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## **SECTOIN 1. Chemical sciences**

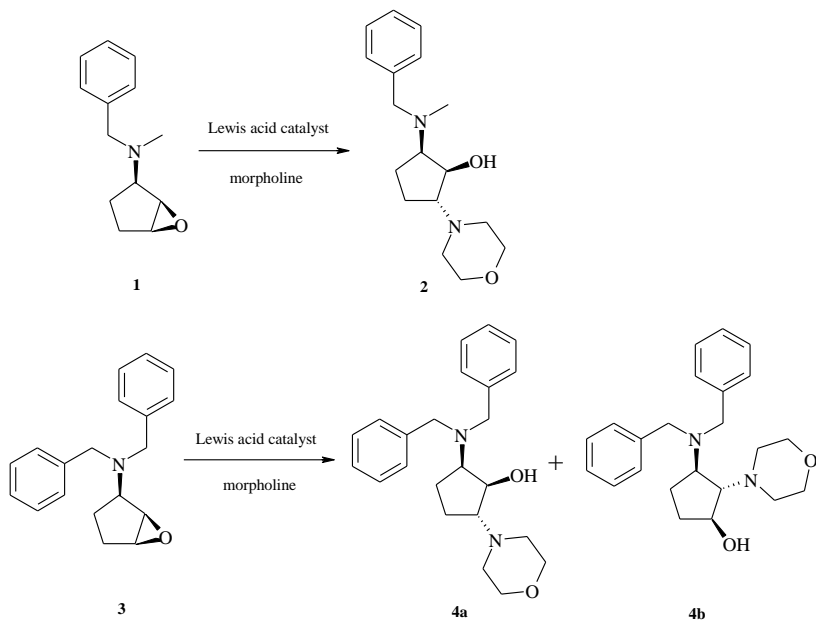
### **THE INFLUENCE OF EPOXIDE STRUCTURE ON THE REGIO- AND STEREOSELECTIVITY OF THE EPOXIDE RING-OPENING REACTIONS FOR N,N-DISUBSTITUTED 1,2-EPOXY-3-AMINOCYCLOPENTANES**

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In recent years mimicry of aminoglycosides has become an important field in pharmaceutical research. Regio- and stereochemical diversity within a sugar-like moiety in those mimics may subtly influence their biological activity. The functionalization of synthetic aminocyclitols represents an attractive strategy towards the preparation of aminoglycoside mimics, and the development of common synthetic routes to various regio- and stereoisomeric aminocyclitol derivatives remains essential. In this context, epoxidation of cyclic allylic amines and the subsequent oxirane ring opening are synthetically significant reactions for the creation of new pharmaceutically important scaffolds.

One of the best routes involves the stereoselective ring opening of epoxides by different nucleophiles in the presence of  $\text{Zn}(\text{ClO}_4)_2 \times 6\text{H}_2\text{O}$  [1]. Initially, the starting epoxides were prepared according to the procedure described earlier [2], and epoxide ring-opening reactions were performed using morpholine as a nucleophile (Scheme 1).



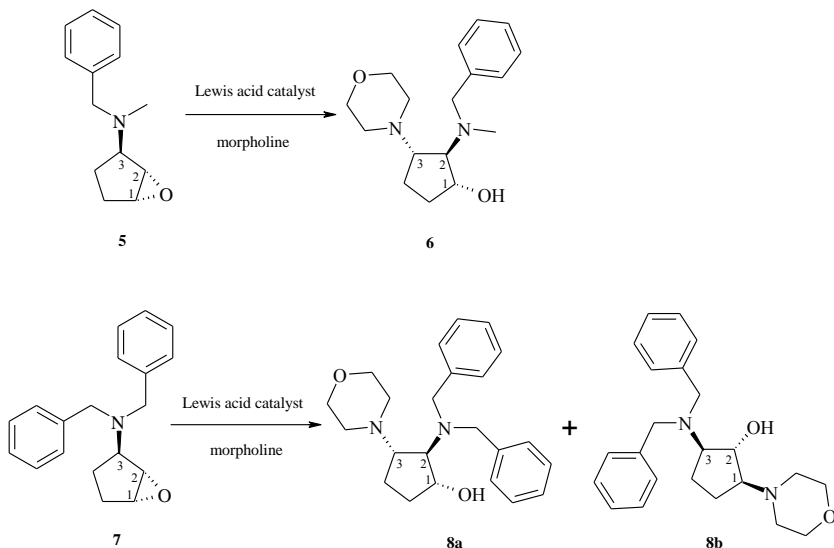
**Scheme 1.** The ring-opening reactions of *syn*-epoxides **1,3** with morpholine

The structure of **2** is consistent with the acid-catalyzed *trans*-diaxial epoxide opening, proceeding via a late-transition state, thus promoting nucleophilic attack at the C1-oxirane carbon atom where the electron-withdrawing inductive effect of N-benzyl-N-methylammonium moiety is lower [3]. Surprisingly, the reaction of **3** bearing N,N-dibenzyl moiety with morpholine displayed poor regioselectivity. In fact, a mixture of two separable regioisomers was obtained in the ratio **4a**:**4b**=2:1. The regioselective outcome can be explained in terms of the electronic factors associated with the substrates **1,3**. Complex formation between the epoxide oxygen atom and the catalyst leads to accumulation of the positive charge on the oxygen atom. The positive charge that is developed on the oxygen atom of the epoxide is delocalized through the adjacent carbon atoms constituting the epoxide ring (C1 and C2) and increases the electrophilicity at these two sites. The presence of the substituent at C3-carbon atom results in differential polarization at the epoxide ring



carbon atoms, and selective nucleophilic attack takes place at the more electrophilic C1-carbon atom of the epoxide ring. The electron-withdrawing effect of N,N-dibenzylammonium moiety in **3** is lower than that of N-benzyl-N-methylamino group in **1**, therefore, both carbon atoms of the epoxide ring of **3** exhibit the similar carbocationic character, and the concurrent nucleophilic attack of the amine towards carbon atoms C1 and C2 becomes possible.

Aminolysis of **5,7** under Lewis acid-catalyzed conditions mainly led to the formation of regioisomers **6,8a** with 1,2-*anti*-2,3-*anti*-stereochemistry (Scheme 2), while the desired isomer **8b** was obtained only in case of *anti*-epoxide **7** as the minor product with the ratio **8a:8b**=13:1.



**Scheme 2.** The ring-opening reactions of *anti*-epoxides **5,7** with morpholine

These results are in contrast to the outcome of the ring-opening reactions of *syn*-epoxides **1,3**, and this may be accounted for by the fact that the formation of **6,8a** presumably involves the aziridinium intermediate [4], that is formed by the intramolecular rearrangement of the epoxide-catalyst complex arising from  $\text{Zn}^{2+}$ -

catalyzed C-O bond cleavage followed by the attack of N,N-disubstituted amino moiety towards C2-carbon atom. The approach of N,N-disubstituted amino group to C2-carbon atom would be more favorable than that of the nucleophile to either oxirane carbon atoms. Therefore, the nucleophilic attack is subsequent to the formation of the aziridinium ring, which is quite consistent with our experimental results.

The regio- and stereochemistry within all the products was assigned by the analysis of  $^1\text{H}$  NMR and bidimensional (HSQC-DEPT,  $^1\text{H}$ - $^1\text{H}$  COSY and NOESY) spectral data.

In summary, we have optimized the reaction conditions for ring opening of *syn*-epoxides **1,3** and *anti*-epoxides **5,7** with morpholine to give the corresponding diaminocyclopentanols in good yields. It has been shown that using  $\text{Zn}(\text{ClO}_4)_2 \cdot 6\text{H}_2\text{O}$  under solvent-free conditions is preferable to the ring-opening reaction of di-N-protected cyclopentanamine epoxides. We have highlighted the influence of the nature of N,N-disubstituted amino moiety and the orientation of the oxirane ring on the regio- and stereoselective outcome. Aminolysis of *syn*-epoxides **1,3** is mainly dictated by electronic bias to afford the corresponding C1 adducts for **1** and the mixture of C1 and C2 adducts for **3**. Using Lewis acid as a catalyst for the ring-opening reactions of **5,7** provides an alternative mechanism that involves the formation of aziridinium intermediate. As a result, regioisomers **6,8a** were obtained as the major products.

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## **SECTION 2. Biological sciences**

### **SPECIAL ASPECTS OF BOARS' THYROID DEVELOPMENT DURING RATION FORTIFICATION WITH ZEOLITE-CONTAINING "PERMAMIK" AND INTRAMUSCULAR INJECTION OF "SEDIMIN"<sup>®</sup>**

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Among the available literary sources there weren't found any information on landrace breed boars' age-specific morphological changes of the thyroid gland in the early postnatal period of development under the conditions of growing in the territory of the southern subzone of the South-east on chernozemic type of landscape of Chuvash Republic agrolandscape type during ration fortification with zeolite-containing preparation and simultaneous application of Sedimin<sup>®</sup>.

Thus, the aim of our research was to study the peculiarities of landrace breed boars' micromorphology of the thyroid gland in the early postnatal period during the application of biological products Permamik and Sedimin<sup>®</sup> under the conditions of growing in the territory of the southern subzone of the South-east on chernozemic type of landscape of Chuvash Republic.

A series of experiments, including scientific and economic experiments (cattle complex in Yalchiksky District of Chuvash Republic) and laboratory studies (teaching and laboratory facilities of the Faculty of Natural Science and environment design of the Federal State Budgetary Educational Institution of Higher Professional Education "Chuvash State Pedagogical University named after I.Y. Yakovlev") with 40 animals - landrace boars were carried out.

Control and test groups were formed from physiologically mature newborn boars of 20 animals in a group [4].

Investigations were carried out on the background of balanced feeding on key indicators in accordance with the norms and rations [3].

Boars of the control group up to 360-day-old (experiment duration) were kept on the basic diet (BD).

Second test group animals were kept on the BD. All animals were injected intramuscularly with Sedimin® (Russia, Pushchino, certificate of state registration of a medicament for animals no.PVR-2-3,6/01651) on the 3rd and 14th day of life in a dose of 2 ml each animal once, then 10 days before weaning - at a dose of 5 ml each animal once. In similar terms animals in the control group were injected intramuscularly with normal saline. Still in the period from 60- to 120-day-old a complex powder was added daily to the BD - Permamik consisting of zeolite-containing Tripoli from Alatyr field deposit of Chuvashia (specifications 9317-018-00670433-99), at a dose of 1.25 g / kg bw.

A morphometric evaluation of thyroid gland with a calculation of the mass (gland weighing on an analytical balances with the absolute mass definition up to 0.01g), a definition of the follicle and epithelium linear parameters (diameter and height,  $\mu\text{m}$ ) were carried out. Calculated: epithelial-clearance index (ECI) - the average between the outer and inner surface of the follicle; nuclear index (NI) - volume of the thyrocytes nucleus; colloid accumulation index (CAI) - calculated by the formula :  $\text{CAI} = d / 2h$ , where  $d$  – an internal diameter of the follicle , and  $h$  - a follicular epithelium height; average area of a follicle (FA) in thousands of square micrometers [7].

During a series of experiments it was found that the mass of the studied gland expectedly increases with an age of all experimental animals. Thus, the weight of boars' thyroid gland in a control group increased to 8.21g from 1- to 360-day-old, in the second group – to 6.65g. In this case, on 180- and 360-day-old the mass of this gland among the boars of the second group was lower compared with the control group peers by 8.0 and 15.3% ( $P < 0.05$ ).

It was revealed that control group animals' thyroid epithelium height increased by 33.3% from 1- to 360-day-old, in the second group – by 34.6%. It should be noted that in prepubescent (60 days), boars grown applying Permamika combined with Sediminom® had greater by 12.5% ( $P < 0.05$ ) thyrocytes height compared to the control peers.

It was established that the average follicles diameter of all the animals has increased during the observation period on an average of 71.8%. The greatest difference in this index was noted in the 180-day old when the second group animals' average follicles diameter of the thyroid gland was slightly lower than in the control group of peers by 5.1% ( $P < 0.05$ ).

Such dynamics can also be traced in terms of follicles area - in 180-day-old a significantly lower value of this parameter in the test group by an average of 9.9% ( $P < 0.05$ ) as compared with intact peers was noted.

Calculated indexes also show the optimal functional state of the thyroid gland of animals grown applying studied biological products.

It was found that all boars had an average CAI ranged from  $23,68 \pm 1,37$  to  $57,97 \pm 0,75$  cu from newborn to weaning period, whereas on 60-, 180- and 360-th day of observation the second group boars had the index lower by 6.0-13.9% ( $P < 0.05$ ) compared with the animals of the first group.

It was found that ECI of all the animals increased by an average of 58.5 - 59.9% as they grew, but at the same time boars grown applying the biological products had lower ECI. Thus, the value of the index was lower in the second group of boars in comparison with their peers in the control group in the 60-, 180- and 360-day-old by 6.0-13.9% ( $P < 0.05$ ).

It was revealed that newborn piglets have an average NI of  $6,43 \pm 0,73$  cu, but the 360-day-old boars' index is ranged from  $39,50 \pm 1,33$  to  $72,31 \pm 1,05$  cu. Thus, from prepubescent until puberty (360 days) this index was significantly higher in the second group of boars compared with those of the control group averaged 29.5-46.5% ( $P < 0.05$ ).

Thus, the observations of experimental animals found that upon the conditions of biological products applying the histological structure of the thyroid gland is slightly different from that of intact peers. Undoubtedly, iodine deficiency plays the main role in the etiology of hypothyrosis. However, deficiency of zinc, selenium, cobalt, molybdenum, manganese in a body also aggravates the condition of the thyroid gland, what is pointed by many researchers in their works [1], [2], [5], [6].

This fact is also confirmed by our studies: maximum effect appears in the conditions of applying Sedimina®, that decreases iodine and selenium deficiency in the body in critical periods of development - a newborn and weaning, and further ration fortification with Permamik, including macro- and micronutrients.

Experimental animals, grown applying biological products, have amplified synthesis processes, lipid metabolism, growth hormone secretion, stimulated cardiovascular and respiratory systems, etc. It follows that the need for thyroid hormones increases, which affects the thyrocytes height, which was higher in the experimental boars group in our study.

The obtained morphometric parameters are closely related to processes occurring in the thyroid gland, and, in fact, are a morphological reflection of biochemical processes occurring in the gland. Established data show that ration fortification with micro- and macronutrients, especially during critical periods of postnatal ontogenesis, enhances a functional activity of the thyroid gland, which allows to provide a better quality of adaptive response of the producing animals organism.

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## **NONCLINICAL TOXICOLOGICAL STUDIES OF NEW FIXED COMBINATION OF ANTIHYPERTENSIVE DRUGS AMED FOR STATE REGISTRATION**

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Preclinical studies for the purpose of registration in the Russian Federation of a new antihypertensive drug, which is a fixed combination of two active ingredients, amlodipine besylate and metoprolol succinate, are conducted. A combination of two single drug products registered in the Russian Federation and containing the same active ingredients was used as reference drug. General toxic effects of the new combined product as well as its efficiency in comparison with the combination of two drugs for monotherapy were studied. Toxic and tolerable doses were identified. With the use of radio telemetry system it was shown that administration of drugs in the high doses produces a sustained hypotensive effect, which leads to disturbance of the normal circadian rhythm. It was found that the new combined product does not differ on their hypotensive properties and toxic effects from reference drug previously registered

and used in clinical practice, and can be recommended for future clinical trials.

The volume of the research included the study of acute and subchronic toxicity, efficacy and potential allergenic effect of the fixed-dose drug combination containing amlodipine besylate (calcium channel blocker) and metoprolol succinate (β1-adrenergic antagonist), in comparison with mixture of monopreparations Norvasc® (amlodipine besylate) and Betalok ZOK® (metoprolol succinate), registered in the Russian Federation and used in clinical practice.

Animals for the research were obtained from the NPP "Laboratory Animal Breeding Center of Bibch RAS." Nursery has been provided by the last control animal health, SPF-confirming their status (animals, free of pathogens). Obtained prior to study animals were placed into a separate room for adaptation period for 7 days in group keeping in the cages. Animals without signs of abnormalities in health status were selected in the experiment so that the individual values of the body weight are not deviated from the average values for the group by more than 10%. After distribution in groups animals were kept in cages individually. During of group forming animals were labeled with perforation of the ear, and each animal was assigned a unique number.

Basic rules of maintenance and care were in consistence with the standards specified in the manual Guide for Care and Use of Laboratory Animals. (ILAR publication, 1996, National Academy Press). All routine procedures for animal care were performed according to SOPs of the Laboratory. Animals were kept in a controlled environment (temperature 21-26 °C, 40-70% relative humidity, 12 hour lighting cycle and at least 10-fold volume change of room air per hour). The animals were housed individually in makrolon cages Type-3, equipped with steel lattice covers with steel delimiters for food and label holders. Commercial dust-free bedding for rodents, made of wood crumb, was used («LIGNOCEL JRS», Germany). The bedding was routinely tested for microbiological contamination by Test Facility. Animals were fed on Laboratory Rodent Diet (SSNIFF® V1534-3 10 mm pellets, autoclavable) *ad libitum*. This diet was analyzed by the manufacturer for nutritional



components and environmental contaminants and routinely tested by Test Facility for microbiological contaminants. Tap water filtered by the MilliRO system was given *ad libitum* in standard autoclaved drinking bottles with steel nozzle-covers. The drinking water is periodically analyzed at the laboratory for microbiological contamination.

