\sigma_{ij}^{(1)}\}$, $\{\sigma_{ij}^{(2)}\}$ in fragments (1) and (2) through pressure $\{\sigma_{ij}\}$, operating on representative volume in whole, in a kind

$$\{\sigma_{ij}^{(1)}\} = [P^{(1)}]\{\sigma_{ij}\};$$

$$\{\sigma_{ij}^{(2)}\} = [P^{(2)}]\{\sigma_{ij}\}. \qquad (11)$$

Matrices have the size of 6×6, the elements involved are:

$$p_{1j}^{(1)} = \frac{1}{\Delta}(a_{22}b_{1j} - a_{12}b_{2j});$$

$$p_{2j}^{(1)} = \frac{1}{\Delta}(a_{11}b_{2j} - a_{21}b_{1j});$$

$$p_{ij}^{(2)} = \frac{1}{1-\rho}(\delta_{ij} - p_{ij}^{(1)});$$

$i = 1, 2, j = 1, 2, 3,$

$$p_{66}^{(1)} = \frac{s_{66}^{(2)}}{\rho s_{66}^{(2)} + (1+\rho)s_{66}^{(1)}};$$

$$p_{66}^{(2)} = \frac{s_{66}^{(1)}}{\rho s_{66}^{(2)} + (1+\rho)s_{66}^{(1)}};$$

$$p_{ii}^{(1)} = p_{ii}^{(2)} = 1;$$

$i = 3, 4, 5,$

$$a_{i1} = s_{i1}^{(1)} + \frac{\rho}{1-\rho}s_{i1}^{(2)}; \quad a_{i2} = s_{i2}^{(1)} + \frac{\rho}{1-\rho}s_{i2}^{(2)};$$

$$b_{ij} = \frac{1}{1-\rho}(\delta_{1j} + \delta_{2j})s_{ij}^{(2)} + \delta_{3j}(s_{i3}^{(2)} - s_{i3}^{(1)}).$$

The remaining elements of the matrix $[P^{(1)}]$ и $[P^{(2)}]$and and are equal to zero; δ_{ij}– Kroneker's symbol.

Further, by means of (11) it is excluded from the equations (6), (8)-(10) components of pressure and deformations in fragments (1) and (2), we will receive the effective equation of a condition of a material of *representative volume:*

$$\{\varepsilon_{ij}\} = [S]\{\sigma_{ij}\}. \qquad (12)$$

Here the matrix $[S]$ is of dimension 6×6; its elements are given by:

$$s_{1j} = s_{11}^{(2)} p_{1j}^{(2)} + s_{12}^{(2)} p_{2j}^{(2)} + \delta_{3j} p_{13}; \quad s_{2j} = s_{21}^{(2)} p_{1j}^{(2)} + s_{22}^{(2)} p_{2j}^{(2)} + \delta_{3j} p_{23};$$

$$j = 1, 2, 3\ j = 1, 2, 3,$$

$$s_{3j} = \rho\left(s_{31}^{(1)} p_{1j}^{(1)} + s_{32}^{(1)} p_{2j}^{(1)} + \delta_{3j} p_{33}^{(1)}\right) + (1-\rho)\left(\left(s_{31}^{(2)} p_{1j}^{(2)} + s_{32}^{(2)} p_{2j}^{(2)} + \delta_{3j} p_{33}^{(2)}\right)\right);$$

$$s_{44} = \rho s_{44}^{(1)} + (1-\rho) s_{44}^{(2)}; \quad s_{55} = \rho s_{55}^{(1)} + (1-\rho) s_{55}^{(2)};$$

$$s_{66} = \frac{s_{66}^{(1)} s_{66}^{(2)}}{\rho s_{66}^{(1)} + (1) + \rho\ s_{66}^{(2)}}.$$

The remaining elements of the matrix $[S]$ are zero.

4. Let's consider, that in a zone of a stain of contact in representative volume conditions are satisfied:

1) $\sigma_{11} = -p$; $\sigma_{12} = \sigma_{13} = \sigma_{23} = 0$.