The first step of experiments was the comparative study of drugs in a single oral administration (into the stomach by gavage) to male and female CD-1 mice. 50 CD-1 mice of five experimental groups of 5 males and 5 females in each group were used in the study. Animals of the first experimental group were injected with vehicle. Animals of the 2nd and 4th groups were treated with the test drug; animals of the 3rd and 5th groups received a comparator combination of the two monotherapy drugs (Norvasc<sup>®</sup> + Betalok ZOK<sup>®</sup>). The human therapeutic dose adjusted for animals of this type and the dose maximum possible for a single injection were used in the study. During the administration period, body weight gain of the animals, food consumption and symptoms of toxic effects were recorded. On the 15th day of the study the animals were euthanized with gross pathology observation.

During the first two hours after administration of the test drug and comparator drugs in the highest dose, both male and female experimental animals showed clinical signs of toxicity of the study drugs in the form of general weakness, atonia, lethargy and hunched posture. The severity of the symptoms observed was about the same for the test drug and combination of comparator drugs. Statistically significant differences between animals receiving the test drug and the animals treated with the combination of comparator drugs, in terms of "weight gain" and "food consumption" in any of the studied doses, neither male nor female, have not been identified.

The aim of the next phase of the research was a comparative study of the toxic effects of the test drug and combination of comparator drugs, with their chronic oral administration to male and female CD rats for 28 days followed by a 14-day treatment-free period. 60 CD rats in three experimental groups of 10 males and 10 females per group were used in the study. Animals of the first group were treated with vehicle. Animals of group 2 received the test drug

at the dose of 25 mg/kg amlodipine + 250 mg/kg metoprolol succinate. Animals in the third experimental group received a comparator combination of two drugs for monotherapy (Norvasc<sup>®</sup> + Betalok ZOK<sup>®</sup>) at the same dose (25 mg/kg amlodipine + 250 mg/kg metoprolol succinate). The suspension of drugs was administered to animals every day for 28 consecutive days. During the administration period, the animals were observed for body weight gain, food consumption and symptoms of toxic effects. After 28 days of administration (at the 29th day of the study) one part of the animals was euthanized, and the remaining animals were euthanized on day 43 after 14 days of treatment-free period. After the animals were euthanized, blood samples for determination of hematological parameters, and serum biochemistry. Animals were necropsied, organs were weighed and fixed for subsequent histological analysis.

Deaths associated with toxic effects of investigated drugs were not observed during the study. After administration of the test drug as well as combination of comparator drugs, starting from the 14th day of the study, signs of intoxication such as impaired muscle tone, lethargy, cachexia, bloating and diarrhea were observed. Revealed signs of toxicity were solitary, reversible and after a period of cancellation of administration of the investigated drugs were not observed. Statistically significant differences between animals receiving the test drug as well as combination of comparator drugs and vehicle in terms of "weight gain" and "food consumption" have not been identified.

28-day oral administration of the test drug as well as a mixture of comparator drugs Norvasc<sup>®</sup> + Betalok ZOK<sup>®</sup> influenced erythropoiesis and thrombopoiesis, causing a statistically significant decline in mean corpuscular volume (MCV) in animals of both sexes and mean platelet volume (MPV) in relative to the control group in males. Two weeks after the cancellation of the administration of the drugs these indicators returned to the level of the control animals.

During biochemical analysis in animals treated with the test drug as well as a combination of comparator drugs were registered statistically significant increase in cholesterol level, decreased level of bilirubin and increase in alanine aminotransferase level.

According to the analysis of the mass of internal organs a statistically significant increase in testes, heart and liver weight relative to the control group in males treated with test drug as well as combination of comparator drugs were showed. In females, a statistically significant increase in the liver and heart weight relative to the control group was detected. All these parameters were restored to the level of the values of the control group after the treatment-free period, except for an increase of heart weight in males.

Based on the results of the histological analysis solitary abnormalities of the liver and spleen in animals treated with both the test formulation and the reference drugs were observed. The study found that the test drug and the reference drugs combination induced unidirectional changes of hematological and biochemical parameters of blood, as well as changes in weight and histological structure of the internal organs of experimental animals. A statistically significant difference between the test drug and comparator drugs combination were not identified.

The purpose of the next phase of the research was a comparative study of hemodynamic parameters (blood pressure and heart rate) in experimental animals after a single oral administration (by gavage) of test and comparator drugs in male CD rats. The study employed 5 male rats in each of the five test groups. Animals from the first group received vehicle. Animals from 2nd and 4th groups were treated with the test drug, animals from 3rd and 5th groups received a combination of the two comparator drugs for monotherapy (Norvasc<sup>®</sup> + Betalok ZOK<sup>®</sup>). The human therapeutic dose adjusted for animals of this type and a dose close to the maximum tolerated for a single injection were used in the study. Blood pressure, heart rate and locomotor activity in experimental animals within 2 days after administration of test and comparator drugs were recorded during the study using a radio telemetry system.

The results of the study conducted has shown that administration of the test drug as well as comparator drugs combination, at the dose of 10 mg/kg of amlodipine + 100 mg/kg of metoprolol succinate, induced short-term hypotensive effect, which takes place during the first 12 hours without disrupting daily circadian rhythm. Administration of test drug and comparator drugs

combination at the dose of 25 mg/kg of amlodipine + 250 mg/kg of metoprolol succinate causes deeper and more prolonged hypotensive effect of causing the disruption in the circadian rhythm, and which runs until the end of the second day after administration. A statistically significant difference between animals receiving the test drug and the animals that received a combination of comparator drugs in parameters studied in any of the doses were not detected. In terms of "locomotor activity" statistically significant differences between the test drug and a combination of comparator drugs also have not been identified.

In order to investigate the possibility of allergic reaction to the study drugs several tests were conducted: assessment of allergenic properties of drug in delayed-type reaction of hypersensitivity and pseudoallergic reaction in mice, as well as testing by conjunctival test in guinea pigs. To assess the allergenic properties of investigated drugs in delayed-type hypersensitivity reaction, experimental animals of various groups were sensitized with single subcutaneous injection of test drug, reference drugs combination or phosphate buffer emulsion in the Freund's adjuvant. To identify sensitization after 5 days the animals were injection subplantarily with test drug or reference drugs combination. After 6, 22 and 24 hours after resolving injection the thickness of the right and left hind paws of animals were measured with a digital caliper. Intensity of hypersensitivity reaction was evaluated by the difference in thickness of the paws of the animals.

To evaluate pseudoallergic reaction, different groups of experimental animals were sensitized by a single oral administration of control substance (phosphate buffer), test drug or reference drugs combination. The human therapeutic dose adjusted for animals of this type and 10-fold therapeutic dose were used in the study. After 1 h following sensitization animals subplantarily (in the hind paws foot pad) received injection of concanavalin A, and in the contralateral limb - equal volume of phosphate buffer. After 1 hour after administration of Con A animals were euthanized and the weight of control and test pads was determined.

For the conjunctival test, animals were sensitized by a single oral administration of drugs at the dose of 5 mg/kg of amlodipine

besylate + 50 mg/kg of metoprolol succinate. 3 hours after administration the guinea pigs were treated with 1 drop of the aqueous solution of the drugs under the upper eyelid. In the other eye (control) animals received a drop of water. Allergic reaction was assessed by the reddening of the conjunctiva, sclera and tear duct in 15 minutes (quick response) and 24 - 48 hours (delayed- type hypersensitivity) by the point system. As a result of experiments conducted it was concluded that the test drug as well as reference drugs combination in the doses studied did not have allergenic properties.

Thus, the results of pre-clinical trials of a new drug of fixed-dose combination, containing in its composition amlodipine besylate and metoprolol succinate as active ingredients, in comparison with combination of amlodipine besylate (Norvasc<sup>®</sup>) and metoprolol succinate (Betalok ZOK<sup>®</sup>) used in clinical practice for monotherapy, showed that the test drug did not differ from the combination comparator drugs on its hypotensive properties and the toxic effects and can be recommended for further clinical trials.

## **SECTION 3. Earth Science**

### **TRANSPORT CAPACITY OF SMALL DEPTH OF FLOWS TO TRANSFER SOIL MATERIAL**

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Detachment of soil particles and their transport flows is the basis of the process of water erosion of soils on the slopes. The transport and accumulation of soil particles by water streams are the manifestations of the mechanical interaction of the transferred and transported phases (water and soil particles). Detachment of particles and their transport may be carried out at the expense of energy of raindrops and (or) shallow-water flows. Splashing soil rain drops in natural and laboratory conditions are studied full enough [9-11 and et.al.]. Outwash of soil by water flow is also dedicated a lot of scientific work, but still not the proposed equations, satisfactorily describes the process of separation and transfer of soil particles. Sediment transport has been studied mainly in the annex to the stream flow. There are number of methods and formulas for estimating transport capacity in relation to stream flow [3, 6, 8 and et.al.]. Besides these formulas are the best known and most widely used calculation formulas transporting capacity of the flow are formula I.I. Levi [7], G.V. Zheleznyakov [5], V.K. Debolski, V.M. Kotkov [4]. There are other equations of sediment transport, considering the process as a function of flow velocity, tangent tension, and as a probability function.

The objective of this work – by the example, soddy-podzolic soils of different degree of wash off and over wash to quantify the capacity of water flows to the small depth at the system level “flow–soil” to transfer a specific mass of soil material. According to the results of model experiments to verify the theoretical equation of sediment transport.

Determination of the transfer and deposition of soddy-podzolic soil was carried out on the large erosive tray of the Department of

erosion and conservation of soil, Soil Science Faculty MSU. For the experiments in the tray was created artificial channel (length 5 m, width 0.1 m, height of the bottom roughness 0.35 mm), which specify different water flow velocity and the flow of water in the soil artificially loaded by air-dry or capillary-wetted condition. The range of velocities varied from 0.27 to 0.67 m/s, and the flow depth within 8-13 mm. Investigated arable horizon not eroded, weekly washed, medium washed and alluvial soddy-podzolic soils.

In the experiments, we obtained the following indicators: average velocity and muddiness flow, the diameter carried and deposited in channel aggregates, and others.

These indicators have been used for verification of the following theoretical equation [1]:

$$\beta = \frac{C}{(gH)^{1/\gamma}} (V^2 - V_k^2)^{1/\gamma}, \quad (1)$$

where  $\beta$  is the transport capacity of the flow,  $\text{kg/m}^3$ ;  $V$  and  $V_k$  are respectively the average and critical flow velocity, m/s;  $g$  is acceleration of gravity,  $\text{m/s}^2$ ;  $H$  is depth of flow, m;  $C$  is empirical coefficient,  $\text{kg/m}^3$ ;  $1/\gamma$  is empirical exponent.

Calculation of  $V_k$  was conducted by the following equation [2]:

$$V_k = \sqrt{\frac{\frac{4}{3}(\frac{\rho_i}{\rho_w} - 1)gr_i + \frac{f_i}{r_i\rho_w}}{K_d}}, \quad (2)$$

where  $\rho_i$  is density of the soil solid phase,  $\text{kg/m}^3$ ;  $\rho_w$  is water density,  $\text{kg/m}^3$ ;  $r_i$  is the radius carried or deposited in channel aggregates, m;  $f_i$  is coefficient of surface strength for transported or deposited aggregates, N/m;  $K_d$  is lift coefficient (c-vortex).

It is known the humus content in the soil affects its aggregate composition. We analyzed aggregate composition of soddy-podzolic soils with different content of humus in it. The results showed that the reduction in the humus content from 2.37% (not eroded soil) to 1.96% (medium washed) changes the average diameter of aggregates, respectively, from 4.08 mm to 3.34 mm (air-dry soil) and from 4.14 mm to 2.86 mm (capillary-wetted).

Based on the experimental data was found the following regularities. The average diameter of the flow carried aggregates increases with increasing water flow velocity and the diameter of

aggregates deposited in channel decreases with increasing flow velocity. It is established that it depends not only on the flow velocity, but also on washed of soil, humus content and water-stable aggregates. On the basis of data obtained in the model experiments, the values of empirical coefficient ( $C$ ) and empirical exponent ( $1/\gamma$ ) necessary for verification of previously developed theoretical equation transporting capacity of the water flow. The basic data are presented in Table.

Table. Indicators defined in the model experiments

Soil	$C$ , kg/m <sup>3</sup>	$1/\gamma$	$ P $ , %	R
Not eroded				
Air-dry	42,73	0,81	20,7	0,94
Capillary-wetted	30,93	0,40	16,2	0,75
Weekly washed				
Air-dry	48,13	1,27	31,6	0,86
Capillary-wetted	19,14	0,50	16,4	0,72
Medium washed				
Air-dry	42,18	0,66	13,8	0,98
Capillary-wetted	78,34	0,73	18,8	0,90
Alluvial				
Air-dry	12,76	0,36	12,9	0,77
Capillary-wetted	31,25	0,51	16,7	0,84
Average			18,4	0,84

Note.  $C$  is empirical coefficient;  $1/\gamma$  is empirical exponent;  $|P|$  is relative error in module; R is coefficient of correlation.

The obtained experimental data allow drawing a conclusion on the applicability of the model transport capacity of the flow in respect of the soil material. The comparison of obtained experimentally and calculated by the equation values of muddiness showed satisfactory compliance. The average relative error in module was 18.4%, and the correlation coefficient is 0.84.



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## **SECTION 4. Engineering**

### **THE INFLUENCE OF ARTIFICIAL SUBMILLIMETER SURFACE ROUGHNESS ON THE HEAT TRANSFER PROCESSES**

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Boiling and evaporation of liquids are commonly used in chemical engineering and other sectors of the economy, so the intensification of these processes is of great practical interest.

One of the possible technical solutions for this is the creation on the metal surfaces of the heating elements artificial roughness which amounts at submillimeter protrusions affect the integrity of the boundary layer in impingement dynamic fluid flow and causes it to swirl with increased local heat transfer. It is shown that the influence on the crucial factor is the ratio of heat transfer protrusions height  $h$  to the distance between  $S$  ( $h / S$ ), as well as artificial roughness parameters, while the shape and dimensions of the cross-sectional projections play a minor role [1].

However, the influence of artificial roughness on heat transfer modes of free convection and nucleate boiling, to our knowledge, has not previously been studied.

The process of boiling the water heater is studied which is created on the surface of artificial roughness in the form of a large number of cylindrical columns submillimeter sizes. Mathematical modeling of hot water under natural free convection heat transfer and developed nucleate boiling.

It is shown that the average overall heat transfer at convection  $h / S = 0$  (smooth surface) is  $2640 \text{ W} / (\text{m}^2 \cdot \text{h})$ . With increasing  $h / S$  is increased by some parabolic law, the slope of the curves increases with  $h$  (Fig. 1).

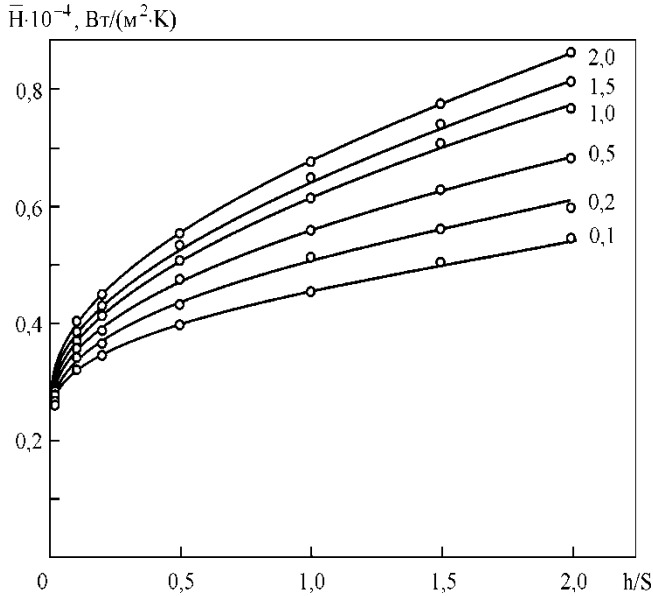


Fig.1. Raschetnye curves obtained when a roughness height of the cylindrical element  $h$ , the curves are shown in mm

Consideration in the nucleate boiling regime showed that for large artificial roughness  $h / s = 2$  and the threshold intensity of the heat flux, we have the most lightweight pair bubbling on the surface roughness of the heater elements to ensure the effective thickness of the liquid layers which is the transfer of heat by conduction, to  $4,2 \cdot 10^{-6}$  m in contrast, a critical intensity and all the irregularities observed difficulty of heat transfer by increasing the effective thickness of the liquid layer to  $17,1 \cdot 10^{-6}$  m, which can be associated with locking recesses large surface vapor bubbles.

For small roughness  $h / s = 0-0,5$  occurs regular decrease of heat transfer coefficient with the intensity of heat until it reaches the effective thickness of the liquid layer heat diffusion  $62,2 \cdot 10^{-6}$  m, characteristic for a smooth surface.

The calculated data depending on  $h / S$  are shown in Figure 2. Note that the above minimum effective thickness of the liquid layers are implemented and heat diffusion in modulated microbubble by

boiling electrolytes in the processes of local laser electrodeposition of metals at  $qS \leq 4,2 \cdot 10^{-6} \text{ W/m}^2$  [2], where  $qS$  - surface heat flux density [2].

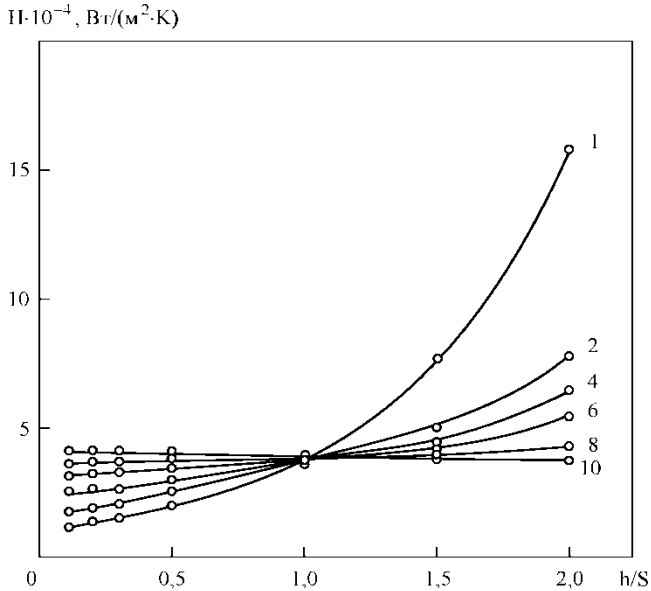


Fig.2. Calculated curves obtained when the heights of the cylindrical members roughness  $h$ , the curves are shown in mm.

It is shown that the acceleration factor  $DF$  is defined boiling influence of surface roughness on the heat generation process of natural convection. Speedup increases with  $h$  and  $h = 2 \text{ mm}$  can reach the values of 40-60 for  $Ku = h / S = 2$  (Fig. 3). Real acceleration coefficients should be somewhat lower due to the nonadiabatic boiling.

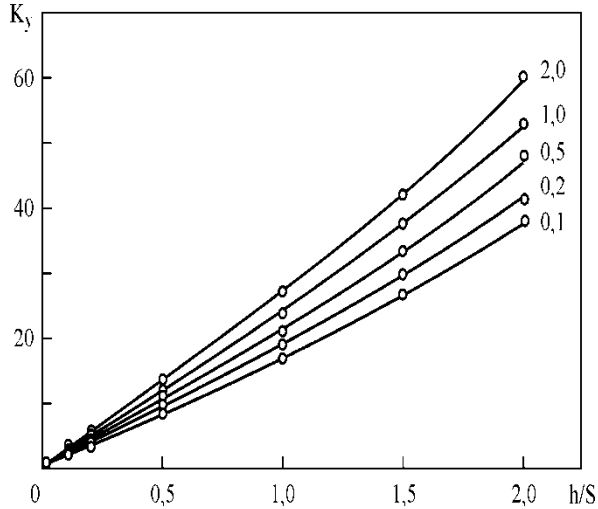


Fig. 3. Calculated curves obtained when the heights of the cylindrical members roughness  $h$  shown in curves, in mm.

Thus, the creation of heat-emitting surface roughness submillimeter seems very promising technical solution to increase the efficiency of technological boilers and evaporators.

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## **HOUSEHOLD WASTES AS A KIND OF FUEL AND ENERGY**

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Emerging problem of household waste is becoming more serious with each passing year. There is about 50 million m<sup>3</sup> of municipal waste annually only in Russia. From this huge volume just about 3% are recycled.

The main question that arises in relation to waste is not how to make them invisible to others, but how to return them to the production cycle thereby replacing natural resources. The main advantage of waste is that there is no need extract and search it.

Household waste is a high-energy fuel which calorific value is comparable with the calorific value of a brown coal . Taking into account the annual growth of production costs of fuel we can consider waste as an alternative energy source .

It is assumed to process an ever-increasing volume of consumer products in the first place with the help of waste incineration plants (WIP ) or other thermal recovery methods . WIP is enterprise which use technology of recycling waste by incineration in boilers or in furnaces of ovens, while the volume of waste disposal is being reduced tenfold. The energy obtained by combustion is used to produce electricity or heating.

In Russia the program of construction modern waste incineration plants , if possible with a closed production cycle , was approved by the commission of Public Council under the Rosprirodnadzor .

According RPN technology of direct combustion of 1,000 kg waste allows to obtain thermal energy by thermal method, which will be equivalent to 250 kg of fuel oil. However, the real savings will be even higher, because the fact of the primary storage of raw materials and the cost of extraction are not considered.

Calorific value of biofuel corresponds to a brown coal. An approximate heat capacity of domestic waste ranges from 1500-2500 kcal / kg; According to thermal capabilities 10 tons of hard domestic waste are equivalent to 1 ton of oil ; regard to sustenance, coals

inferior to domestic waste twice; about 5 tons of garbage releases the same amount of heat as 2t of coal or 1t of liquid fuel.

The level of biological waste incineration is varied in different countries. Thus, in Belgium and Sweden it is from 46 to 52% of the total waste, in Japan - 74 % ; in Switzerland, England and the United States -12 %. In Russia only about 2 % is subjected to incineration. [2].

Recently, waste is widely used in metallurgy as a form of additional fuel. Incineration in metallurgical aggregates and blast furnaces allows to reduce purchase costs of natural resources (coal, oil , gas ) and significantly reduce the emission of harmful substances into the atmosphere compared to the waste incineration plant .

Biofuels is increasingly being used instead of coal, oil and gas. Biofuel is fuel, produced usually as a result of recycling biological waste. There are three types of biofuels:

1. Liquid:

- Biodiesel;
- Methanol;
- Ethanol.

World production of bioethanol is 36-40 billion liters .It is less "energy tight" energy source than petrol ; mileage of cars running on E85 (a mixture of 85 % ethanol and 15 % gasoline ) per unit volume of fuel is 75 % of standard mileage of cars . Addition of even 10 % ethanol reduces emissions by 20 % and increases the octane rating .

2. Firm:

- Pellets;
- Briquettes;
- Chips;
- Straw;
- Husk.

3. Gaseous:

- Hydrogen;
- Biogas.

The process of obtaining fuel gas mainly occurs in a modular technology. Combustible gas produced in the amount of up to 100 m<sup>3</sup> / min. for processing module 3000 kg / h has an energy value of

950-2895 kkal/m<sup>3</sup> depending on the starting materials. The advantage of this process is the lack of emissions of pollutants.

Biogas (density of 1.2 kg/m<sup>3</sup>) has an energy intensity 23MDzh/m<sup>3</sup> kkal/m<sup>3</sup> or 5500 [3].

Solid briquettes -form preparation of various wood waste, agricultural waste (straw, corn husk), peat, charcoal have received a widely use as a fuel for furnaces of all kinds, including solid fuel boilers. In Russia, there is a huge area of rotting forests, which can be used for energy. Calorific value of wood pellets is about 5kW / h (4300kkal / h), which is comparable with coal. When burning pellets It allocated as much energy as the burning of:

- 700l of fuel oil;
- 500L diesel fuel;
- 480 m<sup>3</sup> of gas;

This fuel is an environmentally friendly product and it burns almost smokeless.

There is a second-generation biofuels obtained by different methods of pyrolysis of biomass or other fuels produced from sources of raw materials ( second generation ).The sources of raw materials are cellulose compounds remaining after suitable for use in the food industry of the biological raw materials were removed. Fast pyrolysis allows to turn biomass into the fluid which is easier and cheaper to transport, store and use. Motor fuelsof fuels for power can be produced from fluid. According to independent experts , with the advancement of technology , the pyrolysis of biomass can provide up to 30 % of motor fuel.

One of the main advantages of biofuel is reducing greenhouse gas emissions and reducing carbon emissions . Furthermore, biofuels are essentially free of sulfur.

Prospective modern technology allows to simultaneously solve the problem of disposing of household waste and to create local energy sources. Thus, gousehold waste will return to us not as proliferating dumps and contaminated water but as fuel, electricity through wires and heat in the heater.



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## **SECTION 5. Medical sciences**

### **SOME METHODS OF INCREASING WOMEN'S FERTILITY K. A. Hadartseva, V. N. Morozov, M. V. Panshina, E. A. Ovcharuk**

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In the process of pregnancy, from the moment of conception to delivery, in the functional system "fetus-placenta-mother" one may observe the adaptive programs aimed at creating the constant internal environment (body balance control) in the initial phase of pregnancy. Later the constancy of the mother's physiological functions are maintained (maintaining enantiostasis) during pregnancy and expulsion. In the first trimester of pregnancy, as well as on the 21st day of the reproductive cycle, one may observe dominating *syntoxic adaptation programs* adaptation programs [1, 2, 3]. It is proved by physiological changes along with changes in the concentration of biologically active amines and hormones that reflect the CNS state, including hypothalamus.

### **Material and methods of the research.**

There have been examined 215 women, of which 40 were healthy, of reproductive age (control on the 21st day of the normal reproductive cycle), 40 women with changing menstrual cycle, 15 women with normal pregnancy, and 120 women with placental dysfunction. All women underwent a comprehensive examination of their psychophysiological state, the changes of antioxidant, metabolic and anticoagulative blood values with registering the blood concentrations of adrenalin, noradrenaline, cortisol, serotonin and immunological status. The factors of coagulation and anticoagulation of the blood systems were determined with common methods.

Catecholamine and serotonin in blood were measured by the fluorimetric method. Population and subpopulations of lymphocytes were measured by indirect immunofluorescence applying monoclonal antibodies with CD3 +, CD4 +, CD8 +, CD16 +, CD20 + and immunoregulating index calculation CD4 + / CD8 +. The immune resistance was determined by phagocytosis %, the number of active phagocytes, Nitro Blue Tetrazolium Reduction and Lysosomal Cationic Proteins tests and the complement activity. Functional activity of uterine-placental complex was evaluated on the count of specific proteins of the "pregnancy zone" in the blood (trophoblastic hormones, human chorionic gonadotrophin) and fertility factors (alpha-2-microglobulin fertility test, PAMG -1) followed by the calculation of the *fertile factors activity ratio* (FFAR), based on the following formula:

$$\text{FFAR} = (C_{\text{FAMG}\%} + C_{\text{TH}\%}) / C_{\text{PAMG-1}\%} + C_{\text{COR}\%},$$

where  $C_{\text{FAMG}}$  – the concentration of fertility  $\alpha_2$ -microglobulin in %;  $C_{\text{TH}}$  – the concentration of trophoblastic  $\beta_1$ - glycoprotein in %;  $C_{\text{PAMG-1}}$  – the concentration of placental  $\alpha_1$ -microglobulin in % and  $C_{\text{COR}}$  – the concentration of cortisol in %.

The examined parameters of the immune system varied depending on the time of gestation. In the first trimester of pregnancy, when *syntoxic adaptation programs* dominated, concentration of lymphocytes decreased (compared to the 21st day of menstrual cycle) mainly due to CD3<sup>+</sup>-, CD16<sup>+</sup>-, CD4<sup>+</sup>- lymphocytes parallel to a slight increase in CD20<sup>+</sup>- and CD8<sup>+</sup>- lymphocytes.

In addition, we observed the inhibition of cellular and humoral immune activation. We also observed the reduced activity of nonspecific immune resistance. In the third trimester of pregnancy, when *catatoxic adaptation programs* begin to dominate there is an increase of the concentration of lymphocytes to the upper limit of normal due to CD3<sup>+</sup>, CD20<sup>+</sup> and CD16<sup>+</sup> lymphocytes with a simultaneous decrease in the content of suppressor T cells (CD8<sup>+</sup> lymphocytes). These changes in immunocompetent cells were accompanied by an increase in the concentration of immunoglobulins.

The concentration of IgG, IgA, IgM in the blood serum was calculated with a turbidimetric method. Biochemical parameters were measured on the biochemical analyzer Olympus 400 (Japan). The obtained data were processed by a computer IBM PC/XT with the application of the software package for processing medical and biological research «Statgraphics 2.6».

**Results.** It has been stated, that women with menstrual irregularities had poor anticoagulant, antioxidant, immune functions and the change in concentration of biologically active amines. In women with normal menstrual cycles from the 1st to the 21st day, the index of recalcification time increased from 68,6±2,27s to 94,4±1,26s with heparin concentration increased from 0,44±0,012 to 0,7±0,01 U/ml and the activity of antithrombin III 86,2±0,59% to 94,8±0,66%. In women with a changed menstrual cycle, these changes were not substantial, on the 1st day the recalcification time was 62,7±1,62s and increased to only 67,4±1,7s on the 21st day of the menstrual cycle, when the level of heparin increased from 0,42±0,01 to 0,5±0,01 U/ml and with increasing activity of antithrombin III from 83,6±0,43% to 86,1±0,68% over time from 1 to 21 days of the cycle.

All the studied parameters showed the phasic nature of the adaptation process from *syntoxic adaptation programs* (high activity of parasympathetic autonomic nervous system component, hypocoagulation, immunogenesis depression, high antioxidant activity of plasma) to *catatoxic adaptation programs* (high activity of the sympatic component of the autonomic nervous system,

hypercoagulation, immunogenesis stimulation, high oxidative activity of plasma) in the menstrual cycle.

When looking for means to correct these violations in the adaptive system, we used an alcohol extract of phytoecdysteroids in the treatment of pathological conditions. Since the pathogenesis of human diseases has common nonspecific mechanisms associated with the development of the stress response, which manifests in the dominance of *catatoxic adaptation programs*, the body must actively resist environmental influences. Hence the disorders which rose from stress, are not seen as the result of the stressor, but as a result of insufficient activity of *syntoxic adaptation programs* which ensure the body's resistance.

According to our experimental data the application of phytoecdysteroids, affecting hypothalamic structures, promotes the activation of *syntoxic adaptation programs* that helps to normalize the sensitivity of hypothalamic structures to main fertility factors, and thus optimizes the menstrual cycle. As a result, women become fertile and can carry a fetus normally.

Consequently, there is a certain number of women, who seems to have a normal menstruation, but they are somewhat different from normal women by the fact that antioxidant and anticoagulant capacity of their blood changes insignificant that allows the constant domination of *catatoxic adaptation programs* in the menstrual cycle, making the nidation of a fertilized cell more difficult.

The application of phytoecdysteroids allowed to normalize the sensitivity of hypothalamic structures to main fertility factors that restores a normal menstrual cycle, a woman becomes fertile and can carry a fetus normally. We treated women with placental insufficiency in the first and second trimester with oral administration of alcoholic solution of phytoecdysteroids for four weeks at the rate of 10 mg of the drug per 10 kg of the body weight of a pregnant woman. The medicine was taken in the morning under fasting condition 30 minutes before meals and at night before 6 pm and 30 minutes before a meal. The treatment removed the possibility of a miscarriage and pregnancy carried on normally. Biochemical changes in the blood showed the normal course of pregnancy, they

did not differ from that of the first and second trimester of pregnancy in normal pregnant women.

These results indicate the lack of *syntoxic adaptation programs* activity due to insufficient appearance of fertility factors during the menstrual cycle in women with a history of placental dysfunction, followed by abortion in the first and second trimesters. Syntoxic mechanisms are the integrative mechanisms that are necessary for the beginning and development of pregnancy, because they support the functional unity of the mother and fetus bodies, promote empathy with pregnancy.

The insufficient activity of *syntoxic adaptation programs* triggers *catatoxic adaptation programs* respectively with their centers in the posterior hypothalamic nuclei, which leads to an unfavorable course of pregnancy. Activity of sympathetic nervous system increases gradually with simultaneous depression of *syntoxic adaptation programs* (reduction in the concentration of serotonin), which is reflected in the change of carbohydrate and fat metabolism. Tissues of the body begin to consume the free fatty acids and glucose actively. Active glucose consumption in the third trimester affects its reduced concentration in blood with increasing levels of pyruvate and lactate. The level of pyruvate increases to  $95,0 \pm 2,21$   $\mu\text{mol/l}$  and lactate to  $2,1 \pm 0,01$   $\text{mmol/l}$ . The metabolic condition correlates with anticoagulant and antioxidant potentials that are progressively inhibited by the end of the third trimester of pregnancy.