Where p – pressure of a wheel of the car;

2) Deformations in a direction of axes of coordinates 2 and 3 are completely constrained:

$$\varepsilon_{22} = 0,\ \varepsilon_{33} = 0.$$

Under these conditions from the equation (15) it is found

$$\sigma_{22} = -p_{21}p;\ \ \sigma_{33} = -p_{31}p.$$

Where

$$p_{21} = \frac{s_{31}s_{23} - s_{21}s_{33}}{s_{22}s_{33} - s_{23}s_{32}};$$

$$p_{31} = \frac{s_{21}s_{32} - s_{22}s_{31}}{s_{22}s_{33} - s_{23}s_{32}}.$$

Hence, the matrix of average pressure in representative volume looks like:

$$\{\sigma_{ij}\} = \{\sigma\} \cdot p. \qquad (13)$$

Where

$$\{\sigma\} = \{-1 \quad p_{21} \quad p_{31} \quad 0 \quad 0 \quad 0\}^T..$$

As a result, according to the equations (5), (7), (11), (13) pressure in elements of ice, rubber and asphalt are connected with pressure of a wheel in a zone of a stain of contact by the equations

$$\{\sigma_{ij}^{л1}\} = [P^{л1}]\,[P^{(1)}]\{\sigma\}p;$$

$$\{\sigma_{ij}^{л2}\} = [P^{л2}][P^{(2)}]\{\sigma\}p;$$

$$\{\sigma_{ij}^{p}\} = [P^{p}][P^{(1)}]\{\sigma\}p;$$

$$\{\sigma_{ij}^{a}\} = [P^{a}]\,[P^{(2)}]\,\{\sigma\}p.$$

Thus, the task in view is solved.

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HIGH-TORQUE ELECTRIC ENGINE FOR THE MOTOR-WHEEL

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In the modern world the economy of industrial resources has got the greatest value. To save on energy is possible only by construction of the electrical machines, that best of all satisfy the requirements for them by these systems.

The constantly growing use of a municipal motor-vehicle transport has led to the necessity of development of the machines which are not pollute air pools by exhaust gases, have low noise level and progressive constructive decisions. Modern technical systems have a number of lacks in the technical and economic parameters due to forces of friction [1]. The new concept of motor-wheel drive ex-

cludes many mechanical losses between the engine and the working unit, in which the electric motor and the mechanical transfer are connected [2].

The main area of a motor-wheel's application is motor industry. Such kind of these devices is used in electric cars, bicycles, invalid carriages, moon rovers. Hence the development of trolley buses with independent power supplies is worthwhile today.

As the engine of motor-wheel's drive the variant of the contactless synchronous electric machine with a ring coil on the stator and permanent magnets on the rotor was chosen and designed. It provides wider functionality in the heaviest conditions and operating modes in comparison with asynchronous machine [3]. For the majority of control systems the contactless engine is designed as the high-torque low-speed electrical machine.

The magnetoelectric engine is capable to work also in a mode of the generator of electric energy. The design of the stator of the electrical machine allows to simplify the winding and to protect it from various influences. Owing to the very small front parts of a ring winding, the electric engine has the best power and mass-overall characteristics.

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EFFECTIVE METHOD OF HARD GOLD-CONTAINING ORE PREPARATION TO LEACHING

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For effective preparation of hardly concentrating ores to leaching there are considered to be perspective the methods of two-phased oxidation, which is based on photo electrochemical influence on solutions of reagents with formation of strong oxidants (active forms of oxygen) with the following biooxidation of hard minerals, which are realized in ditch version.