According to the data received during a physiological pregnancy, there is a depression of antioxidant and anticoagulant mechanisms of blood. The first trimester is marked by the activation of antioxidant and anticoagulant in blood potentials. At the same time the concentration of the mediators of anticoagulation increased - heparin, antithrombin III by 15-20% . Gradually, with the development of pregnancy there was a decrease in antioxidant and anticoagulant mechanisms of blood, reaching their minimum values at the end of the third trimester.

These processes developed simultaneously with the progressive increase in the concentration of antiplasmin –  $\alpha_2$ -macroglobulin and  $\alpha_1$ -antitrypsin. The trigger in the depression of anticoagulant blood potential was changes in metabolism,

characterized by an increase in the proportion of lipid peroxidation. With no complications during pregnancy there was an increase in concentration of hydroperoxides and malondialdehyde due to lowering of the total plasma antioxidant activity, catalase. All of these metabolic processes parallel to the ongoing pregnancy also have an impact on the immune status.

Opportunities to increase women's fertility concern the use of natural substances (plant) origin - phytoecdysteroids, as well as medical drugs and drug-free means stimulating *syntoxic adaptation programs*.

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## **SECTION 6. Agricultural science**

### **POTASSIUM RESERVES IN GRAY FOREST SOILS OF VLADIMIR OPOLYE**

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In this paper we attempt to assess reserves of potassium of agrogrey heavily argillaceous soils in Vladimir Opolye on the basis of differentiation analysis of its content in the fractions of the size less than 1, 1-5, 5-10  $\mu\text{m}$ .

The subject of the research is agrogrey heavily argillaceous soils of a trench that were formed on loesslike clays loams. The arable horizon is marked by the largest number of silicon oxide as a result of the involvement of the eluvial part of the natural soils, as well as the minimum amount of aluminum and iron.

The distribution of total potassium lacks any differentiation, which is also probably due to anthropogenic impact. The amount of magnesium increases towards the bottom of the profile. The titanium oxide is uniformly distributed throughout the profile. The greatest amount of manganese oxide is observed in the upper profile.

The data on the amount and distribution of oxides of elements of the profile that we obtained are similar to those found in the literature [4,2,5,3].

The distribution of oxides of elements of the silt fraction is significantly different from that of the soil as a whole. The amount of silica oxide is dramatically reduced, and the nature of its distribution along the profile is uniform (49,5-51,2%). The heavy increase of the iron oxide and alumina is observed (10,1-11,1% and 18,2-19,1%, respectively). Compared to the soil as a whole, silt fraction is enriched in total magnesium. The amount of calcium oxide is negligible. The amount of potassium oxide in the silt does not greatly exceed its amount in soil in general.

The total chemical composition of the silt fraction suggests that the fraction is mainly composed of clay minerals that are

characterized by high amounts of aluminum, iron, magnesium, and potassium.

The main components of the fraction are complex disordered mixed-layered formations with the dominance of mica-smectite with high amount of smectite layers. Smectite phase and hydromica together amount to 85-90% of the sum of silt components. The amount of kaolinite and chlorite stands at around 10-15%. These minerals are sources of potassium, magnesium and anions, and determine the behavior of anions of the soil.

The profile differentiation of agrogrey soil is conditioned by the differentiation of silt material, which amount is 10-20% higher in the illuvial than in the eluvial part of the profile. The differentiation of minerals is most clearly observed when calculated for soil as a whole.

In the fine dust fraction the increase of silicon oxide is observed, and its amount approaches indicators in the soil (see Table 1). The sample taken from the depth of 40-50 cm stands out in terms of the highest amount of silica oxide (71.9%). The difference in the amount of oxides of aluminum and iron in the profile horizons is less notable. In comparison to the silt fraction, this fraction contains a higher amount of potassium oxide. This is explained by mineralogical composition, where the main components are mica and potassium feldspars.

When assessing reserves of potassium in the fine dust, we noted its decline in comparison with silt fraction. This is due to a lower amount of this fraction. The amount of mixed-layered formations is significantly reduced (to 2.2%), the amount of quartz (up to 25.6%), feldspars (up to 21.8%), and plagioclase (up to 15.4%) increased. Among the layered silicates, in addition to smectite, mica (29.7%), kaolinite (10.4%), and chlorite (3.6%) were diagnosed. The source of potassium here is mica and potassium feldspars that together are responsible for producing high percentage of total potassium that was found in fraction. Chlorite is a source of magnesium.

The fine dust fraction is dominated by quartz and mica that are followed by potassium feldspars and plagioclase. The relative



increase in dust quartz, feldspars and plagioclases in the upper part of the profile has been observed.

The medium-size dust fraction (5-10  $\mu\text{m}$ ) constitutes only 4,8-10,1% of the sum of granulometric fractions. The main components of the fraction are quartz, potassium feldspars, plagioclases, and mica. The components listed above is clearly divided within the profile into two parts - the upper part characterized by the highest amount of potassium feldspar, plagioclase, and the lower part with quartz being its dominant mineral (30-40%).

The amount of silicon oxide in the medium-size dust fraction reaches 80.7 %. The amount of iron and aluminum oxides is reduced to 10 % and 2.9 %, respectively. The same pattern is typical for K, P, Mg, Ca. Mica amount in this fraction is reduced, whereas the amount of potassium feldspars is higher i.e., minerals potassium here is of a different nature, it becomes less accessible for plants.

In the fraction of the larger size (more than 10  $\mu\text{m}$ ), the amount of iron oxide is reduced to 2.4%, magnesium - to 0.6 %, and potassium - to 2.3 % .

The gray forest soils under study possess large total reserves of potassium. The accessible reserve accounts for one fourth, and sometimes one fifth of total reserves (Table 1). The amount of the readily accessible reserve (or the amount of mobile potassium) is about average. Therefore, potassium-demanding crops will need potassium fertilizers.

Table 1 - Potassium Reserves in Agrogrey Soils of Vladimir Opolye

Soil, section number, location	Depth, cm	Fraction, <0,001 mm%	Content, K <sub>2</sub> O,%		Reserve, mg on 100 g			
			Soil as a whole	Fraction < 0,001 mm	Potential	Accessible	Readily Accessible	Total
Trench 1, 2 <sup>nd</sup> m	0-10	16,5	2,57	2,75	2100	454	16	2570
	40-50	31	2,66	2,75	1796	852	12,4	2660
	80-90	16,9	2,57	2,75	2097	465	8,2	2570
	200-210	20,1	2,53	2,66	1986	535	8,8	2530

Employing the methodology proposed by Gorbunov [1], we try to reflect the nature of the distribution of total potassium along granulometric fractions (Table 2).

Table 2 -Distribution Pattern of Potassium Along Granulometric Fractions of Agrogrey Heavily Argillaceous Soils of Vladamir Opolye

Depth, cm	sludge, %	K2O in the mud	reserve K2O in soil mg/100g	fine dust, %	K2O in the fine dust %	reserve K2O in fine dust %	average dust %	K2O content in high dust %	reserve K2O in high dust %	Fraction >10 mkmm	Content K2O In the fraction >10 mkmm %	reserve K2O in the fraction >10 mkmm %
0-20	16,5	2,75	432	7,7	3,3	254	10,1	2,65	260	71,1	2,3	1633
30-40	31,0	2,75	837	9,5	3,3	313	7,1	2,68	182	52,5	2,1	1092
200-210	20,1	2,64	609	16,0	3,1	496	6,0	2,79	168	54,7	2,0	1273

Potassium reserves of the silt fraction are the highest in comparison to those in the fine and medium-size dust fractions because the main source of potassium are the components that account for more than 80% of all the minerals in the fraction (Table 2).

All in all, the greatest amount of such nutrients as potassium, phosphorus, and magnesium are found in fine-dispersed fractions; phosphorus and magnesium - in silt fractions; potassium and magnesium – in both fine-dispersed and silt fractions. Silt fraction is the most functional not only as a source of these elements, but also as a regulator of behavior of the elements added with fertilizers by “fixating” these elements through minerals lattice.

The anthropogenic effects leading to soil acidification contribute to the enhanced destruction of potassium rich minerals, whereby the level of its amount in the soil solution increases, but at the same time natural resources are being depleted. The restoration of natural reserves calls for periodic plowing of illuvial horizons.

The latter precludes texture differentiation of profile, increases the amount of fine-dispersed fractions and therefore, plants nutrients.

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## SECTION 7. Economics

### **DEPENDENCE ECONOMIC AND MILITARY SECURITY OF GDP**

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**Abstract.** In this article the basic problem of providing economic and military security and their impact on economic stability and growth of GDP. Depending reflected increasing military security and economic security and GDP.

**Keywords:** economic security, GDP, military spending, sustainable development, environmental security.

State security is the most important criterion of democracy and civilized modern society. In this regard, one of the most important conditions for the existence and development of the society is to ensure its security, a set of socio-economic, political, legal, and environmental and other conditions of life in which people would feel completely socially secure.

The theoretical basis of this rethinking is created in the 1980 s. works poststrukturalistiv Ashley R., Walker O., R., Der Derian, J. Ullman, R., Matthews, J., Buzan B. It should be noted that in 1991 published based on these ideas new work B. Buzan [3], which traditional understanding of national security is just one element of a broader security environment, including the addition of military, security, political, economic, social and environmental, that are in constant interaction.

With the globalization of most security threats in international relations are territorial and their degree depends on the geographical distance. B. Buzan and O. Waever emphasize that "regional security complex theory (TKRB) - a theory of security, in which geographical factors are central to" [3, p. 70]. Most states experiencing concern mainly due to the potential and intentions of their neighbors.

There are predictions that it was the emergence of nuclear

weapons has brought stability in the South Asian region [1].

For geopolitical scheme UN South Asian region are Afghanistan, Bangladesh, Burma, Bhutan, India, Iran, Maldives, Nepal, Pakistan, Tibet and Sri Lanka. A characteristic feature of the region is the high degree of conflict and political instability experienced by numerous ethnic and religious conflicts, basing terrorist groups, separatists. In the intertwined interests of the two nuclear powers India and Pakistan.

So according to the Stockholm International Peace Research Institute in 2011, the nuclear potentials of India and Pakistan are approximately 110 warheads in each [8]. It is worth noting that India's nuclear weapons are entirely under the control of civilian leadership because nuclear arsenal may be regarded as a political tool. In addition, the acquisition of nuclear weapons by Pakistan was due to the following factors [3]:

1) nuclear bomb test by India in 1974 became the basis for developing its own nuclear program;

2) the desire to increase its credibility in the Muslim world (becoming a nuclear country led to the political and economic support for other Muslim countries);

3) support the public of Pakistan's nuclear program in order to strengthen the national independence and the country's defense.

It should be noted that the cost of nuclear weapons could adversely affect economic processes due to their lack of funding.

Economic development is a priority not only for the welfare of societies, but also to enhance military capabilities.

Throughout 1998 and 2010 total world military spending in real terms every year increased, but in 2011, after reaching the level of 1634 billion. U.S. growth stopped. The largest increase was observed in 2001 to 2009, when the average annual growth stood at 5%. In 2010 growth slowed and in 2011 decreased to 0.3%, subject to some uncertainty estimates is almost zero (Fig. 1).

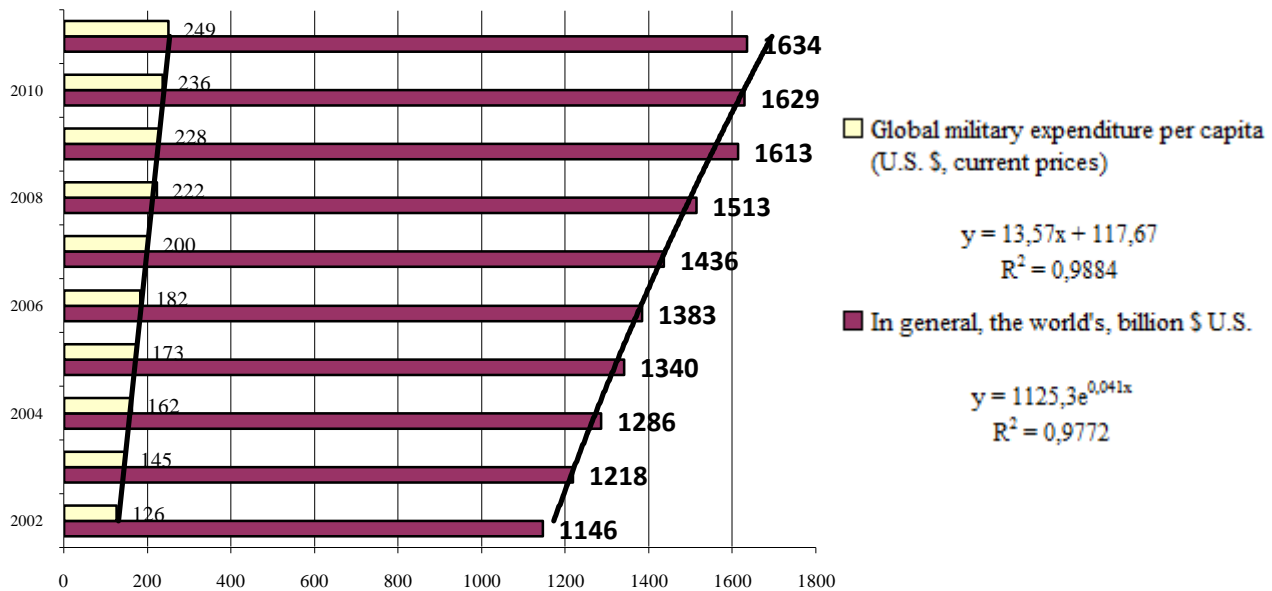


Figure 1. Dynamics of global military spending per capita and as a whole for 2002-2011 years [5]

In Europe, a significant increase in costs in Eastern Europe - particularly in Azerbaijan and Russia - nivelyuvalos their second year decline in Western and Central Europe.

U.S. military spending, which from 2001 are the main components of global growth in 2011 slightly decreased - the first time since 1998. As for the rest of the world, the growth of military spending in Africa, the Middle East, Asia and Oceania contrast to their reduction in Latin America.

However, the military burden - military expenditures as a share of GDP - fell in 2002 to 2011, especially in Turkey (from 3.9% to 2.3%). Four countries, including in the first place were the U.S. increased military pressure from 3.4% to 4.7%.

During 2002 to 2011 there was a significant increase in military spending in all regions and sub-regions except Western and Central Europe, where virtually no change occurred. Growth was particularly pronounced in North Africa and Eastern Europe. Painting growth and reducing military spending in 2011 is not uniform - as a whole in the world and within regions (Fig. 2).

At the global level the financial and economic crisis has led to significant changes in trends in military spending. During 2002 and 2008 78% of which data are available have increased them, but in 2008 to 2011 share of these countries has decreased to 56%. The opposite trend showed military spending as a share of GDP - due to the slow rise or fall as a result of the last crisis. In 2002 and 2008 25% of which data are available have increased.

Methods of research covering accounting methods to determine all potential causes of dropped income and benefits, and econometric approaches in which to assess the costs of GDP using statistical methods.

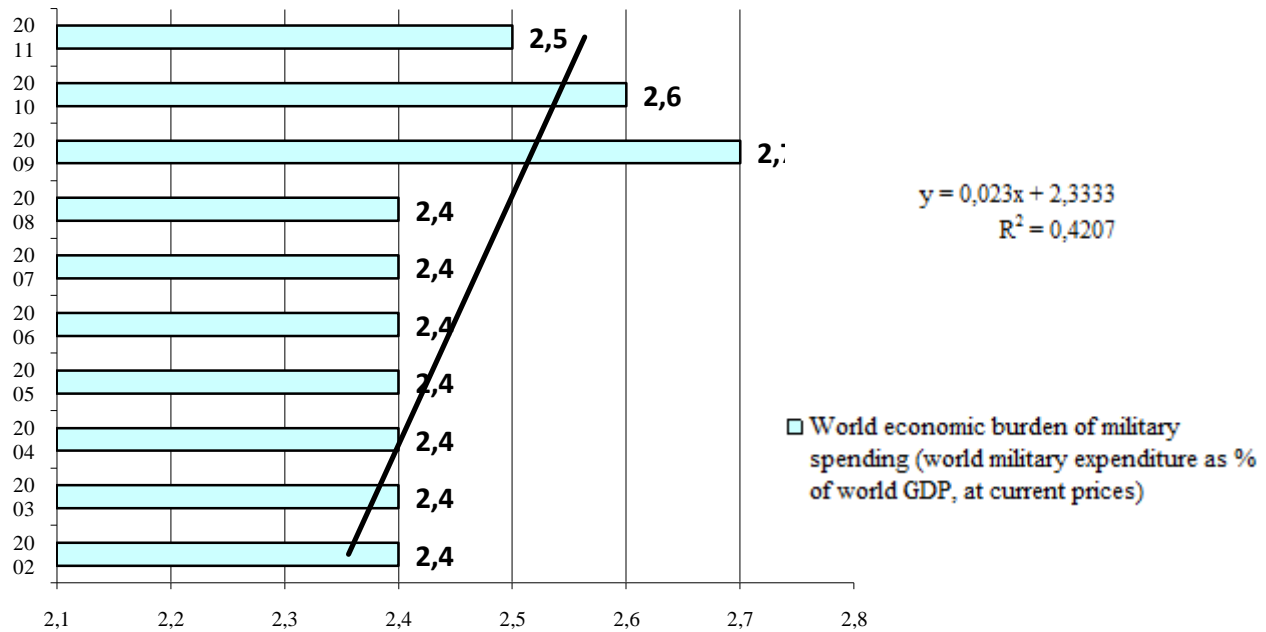


Figure. 2. The dynamics of the global economic burden of military spending for 2002-2011 years [5]



Similar estimates are always suffering from significant inaccuracy due to conceptual difficulties identify all cost components, often low-quality data from member countries of conflict, but also because of the need to compare all of these estimates of potential results that could be obtained from conflict-free conditions. In 2010 scientists of the German Institute for Economic Research (German Institute for Economic Research, DIW, Berlin) studied the available literature and on the basis of an estimation of total global GDP losses from all conflicts since 1960. It was found that if since the world was armed conflicts, global GDP in 2007 would have been 14.3% (or 9.1 trillion \$ U.S.) higher.