An examination of peculiarities of photo electrochemical influence and bacterial oxidation on the change of material surface structure and the process of dissection of mineral medium was carried out on the polished selection of sulfide minerals of Kokpatassk, Daugyztausk (Uzbekistan), Bugdainsky, Darasun, Teremkinsk (Transbaikalia) deposits. On the base of the analysis of received information of two-phase oxidation it was stated that, by the photo electrochemical influence the sulfide oxidation degree increased by 19,9% (from 44,2 to 64,1%) – 26,1% (from 64,1 to 90,2%), sulfide sulphur – by 15,9% (from 40,4 to 56,3%) – 21,9% (from 63,1 to 85,0%). By the photo electrochemical oxidation of minerals the facts of X-ray phase analysis testify the formation of new mineral phases: magnetite, hematite, scorodite, element sulphur. General tendency of sulfides oxidation is confirmed by the results of Eh change from 480 to 780 мВ, pH from 4,5 to 2,0, iron concentration change from 5,1 to 70 g/l and arsenic concentration change from 110 to 180 mg/l in liquid phase.

During the examination of polished selections by incident light it was visually defined that the volume of emptiness till the biooxidation was in average 5-15%, and – 40-50%. Softening of mineral matrix by the photo electrochemical influence and formation of nanoaccumulation of element sulphur in optimal regimen stimulates the bacterial oxidation, fastening the leaching of metals by 2-3 times. An iron output into solution in 24 hours in the variants with photo electroactivation was 30-35 g/l, in 36-48 hours – 33,2-70 g/l. when in variants without preliminary treatment – only 8-10 and 20-25 g/l accordingly. Long treatment didn't improve the showings of leaching.

Experimental researches of the two-stage oxidation influence on dissection of hard minerals were carried out on the sulfide ore of Daugyztausk deposits.

On the base of experimental researches there were received new results, which testify the high effectiveness of preparation of hard raw materials with two-stage oxidation to gold leaching: there was received an increase of gold extraction by the cyanidation of oxidized sulfide ore in 46,9% (from 40,2 to 87,1%) into a liquid phase and in 41,1% (from 48,4 to 89,5%) into a resin.

Firstly on the base of processing of experimental facts of two-stage oxidation with the use of mathematical statistics by the method of Protodyakonov there were received following empirical dependences:

1) degree of material oxidation depends on the duration of photo electrochemical oxidation:

degree of photo electrochemical oxidation of sulfide minerals

$$У_3'(\beta'_{sulph.min}) = 10\cdot(0{,}84 + 1{,}01 + \log(X) - 0{,}21 + \log(X)\cdot 2),$$

degree of photo electrochemical oxidation of sulfide sulphur

$$У_4'(\beta'_{S_s}) = 10\cdot(0{,}89 + 1{,}01 + \log(X) - 0{,}22 + \log(X)\cdot 2).$$

There were experimentally stated rational parameters: duration of photo electrochemical oxidation ($X_{opt} = t_1$ = 6-12 ч) and degree of photo electrochemical oxidation of minerals ($\beta'_{sulph.min}$ = 40-52 %; β'_{S_s} = 30–42 %);

2) degree of two-stage oxidation depends on the parameters of photo electrochenical influence:

degree of two-stage oxidation of sulfide minerals

$$У_3(\beta_{sulph.min}) = 48{,}72 + 10{,}30\cdot\log(t_{splash\ lubrication}) + 10{,}41\cdot\log(U_э) + 2{,}20\cdot\log(t_{splash\ lubrication})\cdot\log(U_э) +$$
$$+ 10{,}32\cdot\log(t_{irradiation}) + 2{,}18\cdot\log(t_{irradiation})\cdot\log(t_{splash\ lubrication}) + 2{,}21\cdot\log(t_{irradiation})\cdot\log(U_э) + 10{,}48\cdot\log(P) +$$
$$+ 2{,}22\cdot\log(P)\cdot\log(t_{splash\ lubrication}) + 2{,}24\cdot\log(P)\cdot\log(U_э) + 2{,}22\cdot\log(P)\cdot\log(t_{irradiation}),$$