The influence much of these factors can be stored for a long time after the armed conflict due to the continued violence and criminal activity in post-conflict societies, as happened in Iraq. Third - the cost of reconstruction and restoration: restoration of physical capital and infrastructure, medical aid to victims of the conflict. Such activity increases GDP, but requires resources that could be directed not to cover losses from the conflict, and for other purposes.

There are many sources of data on economic costs, but the actual amount is extremely difficult to assess. In addition, there is a linear relationship between total military spending and the level of economic development, because they actually are economic costs to society (Table 1).

In 2011 total military spending in Europe in the real prices were, in fact, at 2010 - \$ 407 billion, a slight reduction of 1.9% in real terms in Western and Central Europe was offset by growth of 10.2% in Eastern Europe through Russia and Azerbaijan (Azerbaijan growth of military spending by 89%, to \$ 3.1 billion in real terms, was the largest in the world).

Since 2008, two-thirds of Western and Central Europe have reduced military spending. Not surprisingly, the size of these cuts demonstrates a strong bond with the general trend of reduction of the national GDP.

Table 1

**Factors affecting military spending**

Region/Country	Factors that affect military spending
USA	<p>antiterrorism and war with irregular armed groups, deterrence and defense;</p> <p>ability to transfer troops and equipment in anticipation of the use of asymmetric means, such as those used by China and Iran;</p> <p>development of new, effective capabilities in cyberspace and space;</p> <p>increased military presence in the Asia-Pacific region in response to the growing power of China;</p> <p>Financing and partnerships with India and maintaining peace on the Korean peninsula;</p> <p>The Middle East is defined as another priority area where defense</p> <p>USA efforts should be "aimed at countering violent extremists and threats of destabilization her" and where the proliferation of ballistic missiles and weapons of mass destruction of particular concern the USA [14]</p>
Africa	<p>civil conflicts;</p> <p>regional ambitions;</p> <p>economic growth;</p> <p>increase in oil revenues;</p> <p>increase the threat of terrorist activity Islamist groups, causing considerable interest in these regions external actors, especially the United States.</p>

Conversely, an increase in military spending inherent countries - including Norway, Poland, Turkey and Sweden - which during the crisis managed to maintain economic growth. Perhaps this is a bit of a surprise, but the relationship between changes in military expenditures and changes in state Greyhounds or deficit of the public sector as a share of GDP was much weaker. Compared with Western countries, the reduction of military expenditures in the former communist countries of Central Europe were much larger - both in absolute terms and relative to GDP growth; Central European countries have reduced costs by an average of 15% more than the West - for such changes of GDP.

After a significant reduction in military spending in Central Europe, many countries have recently become members or apply for membership in NATO was a period of significant increase, under conditions of economic crisis is irrational. However, several Central European countries (Romania, Serbia and Croatia) plan to make significant new purchases of combat planes.

Current and future reductions in military spending caused many experts and politicians concerned risk losing European countries through a global impact is increasingly lagging behind the U.S. in military capabilities, while new rising powers, including China, quickly catching up and even ahead of them. In Table 2 presents military spending as a share of GDP for the 166 countries covered by the database on SIPRI military expenditure. Military spending is a measure of input, which is not directly determine the outcome of the military sector - military potential or level of military security, because the main purpose of collecting data on military spending is an easy-to-use assessments of resources allocated to military purposes. Long-term trends in military expenditures and their sudden fluctuations may indicate some changes in performance in the military sphere, but these findings should be made with caution.

Table 2

**Military expenditure as% of GDP for 2002 – 2010 years**

Country	Years								
	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Africa</b>									
Burundi	7,2	7,3	6,6	6,2	4,9	4,7	3,8		
Djibouti	6,0	7,2	5,6	6,3	6,4	4,1	3,7		
Eritrea	20,7	20,9							
<b>America</b>									
United States	3,4	3,7	3,9	4,0	3,9	4,0	4,3	4,8	4,8
Ecuador	2,0	2,6	2,2	2,6	2,3	2,9	3,0	3,7	3,6
Chile	3,6	3,4	3,5	3,4	3,4	3,2	3,5	3,3	3,2
Colombia	3,4	3,5	3,5	3,4	3,3	3,3	3,7	3,8	3,6
<b>Oceania and Asia</b>									
Afghanistan		2,1	2,2	1,8	1,8	2,4	2,2	2,0	3,8
India	2,9	2,8	2,8	2,8	2,5	2,3	2,6	2,9	2,7
Kyrgyzstan	2,7	2,9	2,8	3,1	3,2	3,4	3,4	3,5	4,4
Pakistan	3,9	3,7	3,6	3,4	3,3	3,0	2,8	2,8	2,8
Sri Lanka	3,3	2,9	3,0	2,6	2,8	3,3	3,7	3,6	3,0
Brunei	5,3	3,7	2,5	2,6	2,6	2,6	2,5	3,3	3,2
Singapore	5,0	4,9	4,5	4,4	4,0	3,7	3,9	4,1	3,7
<b>Europe</b>									
Georgia	1,0	1,1	1,4	3,3	5,2	9,2	8,5	5,6	3,9
Russia	4,4	4,3	3,8	3,7	3,6	3,5	3,5	4,3	3,9
Ukraine	2,8	2,8	2,6	2,8	2,8	2,9	2,7	2,9	2,7
France	2,5	2,6	2,6	2,5	2,4	2,3	2,3	2,5	2,3
Germany	1,5	1,4	1,4	1,4	1,3	1,3	1,3	1,4	1,4
United Kingdom	2,5	2,5	2,5	2,4	2,4	2,3	2,5	2,7	2,6
<b>Middle East</b>									
Bahrain	4,7	4,8	4,3	3,6	3,4	3,2	3,0	3,9	4,3
Israel	9,6	9,6	8,7	8,0	8,1	7,5	7,1	7,0	6,5
Iraq			1,7	2,2	1,9	2,2	2,2	2,5	2,4
Oman	12,4	12,2	12,1	11,8	11,0	10,3	7,6	9,6	8,5
Saudi Arabia	9,8	8,7	8,4	8,0	8,3	9,2	8,0	11,0	10,1
UAE	8,6	7,9	7,4	5,6	5,1	5,0	5,5	7,6	6,9

The volume of international arms deliveries in 2007 and 2011 24% higher than rates in 2002 and 2006 (Table 3).

The lists of the five largest suppliers of changes have occurred.

Ukraine in 2007-2011 ranked 12th in terms of deliveries of major conventional weapons totaling \$ 2,455.0 million U.S. and joined the ten largest suppliers of weapons (to Pakistan - 4.0% China - 2.0%, Algeria - 1.0% of the world).

Table 3

**The volume of export and import supplies of major conventional weapons in 2007 – 2011 years**

Place	Vendor	Exports					Place	Recipient	Imports				
		Million \$ U.S							Million \$ U.S				
		2007	2008	2009	2010	2011			2007	2008	2009	2010	2011
1	USA	79	64	66	81	99	1	India	22	18	22	28	35
		19	63	56	11	84			13	04	00	51	82
2	Russia	54	59	52	58	78	2	South Korea	17	17	87	13	14
		96	80	87	81	74			67	10	4	20	22
3	Germany	32	23	24	24	12	3	Pakistan	63	10	11	24	16
		34	83	94	76	06			6	37	24	50	75
4	France	24	20	20	85	24	4	China	17	16	10	71	11
		00	48	37	6	37			58	83	54	8	12
5	UK	10	99	10	13	13	5	Singapore	38	11	16	97	92
		08	8	18	35	56			4	78	97	6	1
6	China	43	59	10	13	10	6	Australia	64	38	64	13	17
		4	3	18	35	70			0	5	9	86	49
12	Ukraine	73	36	38	48	48	8	USA	81	88	94	88	94
		2	7	5	8	4			8	0	7	1	6

The five largest recipient countries major conventional weapons - India, South Korea, Pakistan, China and Singapore (Table 3) - there states in Asia and Oceania. This is because the major recipients in Asia seeking to build its own defense industry and reduce dependence on foreign sources of supply.

In addition, in 2007 to 2011 most arms imports as compared with 2002 and 2006 occurred in the states of Southeast Asia (Fig. 3, 4). The growth of the supply to Asia was caused by a number of economic, political and security factors.

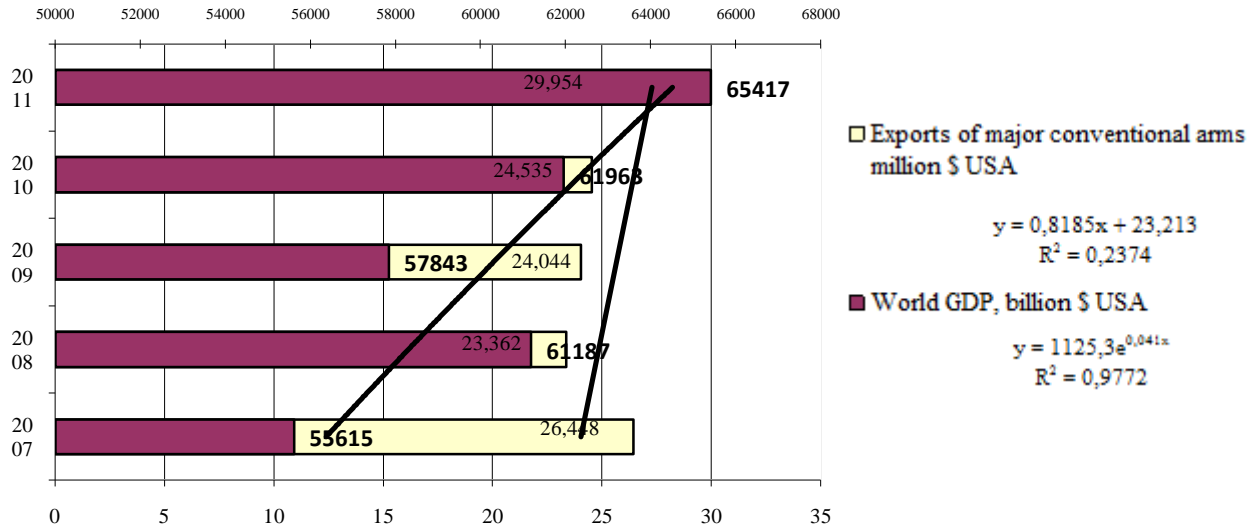


Figure 3. Dynamics of world GDP and export of world military expenditures for 2007-2011 [14; 15]

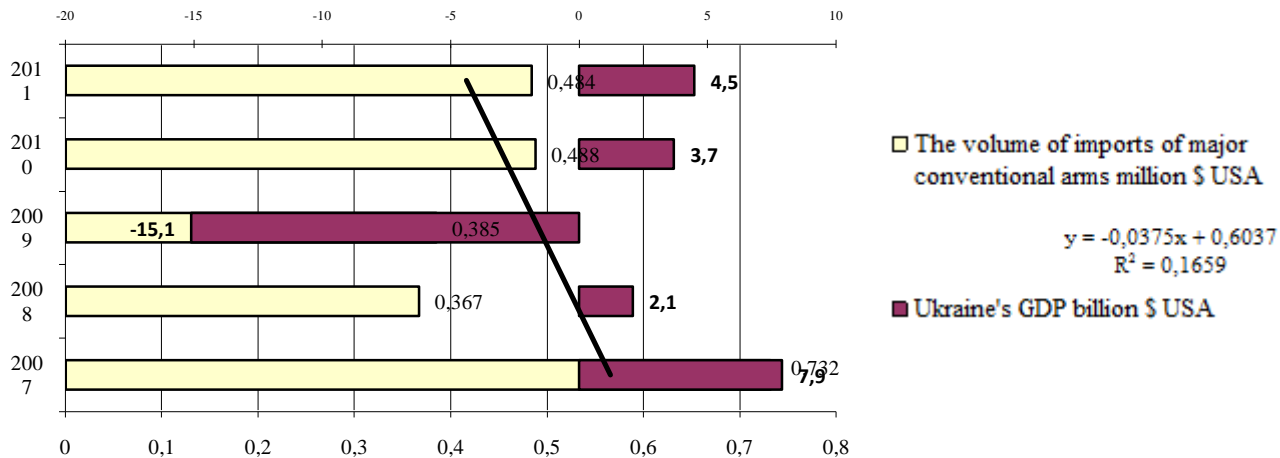


Figure 4. Dynamics of world GDP and import world military expenditures for 2007-2011 [14; 15]

In 2001 and 2010 dominated by domestic conflicts: during most years they accounted for over 80% of all conflicts ever - less than 70% (Table 4).

The main organization is the UN peacekeeping, which in 2011 accounted for 20 of total 52 peacekeeping operations (38%). However, more than half of the personnel deployed in peacekeeping operations world - 137,463 people (52%) - became part of the operations carried out of NATO, mainly to the ISAF (International Security Assistance Force, ISAF) in Afghanistan, so NATO third consecutive year has become the largest organization in number of personnel deployed.

Table 4

**The dynamics of armed conflict on the intensity and type of in 2001- 2010 years [14;15]**

Index	Years									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total	36	32	30	32	32	33	35	37	36	30
<b>Intensity</b>										
Small armed conflict	26	26	25	25	27	28	31	32	30	26
War	10	6	5	7	5	5	4	5	6	4
<b>View</b>										
Interstate	1	1	2	–	–	–	–	1	–	–
Internal	30	28	26	28	26	27	30	30	28	21
Internationalized internal	5	3	2	4	6	6	5	6	8	9

Of course, the leaders of armed conflict remain stable Asia and Oceania, and Africa (Fig. 5).



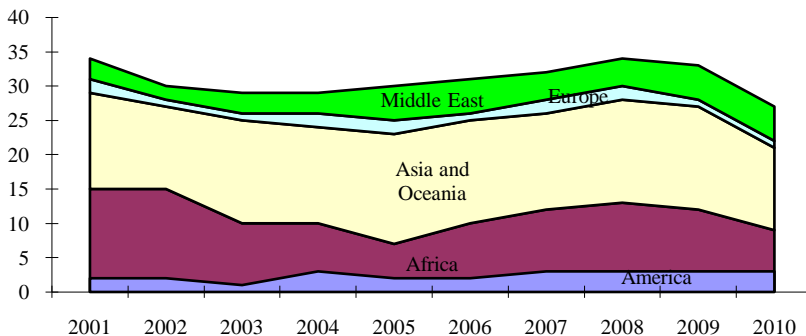


Figure 5. The dynamics of the armed conflict in intensity and regions in 2001-2010 [14;15]

The process of globalization is changing the economic, social, cultural and informational environment of the human habitat. It is, on the one hand, an increase in interdependence among countries in the implementation of their national interests in almost all dimensions, on the other hand, due to its multi-layered and multi-format character to the uneven development of the world community, as well as contributes to the permeability of national borders, aggravation traditional security threats and the emergence of new ones, such as international crime, poverty, famine, pandemics, economic and financial crises, armed conflicts and their consequences.

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## **ANALYSIS OF TRENDS AND SIGNIFICANCE OF TOURISM SERVICES IN THE WORLD ECONOMY**

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Since the second half of the 20th century the world economy has endured qualitative changes largely influenced by the service sector. By 2012, world trade in the main part of it belonged to market services, where the tourism sector differed by steady pace of development.