degree of two-stage oxidation of sulfide sulphur

$$У_4\left(\beta_{S_s}\right) = 48{,}28 + 10{,}16\cdot\log\left(t_{splash\ lubrication}\right) + 10{,}32\cdot\log(U_э) + 2{,}17\cdot\log\left(t_{splash\ lubrication}\right)\cdot\log(U_э) +$$
$$+ 10{,}28\cdot\log\left(t_{irradiation}\right) + 2{,}16\cdot\log\left(t_{irradiation}\right);$$

$$\log(t_{splash\ lubrication}) + 2{,}20\cdot\log(t_{irradiation})\cdot\log(U_э) + 10{,}39\cdot\log(P) + 2{,}19\cdot\log(P)\cdot\log(t_{splash\ lubrication}) +$$
$$+ 2{,}22\cdot\log(P)\cdot\log(U_э) + 2{,}21\cdot\log(\mathrm{P})\cdot\log(t_{irradiation}),$$

where P – consumption of NaCl, g/t;

$t_{splash\ lubrication}$ – duration of splash lubrication, hours; $t_{irradiation}$ – duration of irradiation, hours; $U_э$ – voltage on the electrodes in electrolyzer, V.

There were experimentally stated the rational parameters of photo electrochemical influence:

$t_{irradiation}$ = 5-8 min,

$t_{splash\ lubrication}$ = 1,5-2,0 h, $U_э$ = 20-30 B,

P = 10-20 g/t, duration of biooxidation (t_2 = 48-50 h), degree of two-stage oxidation ($\beta_{sulph.min}$ = 90-94 %; β_{S_s} = 86–91 %).

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Short Reports

NEW BOOKS ON HISTORIOGRAPHY OF EMIGRATION FROM RUSSIA

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A report on a series of books on historiography of Russian emigration, published by the author in editorial office Lambert Academic Publishing (Federative Republic of Germany) in 2011-2012

An open-minded study of Russian overseas has become one of actual problems of modern science. There are several reasons. The first one – in terms of emergence of multi-million diaspora that is linked to Russia in foreign countries studying adaptation of different social groups to new life conditions has obtained an extreme urgency. The second reason – comprehension of the large creative heritage of emigrants has an exceptional significance for spiritual, cultural, and social-economic rebirth of Russia in terms of forming new statehood and selecting variants of social development. Finally, the third of the main reasons is the necessity to review many aspects of our domestic history, objective evaluation of the past of our country, joining cultures of Russian overseas and mother country.

The volume and various types of studies that have been taken since 1991, and the major part of which is represented by dissertations, make us consider emigration study as a new direction in domestic human science. A continuous growth in dissertation flow require a system study, results of which will allow us to judge the emigration science as a whole (monographs, articles, and other types of publications are often needed by authors only to access a defence for their dissertations, that lead them to a degree of doctor or candidate of science – acknowledgement of this factor can be found in official documents of Ministry of science and education of Russia, particularly in the Concept of development of research and innovative activity in Russian institutions), outline its main trends, resume studies on separate problems, plan prospects for further research. These basic objectives form a problem that is to be studied in a series of our books, published by German editorial office Lambert Academic Publishing in 2011–2012. An analysis of dissertations on topic «Russian emigration» that have been defended in RSFSR and RF during 26 years (1980-2005) and include roughly equal in duration soviet and post-soviet period has not been taken yet.

The monograph «Russian overseas: origins of historic research, their evolution» (Saarbrьcken: Lambert Academic Publishing GmbH & Co. KG, 2012. 280 p.) studies a massive of sources on history of Russian emigration and Russian overseas that has been introduced into scientific turnover by domestic historians – emigrant researchers in 1980–2005: archive funds (foreign archives, documents of archive fund of the state archive of RF, funds of other federal archive-keeps, funds of regional archives); sources of personal origin (memoirs and diaries, correspondence, oral testimonies, autobiographic poems and lyrics, material sources); emigrant literature (periodic publications, works by well-known emigration activists and their historic coevals, reviews, opinions, obituaries); documental sources (collections and selections of documents, photo- and video- materials, bibliographic production, resources of Internet network). The authors resume: an intensively growing inter-discipline integration defines ways to solve problems of the sources. It is important to broaden their circle, strengthening the expertise at the same time. Only with usage and comparative analysis of the whole circle of historic sources we can create an objective picture of emigration history. If we remember that abilities of history always depend on its source basis and research methods, then we can confidently forecast an emergence of qualitatively – new gnosiologies and epistemologies of problems of emigration.