GDP of the planet doubled almost for 5 years, and industry structure has endured a qualitative change. [5] It should be noted that the positive dynamics of the service sector is not due to the reduction in output in other sectors of the economy, but due to their capacity. Because of scientific and technological progress the service sector has provided 50.371 trillion dollars in 2010, which accounted for 63.4% of world GDP. From 2005 to 2010, the growth of the service sector was 108.2%. You may notice that the tourism sector consistently takes about 3% of world GDP, and over the past five years it decreased by 0.26% scale. The reduction in the share of the tourism sector is influenced by the sharp growth rate in other service industries, and the market as a whole has expanded significantly. The sharp decline in market volumes significantly only in 2008 that caused the reduction of the dynamics of growth of 0.14%, which is extremely rare for this sector [5, 6].

It should be emphasized that the dynamics of provided tourist services does not reflect the significance of the scope of the global economy. The total volume of the market given its indirect influence in the structure of the world economy has just grown. Characteristic features of the industry - its indirect value of at least 1.5 times the direct significance. So, if touristic sphere direct contribution in the global economy in 2005 was 3.12%, the indirect was 5.9% in 2006, 3.11% direct and indirect 6.1%. A similar pattern is observed in the development of the considered period subsequent years, and in 2010 the scope of the indirect value was almost two times more than direct, accounting for approximately 6.5%. According to the World

Travel & Tourism Council (WTTC), the growth dynamics of both direct and indirect values of the sphere will be long-lasting and in 2020 will be respectively 3.7% and 6.9% of the gross world product.

The economy of many countries is dependent on the service sector, and in some countries the tourism sector is a major economic activity. The above is particularly true for the countries with special geographical and natural data, where the cumulative effect of the sphere is only growing. This level of development and the economy is not so much associated with the intensive development of tourism infrastructure, geopolitical developments and economic integration of countries as to the dynamics of consumer demand. The welfare of the people in recent decades has steadily increased, which directly affects the number of travelers, which over the past 15 years has almost doubled. If in 1990 the number of tourists was only 436 million, over five years, the number of tourists increased by 74 million, reaching a historic 510 million mark in 2010, the number of travelers has reached 949 million, showing growth for 1990 at 217%. Tourism has increased steadily after 2010 reaching a historic mark of 1 billion tourists and travelers in 2012. Experts predict that the World Tourism Organization, the number of international tourists will reach 1.8 billion in 2020, and after five years exceeds the level of the second billion.

It should be noted that the direction of travel of more than 50% are the developed regions. CIS market in this context dramatically lags behind the market leaders, taking modest position given the geographic, natural, historical and cultural opportunities in the region. The most attractive country for international travelers to countries of the former USSR is Russia, where the number of international tourists in 2013 was around 30 million tourists.

A number of countries occupying a small share of the world tourism market have a high specialization of this service sector, which is read as the data structure of GDP. Assess the level of specialization of the country can, by calculating the index of specialization [2, p.20], the formula (1):

$$S = \text{GDP} (\text{Veks} / \text{Vimp}) \quad (1)$$

Where: Veks-exports of services;

Vimp - the volume of imports of services.

Based on this formula, we can say that the service sector in countries with special climatic and geographic conditions takes place in the main GDP. So 97.1% of GDP in Macau, 95.4% of the Cayman Islands, Monaco, 95%, 78% of Antigua and Barbuda takes touristic sphere. It can be seen that small countries are in the touristic sphere which can serve tourists annually.

For countries with a large number of visiting tourists, it makes sense to study the degree of specialization, given the socio-economic characteristics of the country. [4, p.183]. In particular, it is advisable to use the ratio of these parameters calculated for the highly urbanized and tourist regions separately.

Structural changes in the global economy change the structure of employment. Currently 1 out of 11 jobs in the labor market of the world belongs to touristic sphere. The number of jobs in tourism is growing 1.5 times faster than in any other sector of the economy. Every 2.5 seconds in the tourism industry creates new jobs. Increasing the number of vacancies will continue at a rapid pace in the future. According to the World Council of Travel and Tourism, in 2015 the number of jobs in the global tourism market will be more than 500 million.

One can make a definite conclusion that the service Travel & Tourism industry is developing market like 19-20 century.

The evolution of the global economy should stimulate the development of the scope of service of the tourist destinations in the countries that have not yet realized the attractiveness of this sector.

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## **PERSONAL FACTORS DETERMINING THE CHOICE OF SELF-PRESENTATION**

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Factors determining the choice of self-presentation strategies are divided into three basic groups: individual personal factors, inter-individual factors, situational (of social environment) factors, which may be conditionally attributed to the outside factors. All these factors are closely interconnected and interact not only during the presentation, but also when selecting goals and ways to achieve them. Thus, first of all it should be necessary to define stimuli affecting the person's motivation for creating his own image in publicity and including not only the choice of a desirable image, but also a decision about what forms of behaviour are the most suitable for developing such an image, i.e. to select self-presentation strategies. It is also important to take into account some outside situational factors and the existing in the society social norms, which could influence the presentation planning and performance. Communication skills are essential for success in almost any role, but there are particular skills and techniques that manager use in decision making process. Organizations are made up of individuals who have different outlooks and abilities, and are at different stages of their careers. Some may find that tasks the manager had allocated to them are challenging, and they may need support. Others may be looking for opportunities to widen their skills. Either way, the

manager's responsibility is to develop possibilities of human resources. The article enlarges the understanding of a self-presentation, which influence both the person's identity and his state shaping in business interaction. The effective methods of a manager's training will enable organizations to achieve better results of producing, decision making, in development of leadership skills and communication in future. Using efficient and successful self-presentation strategies in business meetings will be helpful for each manager and will open new possibilities in their career. New skills in this aspect of management will define the manager's long-term success.

Under some business situations some difficulties may develop connected with performing the selected or attributed role, when keeping to the selected presentation strategy. There exist clear differences of self-presentation, when adapting to situation requirements [5]. After generalization of different self-presentation investigation data [5;12;13;14], the factors determining the choice of self-presentation strategies are divided into three basic groups: individual personal factors, inter-individual factors, situational factors of social environment, which may be conditionally attributed to the outside factors. All these factors are closely interconnected and interacting not only during the presentation, but also when selecting goals and ways to achieve them. Thus, first of all it should be necessary to define stimuli affecting the person's motivation for creating his own image in publicity and including not only the choice of a desirable image, but also a decision about what forms of behavior are the most suitable for developing such an image, i.e. to select self-presentation strategies. It is also important to take into account some outside situational factors and the existing in the society social norms, which could influence the presentation planning and performance.

The persons once motivated to create their own image may change their behaviour trying to influence other people's opinion about themselves [12;13;14]. The research discloses that some people are more motivated to manage the impressions developed for outsiders than others. For instance, the Machiavelli-type individuals are inclined to influence others by a strategic presentation [12;13;14].

Personal, individual factors are one of basic sources of presentation dynamics [19]. We are to review the basic characteristics of the presenting individuals for developing a desirable image.

**1. *Self-confidence.*** By Baumeister [3;4;5], a self-confident person should not be inclined to apply defensive strategies of presentation. On the contrary, a non-self-confident person may successfully use the disturbing public circumstances in order to avoid responsibility for possible failures. Such a person always observes other people and is directed by their reactions as social allusions, thereby changing his behaviour correspondingly [7]. Buss [7] also states that often the presentation goal is not a manipulation of other people, when seeking economic or social profit, but rather forming an impression of himself, when the person does not sufficiently rely on his own spontaneous behavior or social skills. Also, the presentation quality depends on the reliance upon himself: lack of confidence in his own strength is reflected in non-verbal behaviour (restriction of movements, irresolution, the tension of the whole body, etc.), also in the information presented for the surrounding people in a verbal form (self-criticism, reserve, self-humiliation) [5].

**2. *Self-consciousness.*** A high self-consciousness is tightly connected with the human inclination to concentrate himself on his own publicly observed peculiarities [5]. Knowing that you are an object of other people's attention, reinforces the fear of refusal and vulnerability possibilities and personalism tendencies, i.e. the inclination to react personally to signals of social environment or to understand events as purposely directed to a definite man. Thus, taking into account how he is seen by the surrounding people (i.e. with high self-consciousness), the person is more inclined to apply the self-presentation strategies. High self-consciousness reinforces the sense that you are observed. On the other hand, the observation itself by the surrounding people reinforces a sense of consciousness and motivation of the self-presenting person to create a certain image. Also, it is necessary to mention the realization degree of other persons' reaction connected with the public self-consciousness. According to the investigation data the persons whose realization of themselves as a social object is not strongly expressed, rarely take interest in the impression they make on the surrounding people. Their behavior



corresponding to their inner disposition is characteristic of spontaneity, frankness, cordiality and stability, i.e. these persons are less inclined to change their behaviour because of social context, and otherwise than people with a strong realization of reactions [12;13;14].

**3. Extraversion, other-directness** is closely connected with the above-mentioned factors; it predetermines adapting themselves to circumstances, the conformism, social wishes, desires, and reflects itself on the behaviour directed to social hints searching, when observing the reactions of surrounding people, when people in a public situation are not certain of their role performance and understanding [7]. This personal factor presents a possibility for an introducing person to choose a more suitable self-presentation strategy oriented to people's expectations and social norms.

**4. Self-esteem.** It is found by different investigations that the self-esteem level and self-esteem stability have influence on the self-presentation process. Schneider and Turkat[19]note that defensive, high-esteem possessing persons more appreciate their capabilities and strive for recognition of surrounding people, whereas the self-estimation of persons with firm self-esteem is high, but the need for acknowledgment is expressed weaker [5]. Low self-esteem conditions of the self-presentation strategy are based on striving to avoid failure The high self-esteem level stimulates to apply tactics, connected with striving for a higher status, prestige and competence [5]. People with high self-esteem strive to create and consolidate a positive Ego image, but people with low self-esteem, though striving for a desirable image, are inclined to act indirectly and cautiously. When the return connection is negative, the defensive persons with unstable self-esteem try to present themselves more positively than those people with stable self-esteem.

**5. Perceived self-efficiency.** Such efficiency stimulates a more active work; the accepted solutions to present themselves in a definite manner are of a higher risk (citation according to [10]). When analyzing the social conditions, the situation advantages are more pronounced, stressed and benevolent for the presenting persons, but not their threats and shortages to which most of the attention is paid by a low perceived Ego efficiency degree [9]. The perceived Ego efficiency influences the choice of a person to behave

officially in a particular manner and his capabilities and efforts to reach a goal.

**6. *The style of reasons explanation.*** It also may be an important inner factor based on which the causes of success and failure are ascribed to inner or outer factors [17;18]. As a constant construct of the personality, the style of reasons explanation has a direct connection with the person's self-esteem level and self-praise. By Seligman's words, for persons with the characteristic style of pessimism when explaining reasons, the failure may strongly affect their self-esteem level [17;18]. Thus, the style of reasons explanation may be an important variable influencing the choice of presentation strategy and objective results.

**7. *Social anxiety.*** This sense appears when the assimilation of people's reaction is so strong that it arises the insecurity sense among the surrounding people and unnatural social behaviour conditioned by psychological discomfort and resulting in restraint, suppression and avoiding cooperation [7]. According to the investigation data, socially worried people are inclined to treat the social situation as a threat for them; therefore during the self-presentation they experience a strong physiological and psychological stress. On the other hand, the social anxiety develops when persons wish to impress the surrounding people, but they do not hope to be successful (Schlenker, Leary, citation according to [12]). Anxious people apply cautious, reliable strategies of interpersonal behaviour, which could present a possibility to associate avoiding failure (pushing away, confusion, humiliation). In this case it is more desirable to avoid failure than to be successful. The concept of social anxiety connects closely the defensive presentation strategy and a low level of self-esteem. Another group of personal factors is connected with individual capabilities and skills of self-presenting persons; by applying them the person may create many images [5]. Snyder [20] indicates, that individuals differ by their abilities to present themselves according to the public requirements [10;11].

When presenting themselves, the basic capabilities and skills of the person are included:

**1. *Presentation performing capabilities,*** i.e. capabilities to play and improvise, when creating required images for surrounding

people as well as abilities to rule his own body: gestures, expression of the face, pose and other non-verbal expressions as well as his own voice (citation according to [7]).

**2. Self-regulation skills;** they give a possibility for the self-presenter to direct his activities towards a minimization of the disagreement between the real and the desirable. When this disagreement is minimized up to the desirable level, the self-regulation ends. In self-presentation situations this characteristic is important for overcoming the social anxiety, for minimizing the fear of failure and to react constructively to criticism, rejection and humiliation [1;2]. Self-regulation is closely related to the self-control. When the latter appears, the self-presentation starts with the suppression of spontaneous, natural behaviour. During self-presentation the self-control suppresses spontaneous behaviour and presents a possibility for a self presenter to concentrate the attention only to those aspects of behaviour in public life which are compatible with his image [7].

**3. Abilities of social perception;** the flexibility of public behaviour and the ability to change the self-presentation strategy are connected with the person's sensitivity to other people's behaviour, i.e. an ability to perceive and understand their emotions, needs and motives based on verbal and non-verbal expressions [7]. Abilities of social perception present a possibility for a self-presenter to adapt his behaviour to the requirements of the social situation, different needs and expectations of people, when developing a desirable image or changing it by a better one. The third group of factors, reflecting the inner and outer interaction and influencing the self-presentation process, is connected with the individual socialization of a person and (because of earlier experience and expectations) is based on personal behaviour as well as on information signals from the evaluating environment.

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## **ROLE OF PERSONAL EXPERIENCE IN CHOICE OF SELF-PRESENTATION**

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The persons, who get more often into situations requiring the self-presentation, have more often better abilities and skills and can select more adequate strategies for these situations by experiencing less social anxiety. They are able to manipulate their behaviour and reactions of other people [7]. Therefore it is possible to state that one of the factors, conditioning the self-presentation quality and its course, is a history of socialization of an individual, embracing adequate and non-adequate supports (when incentives are presented

without regarding the quality of performed actions), punishment and evaluation, successes and failures [3]. Jones and Berglas explain that, when experiencing a success independently of performance quality, it is developing a positive, but unstable comprehension of person's possibilities, and the person by the later behavior seeks to defend this positive comprehension (citation according to [11;12]). The history of feedback, i.e. the positive and negative evaluations of public activities in the past are shaping his own Ego efficiency (Bandura; citation according to [10]). Therefore the later self-presentation tactics may depend on the feedback's adequacy, its riskiness and comprehension of the public situation – stressing its shortages and merits. By the opinion of Baumeister et al. [4], depending on the social conditions the presented enforcements and punishments, defensive or reinforcing strategies may be perceived already in the childhood. For instance, in some cultures, societies and families there exist social norms, suppressing or even prohibiting a boastful self-praising, but in other cultures these consolidating tactics are supported and stimulated. Goffmann in his self-presentation concept was inclined to reject the importance of inner, psychological factors in symbolic interactions, meanwhile stressing the importance of outer factors (citation according to [6]). When analyzing the acting history of the person's socialization, it is necessary to pay attention to the main outer factors.

There are some different outer factors determining the choice of self-presentation:

**1. Social and cultural norms.** Investigation of different cultures discloses that there exist different social norms conditioning the limits of public behaviour and its evaluation possibilities. By the data of Powers and Zuroff [14], some cultural norms prohibit the open evaluation of his own positive properties and their demonstration [4]. For instance, the investigations in the Western society demonstrate enforcing or defensive self-presentation strategies diffusion, and comparative investigations in Japan – the humiliating himself tactics prevailing in this country [8]. It is explained by Markus and Kitayama's theory of cultural aspect of Ego (citation according to [8]). In Japanese culture the dependency upon their culture and the point of view of himself as a member of

the society are stimulated; therefore it is avoided in any case to stress his own exclusiveness and preference to others. As in Western culture, the presence of other people stimulates their own benevolent self-presentation, in the same manner, although in the Orient culture the public social environment stimulates to behave in a self-humiliating manner [8]. Thus, because of the influence of cultural norms, the strategy of self-humiliating may be considered as the tactics of self-regulating inner standards. The interpersonal factors may also be conditionally attributed to the outside factors, which influence the self-presentation motivation, the choice of strategies, the performance of self-presentation depending on a definite public situation and its participants.

**2. *The interaction between audience and the expectations of self-presenting people.*** In the context of social norms, earlier experience and individual properties, the individual expectations are formed – a cognitive prevision how to reach social approval and to become attractive for neighbours. The expectations of an individual in a self-presentation situation are connected with a success or failure probability, with his ability to correspond to his own requirements and with the presentation limits [4]. The choice of self-presentation depends on the fact what evaluation of the surrounding people is expected and on a presentiment what do they expect. If a self-presenting individual knows that the observers believe in his success, it may cause the tension, and this in turn, may predetermine the choice of defensive strategy. The expectations of the person and the audience condition the probability how successfully this person will perform the selected role. It is possible to distinguish four moments of expectation influence on self-presentation:

a) content of self-presentation is influenced by expectations of a self-presenting individual, connected with the evaluation in future. They are expectations of results – discussions about events after the self-presentation and when people have some information. For instance, the probability of future failure stimulates preliminary attempts to speak about a potential possibility of failure (Leary, Barnes, Grybel 1986; Quattrone, Jones 1978; citation according to [12]);

b) for self-presentation it is important to foresee the public success caused by audience expectations, as there appears social pressure to behave in correspondence with these expectations, also, there increases the probability that, in case of a failure, the audience's hostility and disappointment to the self-presenting person can arise (Baumeister, Hamilton, Tice, citation according to [4]). Especially in case of failure, earlier boasting and official praising of themselves increase the refusal and humiliation probability, because the failure attracts the attention and unrealised awaitings of listeners increase a more intensive negative attributions process than the events approving the expectations [4];

c) the fact that in the mentioned case after the success forecast a failure follows, shows the overestimation of the self-presenting man and conditions some attributions development, for instance, that the man is egoistic, arrogant, etc.

A failure after praising himself becomes an argument that earlier statements about himself were mistakes, based on non-adequate Ego picture [4]. Because of these reasons the preliminary forecast of the success is a risky self-presentation strategy;

d) on the other hand, the expectations of the audience concerning the success or failure may disturb further development process of creating impression and restrict the self-presenting person [9;10]. Other people are a potential source of positive or negative estimation; therefore they influence the tactics of self-presentation by their behaviour when looking for social agreement and avoiding the disapproval of surrounding people. The discussion of estimators in the self-representation situations allows speaking in general about the influence of other people on the self-presentation strategies selection and their performance. One of the means, by which the surrounding people influence the motivation of a person, his behaviour, Weinstein and Tanur call alter casing, i.e. the behaviour, by which the person changes according to wishes of other people by performing roles expected by them (citation according to [17]). This kind of impact may be described as a certain way of education, when other people present symbolic hints in order to arise a desired behaviour of the self-presenting person. McCallas has noted that a desired change differs from self-presentation. He also



indicates that self-presentation expresses something, who we are, and the desired change shows how we react when interpreting reactions of other people (citation according to [17]).

**3. *The qualities of estimators.*** When a person depends on other people with whom he is connected by the results to be obtained, then he selects the ingratiating strategies, striving for benevolence of other people (Pohra, Pandey; Hendricks, Brickman, citation according to [12]). Therefore, there is a stronger inclination of a self-presenting person to ingratiate himself to authoritative, of a high status, attractive and competent persons, because they have more power when distributing valuable results [11;12]. First, the estimators of the high status and power most often occupy a position, which can present valuable results [11;12]. Also, it is confirmed, that the persons of higher rank are less motivated to develop impressions for a person of a lower rank. Second, the qualities of other people may also affect the choice of self-presentation strategies and their change: a positive evaluation of more desirable, attractive and powerful people is more important, but disregard, repulsion, taking no interest in the self-presenting person is more offensive than from persons of a lower status [4]. Third, some characteristics of estimators (it may be personal qualities and social positions, profession) are important for recognizing the identity of the self-presenting person. For instance, for a student of psychology it may be more important to create a good impression on a psychologist than on his/her parents or other specialist, because creation of such an impression could influence the student's, as a future psychologist's, identity development [4].

**4. *Other values of people.*** By some data of investigations, public images are often developed and reformed according to perceived "the important other" values (Carnevale, Pruitt, Britton; Forsyth and others; Gaes, Tedeschi; Gergen, citation according to [12]). Therefore, when believing that the surrounding people value negative qualities, self-presentation may be assisted by accenting also his own negative features (Jellison, Gentry; citation according to [12]). But disclosing other persons' values influence on self-presentation does not present a reason to state that the images created in this way are deceptive or erroneous. When presenting himself, a

person takes into account everything that is acceptable for the surrounding people, but out of potentially possible images variety he selects those, which could be approved and evaluated favourably. The self-presentation in such cases is tactic, but not necessarily untruthful. On the other hand, the person may consciously present himself by the way, which does not represent the other person's values and positions, either evading this person or wishing to repulse him or trying to develop the sense of his own independency [11;12].

**5. *The behaviour of other people.*** Social norms require that the self-presentation must be coordinated with the behaviour of the surrounding persons, for instance, with disclosing of other people [11;12]. For instance, by restrained behaviour the person answers to restrained disclosure of another person. A person, who does not take into account other persons, may be considered as violating the public order of communication.

**6. *Norms of estimators' group.*** In Hollander's opinion (1958), when adapting himself to social group norms, people accumulate some credits, which in future may give an opportunity to deviate from those norms (citation according to [16]).

**7. *Information of estimators on self-presenting.*** Personal image creation is influenced by the fact how a self-presenter considers to be appreciated by other people during the presentation and how he believes to be considered by them in future. Sometimes the information concerning a self-presenter may limit his later efforts to make an impression, conditioning the choice limits of definite strategies. It is the problem of the already developed image. First of all, people are not inclined to present themselves as those who contradict the information about them because of a small probability to present the opposite impression (Schlenker, citation according to [12]). The present image of a person may influence the choice of corresponding self-presentation strategies. For instance, when the achievements and abilities of a person are known publicly, there arises social pressure to minimize their values by showing modesty and reserve (Ackerman, Schlenker, citation according to [6]). By the data of Schlenker and Leary, people are estimated more favourably, when they devalue their achievements, abilities and talents or do not stress them in public conditions (citation according to [12]). In

different contexts of social presentation people are inclined to behave basing on constant, long-term personal dispositions or to act on momentary impulse, when expressing their emotional reactions to the social environment [6]. Therefore it is necessary to identify not only the personal traits and other human peculiarities influencing the self-presentation process, but also the conditions under which the self-presentation can arise and develop. The importance of a situation sometimes is great, because the self-presentation, which does not correspond to the situation, diminishes the role of a self-presenter [18]. We shall review basic factors, predetermining the choice of strategies.

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## SITUATIONAL FACTORS DETERMINING THE CHOICE OF SELF-PRESENTATION

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The public evaluation situation determines the concentration on your own publicly seen sides and concerns about the impression produced on surrounding people. In this way the environment motivates an individual during self-presentation to control apprehension and evaluation of other people. During the self-presentation public information about himself is presented, his own image for surrounding people created and the individual identity solidified. The start of developing a man's image means a resolution what concrete image is to be produced. Here it is important not only the fact, that a person is motivated to create an impression on other people, but also what impression he wishes to produce reaching his own goals. The second step is the selection of strategies, which could help in reaching these goals. In this work the mentioned strategies are most often applied not separately, but combined into definite combinations.

The main situational factors determining the choice of self-presentation can be represented by:

**1. Public conditions.** Publicity of personal behavior is a function of probabilities that the person's behavior will be observed by other people (Kolditz, Arkin [9]): the more public is the person's behaviour, the more probable is that he will take care of the impression on surrounding people and will be more motivated to produce an impression during self-presentation [11]. The publicity of situation influences the self-presentation motivation, because for achieving some special goals the open behaviour is more important than a private one. On the other hand, closed behaviour may also be influenced by the motives of self-presentation. For instance, a person may individually prepare himself for self-presentation to other people. In addition, public behaviour, developing because of the social pressure, may become so usual that the man will transfer a large part of its elements to his own private environment [11]. Thus,

public conditions are one of the basic appreciating context factors, increasing the probability of the self-presentation when trying to retain a positive opinion concerning himself (Baumeister; Schlenker; Tedeschi, citation according to [4]). Due to publicity in an open social environment there develop behavioural differences, connected with different self-esteem levels. By Schrauger's opinion, the self-humiliating strategy of low self-esteem possessing individuals appears only in public self-presentation situations (citation according to [4]). According to data of Buss and Briggs [8], it is also displayed most often, when people are engaged in public activities (for instance, they become politicians, teachers, traders, confessors, etc. [11]).

**2. *Limitations of a social role.*** Social roles predetermine expectations, connected with the behaviour of performers of these roles (Sarbin, Allen, citation according to [11]). Many roles require special qualities for performing them, for instance, the efficiency of a high status person depends on his ability to openly create a competent leader's image (Calder, citation according to [11]). The failure of transferring the corresponding social role image not only diminishes the efficiency of self-presenter's role, but may even predetermine the loss of the right to perform this role (Goffman, citation according to [7]). Because of these reasons people endeavour to do their best, that a public image would correspond to the requirements of the performed role under certain situations.

**3. *The value of goals sought by the presentation.*** When preparing for the presentation and during it, more attention may be paid to the result of success, but not to the fact, by what ways this success should be reached. In many theories of motivation it is noted that the motivation increases with the goals value [11]. Thus, the motivation of self-presentation may be caused by the value of goals to be reached. For instance, the investigations by Pandey, Rastagio showed, that toadyism of the person, wishing to get a job, increases, if the competition for the duties increases [11]. Therefore, Pandey states, that the development of impression by self-presentation should be natural and usual phenomenon in societies with characteristic limited economic and political possibilities [11]. Along with the goals to be achieved, the subjective value of the activities

performed should be also mentioned [11]. It follows from the investigations conclusions that the motivation of self-presentation rises when experiencing a failure in activities that are personally important. Then it is strived to shape a benevolent impression about himself by underlying his own positive qualities and stressing failure causes favourable for him or by devaluating other people.

**4. Failure acceptance.** This event mostly impresses the change of self-presentation strategy. The people having experienced the failure strive to reconstruct their lowered image by different means, for instance, accenting his/her positive traits (Baumeister, Jones [5]; Schneider [21]), expressing their benevolence and approving other people (Apsler [2]), associating themselves with other persons experiencing success (Cialdini and Richardson 1980) or making self-serving attributions and thus explaining their own failure by accusing outside factors (Weary, Arkin [2], citation according to [3]). In case of failure, the person becomes motivated to present himself by expressing resistance to a non-benevolent image. An understanding that by an image creation the desirable effect has not been achieved stimulates different strategies of earlier image presentations. It is stated that when the failure is not apprehended, it does not influence the self-presentation behaviour, i.e. only a subjectively apprehended public failure may determine the choice of new self-presenting strategies [4].

**5. The feedback.** In every situation of personal contacts the person is inclined to have feedback from a partner to know what impression has been produced [1]. When feedback or even hints about a positive social behaviour of the person are not obtained, the situation becomes indefinite; it results in the non-adequate attribution to the surrounding people, unsafe feelings and lack of confidence in his own abilities to produce a favourable impression on other people. Meanwhile, knowing of the estimation results and the potential of estimating person gives the possibility to prepare himself appropriately and to control the situation of self-presentation. However, when explaining the importance of feedback, it is necessary to take into account that different people react differently to the same stimuli of positive or negative feedback.

**6. The stage of personal relations.** Buss [7] states that some strategies of self-presentation have characteristic short-term effects, because it is possible to suppress emotions and spontaneous behaviour only for a limited time. Therefore it is possible to ascertain that such ways of outwardly desired behaviour are characterized as “holy” lying, worming himself in somebody’s favour and are limited not only by time, but also by the development. According to investigations, the creation of impression is mostly used during the first meeting, when the relations are supposed to be continued only superficially [7]. In that case the image to be developed may not correspond to the actual Ego. In close relations, in a dyad, when social behavior develops in close surroundings (with no direct observers), the need for active controlling the mutual impressions weakens in time. The strategies of impression development and worming himself in such relations are less connected with manipulations. Thus, in a formal context the need for demonstrative behaviour is expressed in a weaker form [5]. The results of self-presentation are perceived to be more important depending on how many times the person expects to meet another man or a group of people. The investigations disclose, that the people who expect further communication with the other man, are more inclined to control this man’s created impression about himself [11]. The self-presentation motivation and behaviour in public social surroundings is influenced by many connected and interdependent factors. Some of them are connected with individual qualities of man’s behaviour, predetermined by personal variable and specific abilities and skills (they were conventionally called internal factors), while others with such social situation characteristics as norms existing in the society, regulations, expectations are interpersonal (outer) factors. Each of these factors predetermines, how intensively and by what ways the person seeks to control the impressions of the surrounding people, because every factor mentioned may take part in the process of striving for desirable results, maintaining the self-esteem and developing the desirable identity.

The third step is the performance of self-presentation and its evaluation, depending on many inner or outer factors, among which not only the qualities of self-presenting people, associated skills and



style, but also the situation of self-presentation perform an important role. The strategies of self-presentation reflect a great variety of possible impressions created by active human behavior in public. Their goals depend on the self-presenting person's inner structures, individual skills and capabilities to present himself and on the outer situational factors. By self-presentation it can be tried to achieve social and material results; self-presentation also may be used for strengthening the person's self-esteem and his identity.

The main strategies of self-presentation are those of self-strengthening, defensive, worming themselves into somebody's favour and humiliating themselves and are known by potential profit from their application and the risk to receive opposite evaluations contrary to expectations. Following after self-presentation the public behavior evaluation influences the later behaviour of self-presenting person, the choice of new self-presentation strategies, and by feedback also influences the impression creating motivation and inner factors determining the contents.

Personal (individual, inner) factors, interpersonal and situational (outer) factors, determining the strategies selection, are closely interrelated not only during self-presentation, but also when selecting goals and means to reach these goals. In earlier self-presentation investigations insufficient attention was paid to perceptual and cognitive processes, when the participants selected the self-presenting strategies.

Many investigators present data about the attempts to create "the best" images and following them clear feedback from the auditorium going round these stages, when a person begins to take interest in his own public image and on the basis of his own public image and other persons response to consider how his behaviour could correspond to expectations of the surrounding people. It remains a non-answered question, in what way these initial stages of development and management take place in planning the representation process itself during which the preconditions for creating a desirable image are researched giving a possibility for presenting himself successfully and ensure support and approval of its audience.

After a discussion of self-presentation motivation and factors which influence strategies selection, a question also arises, which of these factors are more important for self-presenting person's behaviour, when developing a favourable image and which of these factors help or disturb to represent himself successfully – the individual qualities of the self-presenting person or public social environment with its existing values and standards. In further investigations of self-presentation studies it would be interesting to analyze, how the behaviour is changing in public, depending on hints, on a social situation, what behaviour is to be awaited, when the outside factors influence is stressed and a precondition is considered that there exist great individual differences, when adapting to situational requirements.

Based on the discussed inner and outer self-presentation conditioning interrelated factors, it can be stated that not so much the person himself with his own qualities and values, than the social pressure under public situation conditions influences the orientation of the self-presenting person to accept adopted social norms; thus, public images (of political leaders, prominent artists, etc.) are created in advance and only later personalities corresponding to desirable images are “selected”. All the earlier discussed theoretical self-presentation models are based on investigations performed in Western countries.

The investigations in Lithuania could present a possibility to analyze an additional aspect of self-presentation: how in the society living and experiencing a transitional period from one social, economic and political system to another one, with characteristic tension between old and newly developing values, the discussed theories corroborate, i.e. which reactions and changes they can develop in this context. Thus, when introducing himself, does the person manipulate his social environment or, on the contrary, this environment (cultural and social norms, other people's regulations, expectations, etc.) presents the direction of the efforts of the self-presenting person, when consolidating himself in the society? The question should be answered by further self-presentation investigations.

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## **ANALYSIS OF STATE OF INNOVATIVE DEVELOPMENT OF COAL INDUSTRY OF UKRAINE**

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Energy Sector is the basis of the other sectors of economic activity , so the innovative development of the energy sector will be a catalyst for innovation development of Ukraine's economy as a whole. The coal industry is part of the priority sectors in terms of innovation development of Ukrainian economy. The share of coal industry in GDP is 2 %, although the actual contribution to the economy is much higher - one of the elements of sustainable development as the economy and related industries. However , to date, the industry is in crisis and in need of reform . In this regard, the urgent issue of innovations , including the upgrading of coal enterprises and execution of research and development .

General theoretical and methodological aspects of innovation devoted a lot of research of domestic and foreign authors

Schumpeter, R. Fathudinova, G. Menshema [5], A. Halchynskiy, V. Seminozhenko, I. Odotyuk, V. Heytsya and others.

Also, the research question of innovative development of the coal industry engaged in examined by such scientists A. Amosha [1], L. Starychenko [1], D. Cherevatskyy [1], O. Novikova, I. Pavlenko [4] and others. Review of scientific sources revealed that despite the presence of many of publications, there is no common approach to a given problem. Most of the innovative development of the field associated with the improvement of the technological component of the production process as well as the source that will provide that the development is proposed borrowing foreign technology that is contrary to global trends of innovative development of the coal industry.

The study aims to analysis of the state the coal industry, the identification and substantiation of innovative development directions in view of international experience.

Identifying level of implementation of innovations in the coal industry (Table 1). According to the statistics data can be make the following conclusions: the share of enterprises were engaged innovation in the dynamics of the 2001-2012 years, and a number of changing undulating - in 2005 is the growth within 0.5-1% by 2007, then recession to of the same range, and then increase to 3% in 2012.

There are also problem of energy intensity production, as according to implementation of new technological processes, their number is insufficient and considerably effect on cost of production. The environmental problems of the industry such as high levels of CO<sub>2</sub> and sulfur oxide and nitrogen require for immediate investment in clean production systems.