The book is enriched with two supplementations. The first is named «Russian emigration in USA and Canada (according to materials of the newspaper «Immigrants»)» and is aimed to draw researchers' attention towards periodic printed editions (including newspapers) as to a historic source. An obvious advantage of the «Immigrant's» publications is in enrichment of the history of Russian overseas with subjective, «human» contents, in other words, its antropologization. Some of these materials are to be considered as scientific publicity that puts new direction of scientific searches and fills lacunas that are present in our domestic history. The other, a more significant part is to be recommended to professional researchers as a source. The second supplement is named «Russian nationals in countries of old and new overseas (from the archive of I.I. Erenburgh)» and represents a selection of letters by our former citizens that have been taken form the personal archive of one of citizens of Ekaterinburg. This collection is aimed to draw researchers' attention towards personal and family archives as a reserve of sources of historic knowledge that hasn't been studied sufficiently so far. The provided letters allow us to understand more clearly problems of Russian co-citizens abroad, feel deep changes in their life after they had found themselves as foreigners after the break of USSR.

Our complex source, methodologic, and historiograohic analysis of domestic and foreign works on topic «Russian emigration» is followed by the monograph «Russian emigration in domestic dis-

sertation studies of 1980-2005 : bibliometric analysis» (Saarbrücken: Lambert Academic Publishing GmbH & Co. KG, 2011. 480 p.). At the basis of system of scientific and bibliometric indexes branch and qualification contents of dissertations it characterizes dynamics of defences, activity of centers of studying Russian overseas, reveals major research trends among emigrant researchers. The main conclusion of the book is: the volume character of studies that have been taken in the end of the XX – beginning of the XXI century allows us to speak of an emergence of emigrant study as a new socially-significant direction in domestic human science that is developed swiftly.

Obviously, the approbated scientific and bibliometric methodics have proven themselves as quite effective tools to study historiogrphy of Russian emigration. They help a lot to reveal directions and tempers of development of emigrant study, dynamics of research interest, contribution of separate regions, organizations, and authors to the development of emigrant study, intensity of operation of scientific centers, integrative links between branches of science and the studied problems, etc. The only thing that is objectively put outside limits of implementation of bibliometrics is studying texts of scientific works, as only formal sources can be evaluated. Therefore, in order to reflect all the multiplicity of information in dissertations, we use traditional methods of document evaluations in addition to quantitative methods.

Historiographic analysis of dissertation texts and supplementary printed works on history of Russian emigration and Russian overseas was taken in the third monograph of the series – the book, named «problems of historiography of Russian overseas» (Saarbrücken: Lambert Academic Publishing GmbH & Co. KG, 2012. 312 p.). Scientific schools of historians – emigrant researchers, emigrations of different waves, study of regions of Russian spreading, problems of emigration of different ethnic and class groups, comprehension of problems of adaptation of Russian emigrants and the phenomenon of Russian orthodox overseas, study of education, editorial and museum business of Russian emigrants, historic description of life and creativity of well-known emigrant activists are characterized.

So, all emigration waves, the majority of diasporal, ethnic, and class groups, spreading regions of Russian emigrant are presented as the research subject of Russian emigration. Practically all types of emigration are studied: political, economic, military, religious, re-emigration, repatriation. A lot of scenarios, significant for emigration study are present. Demographic, ethnic, and confessional characteristic of different stages of emigration flows is given, their geographic direction is set.

Nevertheless, the problem of re-uniting broken parts of culture of Russian diaspora with the culture of mother nation, creation of new history of Russia, history of joint Russian literature, philosophy, art preserves its urgency.