According to the concept of innovation, which includes innovation processes and innovation capacity, the coal industry is not made any provision to the average level of innovative technologies or updating assets. Strategy of development of the energy sector in 2030, provides for a number arrangements that should carried out gradually, but not all of the position the strategy implemented. The analytical research of the state coal industry enables highlight a number of systemic issues in the industry, including:

- modernization of capital assets in order to increase of production costs;
- increase the level of of labor protection at enterprises sector;
- increase in financing scientific research institutes engaged in research of the coal industry as having developed network of research institutions, reducing financing of which resulted in the outflow of scientists and closing of current research areas;
- privatization of other enterprises of the industry in order to attract investment;
- high capital intensity of and relatively long term development of new deposits of coal.

Table 1

Dynamics of implementation of innovations on enterprises of coal industry

Years	The share of enterprises that implemented innovations of coal industry, %	Implementation of new technological processes	including saving, ecological safety	Put into service in the production of new types of equipment	The share of sales, which applied in manufacturing innovative technology, %
2001	2,5	12	2	22	0,25
2002	2,2	9	1	19	0,5
2003	1,5	5	1	15	0,8
2004	2,5	12	2	12	0,4
2005	2,4	10	4	14	0,2
2006	2,3	11	3	16	0,4
2007	2,0	10	2	14	0,5
2008	1,5	8	1	11	0,2
2009	1,5	5	1	12	0,2
2010	2,0	7	2	14	0,4
2011	2,4	11	3	17	0,2
2012	3,0	15	5	27	0,2

*Source: Compiled based on data by the author [2]*

In order to solve complex systemic issues in developed strategy of the energy sector in 2030 (the Strategy), the main target of which transition to an innovative model development of coal industry of Ukraine.

A result of implementation Strategy we obtained the liberalized market of coal according to European practices, update structure of ownership coal mining enterprises, increasing volumes of coal to 115 million tons per year and renewal processes.

Financing of the measures provided for in the state budget expenditures, assets of individuals and entities obtained as a result of privatization and the involvement of credits of foreign banks.

In such a script the innovative development of coal industry, the state will stop subsidization to 2020, as will on the level industry profitability.

Analysis of the strategy demonstrated that it reflected variety priorities that will ensure innovative script of Coal Industry of Ukraine. Strategy implementation will make it possible to resolve problem of supporting for energy independence Ukraine for short and long term. However, must be noted that it is of the quality of practical implementation of the Strategy, completeness and timeliness of implementation all legal, institutional, infrastructural and financial measures depends on the actual the ability to create of competitive national coal companies that can to provide the required resources economy. Therefore creation of favorable investment climate, transparent business conditions, tax holidays and renewal legislation pertaining to coal industry as a result can provide a positive dynamic of change microeconomic indicators of the industry.

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## **THE DEVELOPMENT OF THE LATVIAN INSURANCES MARKET IN THE CONTEXT OF THE CURRENT PROCESSES OF ECONOMY**

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In today's society the insurance is considered to be the simplest and most effective way of loss prevention, where paying a definite sum of money the person receives a sense of security and a certain confidence in the future. In contemporary world, where a person every day faces with various types of risks that may threaten his interests and economic activities, insurance is the most popular and most available type of risk management, which allows avoiding the loss in the result of unforeseen adverse circumstances. Since property values and material interests, as well as the risks that threaten these interests have always been a part of people's lives and economic activities, the insurance is always going to be one of the forms of protection. [2]

In globalization circumstances the economy of each country is viewed and evaluated not only individually, but also in global and regional context. It allows determining the level of development of a definite country in comparison with global, regional and other countries' indices, its impact and contribution to the global economy,



as well as it helps to detect global and regional impact on the economy of a definite country.

The objective of the research is to explore the development of the insurance market of Latvia in the context of the current processes of global economy in order to determine the indicators characterizing the development of the insurance of Latvia in comparison with the average level of development in the world, Europe and the Baltic States.

In order to achieve the set objective, which is to investigate the development of the insurance market of Latvia comparing it with the insurance sector of other countries, there was done the analysis taking into account the main indicators of the insurance industry as follows: share of insurance services of GDP, the amount of the signed insurance premiums and dynamics of changes, the value of insurance premium per capita, and structure of insurance market and its changes.

In order to obtain the necessary information, there have been used data qualitative acquisition techniques. In the research there has been used not only primary (which was obtained in the course of the research), but also secondary data (the analysis of data obtained in earlier studies, statistical records, document analysis), which allowed to have a broader view of the researched topics, including not only the direct aspects of the study subjects, but as well the descriptions characterizing the situation as a whole.

- *The share of insurance services of GDP*

The insurance industry can work as an indicator in the national economy: the higher the standard of living of the population is, the more people think about their future or how to protect themselves against the risk and not to lose the achieved standard of living, and the higher the share of GDP is.

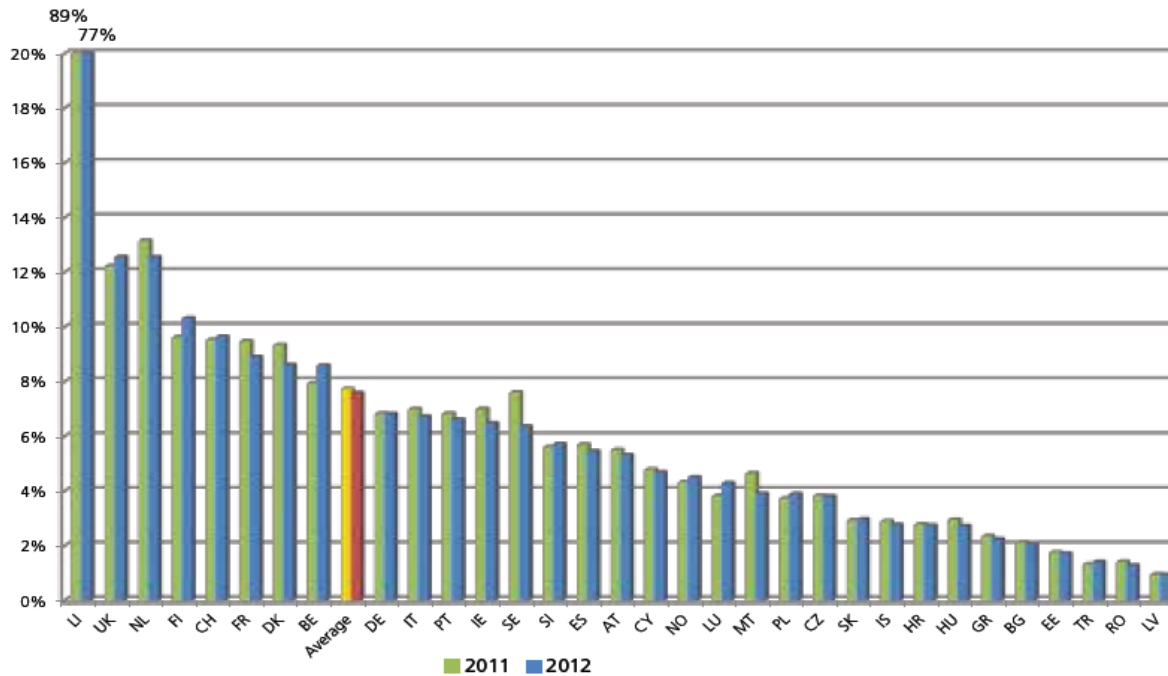


Chart1. Ratio of total European premiums to GDP 2011-2012 [3]

Analysing the insurance sector share of GDP, it must be mentioned that there is a big gap between the insurance markets of 25 different EU countries.

In some EU countries insurance capacity indicators are comparable to those that can be observed in the United States, but in other countries the indicators are very low. The highest insurance capacity figures are observed in Luxembourg, the United Kingdom, the Netherlands and Belgium, where the ratio is above 10 %, while in most of the 10 European Union countries (those, which joined EU in 2004) the ratio ranges from 1 % to 5.7 %. In Latvia this ratio is very low- on average around 1% of GDP. This suggests that the insurance market of Latvia and the economy as a whole are in the period of their development.

- *The amount of insurance premium per capita*

Analyzing the statistics on the amount of the insurance premium per capita, it can be concluded that low results of the insurance market of Latvia are not because of the small area of the country or small number of population, but they are connected with relatively low standard of living, inefficient state economy and relatively underdeveloped insurance market. However, the insurance market cannot develop apart from the economic situation in the country and the world, which to some extent can influence the demand, behaviour of insurers, etc., therefore the development of insurance sector is possible only along with the economic growth of the country.

- *The amount of the signed insurance premiums and the dynamics of changes*

Carrying out the research of a 10-year perspective, the author has sorted out two significantly different stages of market development: the period of prosperity and stability (2004 - 2008) and the period of crisis and post-crisis period (2009- 2014).

The insurance market of Latvia has been developing unevenly, experiencing a number of declines and the periods of a relatively low growth, and only in 2004 along with the accession to the European Union, the insurance sphere began its rapid development, which lasted till 2008, when due to the economic crisis the insurance market of Latvia moved into the recession period. Accession to the

European Union provided a boost to the country's economic growth, which had a positive impact on the insurance industry and contributed to its dynamic growth. During this period the number of signed premiums, paid claims, the number of market participants, and other insurance development indicators significantly increased, however, the global financial crisis, which reached the economy of Latvia in autumn of 2008, led to decline of the amount of the signed insurance premiums in life insurance segment, but overall there was still observed the growth of insurance market. However, in 2009 there was a rapid decline due to the stoppage of mortgage lending that affected property insurance, sales drop in car market and the decline in auto leasing business, which resulted in the reduction of the compulsory third party liability insurance of motor vehicles and CASCO insurance of road vehicles – the types of insurance, which made most part of the non-life insurance market, the decline in purchasing power of the population, as well as other consequences of economic crisis. In 2012 along with the recovery of the economy of Latvia, the insurance market had upward tendencies, but in 2013 the restructured market reached the amounts of pre-crisis level.

- *The structure of insurance market and its changes*

In the world insurance market the ratio of life insurance in the total amount of the premiums signed in 2004 – 2014 was on average of 58.3 %, which is slightly more than a half, while in Latvia it was on average only 12.8 %. This points to one of the most distinct differences between the global market and the insurance market of Latvia – the domination of life insurance sector over non-life insurance in the global market and the absolutely opposite situation in Latvia, i.e., non-life insurance sector's predominance in the insurance market of Latvia.

Every insurance company is trying to establish the most stable and balanced insurance portfolio, i.e., to have a set of insurance contracts, where a large number of commitments will reduce the level of responsibility to its minimum. It should be noted that during the crisis there was a significant decrease in the amount of the signed premiums, but the total amount of the paid claims decreased relatively slightly. In other words, the decline rate of the signed premiums was faster than the rate of decrease of the paid claims. It

significantly influenced a number of insurers' profitability. In order to stabilize the market the overall portfolio was restructured, reducing the shares of less profitable types (Motor Insurance) and gradually increasing the price of services.

Theoretical studies and empirical evidence have shown that: Despite the rapid growth of the insurance market of Latvia in 2004 - 2008, the level of its development and characterizing indicators, such as a share of GDP and the value of premium per capita, are still far behind the average showings in world, Europe and even the Baltic region. In the period of 2001 to 2014 the insurance market of Latvia experienced both rapid growth and decline, which occurred due to the changes in the economic situation of the country.

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## **SECTION 8. Philosophy of Science**

### **THE AWARENESS OF POSSIBILITY OF CONTRADICTION IN STATUS DETERMINATION OF PHILOSOPHICAL CONCEPTS AS A CONDITION OF RETENTION OF SCIENTOLOGICAL APPROACH TO THE PHILOSOPHY STATUS**

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The fact that in modern Russian society there is a growing uncertainty of necessity and possibility of existence of philosophy - in institutional form - among other sciences and academic subjects has been reflected on pages of central philosophical editions for more than ten years: for instance, V.A. Lektorsky opened the round-table discussion "Philosophy in modern culture: new prospects" by saying: "We are here today to talk about the place of philosophy in modern culture and whether this place remains, whether modern culture needs philosophy and what it can give us today. There are some reasons for that kind of discussion and they are quite solid. As for our country, as you well know, the regular attempts to abolish teaching philosophy to students and postgraduates have been undertaken in recent years [1, c. 3].

In an attempt of world view basing of scientific philosophy status as one of the most important conditions of its retention in Russian higher education system when realizing the main arguments of modern national critics of this status we see that one of the important problems towards said object achievement is the awareness of the difference between self-determination of philosophical concept and its real status. K. Marx warned of it as early as 1879 in the letter to M.M. Kovalevsky indicating the necessity of "distinguish between what some author actually gives and what he gives only within his own mind", and this is even "true for philosophical systems: thus, two completely different things -

what Spinoza considered the corner stone of his system and what actually forms this corner stone [2, c. 287].

In spite of the past almost a year and a half century error probability of not distinguishing these “totally different things” is high, particularly, famous Russian modern philosopher T.I. Oyzerman observes “Despite the fact that a large proportion of philosophers don’t consider their philosophy as a worldview ... any philosophy represents a specific namely philosophical worldview” [3, c. 32].

Therefore Russian discussions of the last two decades devoted to the philosophy status need to be reviewed from the point of view of possible error in philosophers’ self-determination who deny scientific character of their own statements. The attempts of such reappraisal have been undertaken by Z.A. Kamensky, one of the most consistent follower of the scientific philosophy status, who in reply to the argument that such criteria as rationalism and systematic character are not applicable to essayist studies and literary-philosophical texts introduces the concept of “proper carcass of philosophical ideas” which in thinkers’ definitions of that type coexist with religious, theological, mystic and other ideas. Referring to reconstructions, for example, of Socrates philosophy by eminent soviet philosophers A.F. Losev and A.F. Asmus, of Pascal philosophy by V.M. Boguslavsky, S. Streltsova, Z.A. Kamensky claims that ideas of that “carcass” meet the criteria of scientific character whereby “any authentic philosophizing is scientific and we can single it out of the whole range of thinker’s reflections and carry out the process of refining his philosophical ideas” [4, c. 63].

Nowadays this process is particularly relevant also because many modern philosophy scientific character critics make arguments that were used in domestic philosophy status discussions at the turn of XX century which leads to the situation that is particularly evident in the example of N.A. Berdyaev’s ideas. His proposed resolution of the issue of philosophy status in favour of its categorical non scientific character is a good illustration that this approach is based on the reduction of science itself exclusively to its historically limited classical model using the classification of the academician of RAS V.S. Stepin (who in 1989 first proposed the

typology of scientific rationalism: classic, neoclassic, post-neoclassic which gained international acceptance [5]). Certain conclusion of twenty-year studies is made in collective monograph “Post-neoclassic: philosophy, science, culture” (2009) by the international research programme “Post-neoclassical methodology: formation, development, principals, prospects”. Let us illustrate what we mean by the words of N.A. Berdyaev: “it is difficult to deny the pragmatic nature of science, its vitally selfish biological character” [6, c. 266], and “science of real scientists and not philosophers justifies Mach and pragmatists but not Cohen and critics” [6, c. 266], because “scientists divided the world’s evidence into separate special fields and gave them economically contracted description as law of nature” [6, c. 266–267]. It is obvious that today analyzing the research and scientific ideas of XX-XXI centuries we won’t be able neither to repeat with the same confidence Berdyaev’s classification here described nor, respectively, to agree with the definition of philosophy as non-science given by the philosopher.

To be fair, the status self-determination error is quite often seen in scientologically-oriented philosophers’ concepts and its extreme expression is scientology of religious thinkers developing what they called “Christian sciences” or of those art representatives of XVII-XIX centuries who worshipped the “Science” and tried to use it in their art which was far from the science itself. These attempts can be explained by the words of the modern competent science philosopher N.I. Martishyna that as in today’s society science authority is high, “value” and “scientific character” of knowledge are taken for synonyms extrascientific knowledge not only demonstrate but is actually aware of itself as scientific. The presence of some particular features, proper standards of thought motion is not found” [7, c. 7]. In less raffish form this contradiction is present in G.V. Hegel who paid his respects to the tradition of understanding philosophy as superscience which object is the Absolute Spirit: “Science is conceiving the Absolute Spirit... it is caught by the science in the form of conception” [8, c. 209]. Absolute idea is the content of science, namely, the examination of the universe which corresponds to the notion in itself and for itself or examination of the concept of mind as it is in itself and for itself and as it is objective



and real in life” [8, c. 122]. It is this aspect of Hegel’s science understanding that is considered today as interfering with its adequate interaction with philosophy: for instance, according to the words of E.A. Mamchur “domestic science philosophy is developing coping not only positivistic approach to the analysis of scientific knowledge but also the recurrence of Hegelianism expressed in nature-philosophical pretensions of some philosophers regarding natural history [9, c. 364].

Discussed above let us make a conclusion that possible erroneous anti-scientological self-determination of philosophy corresponding to modern understanding of science (e.g. when philosophers themselves either unjustifiably narrow the denotation of “science” or do not separate the “carcass” of their “proper philosophical ideas” from value, religious, mystic and other ideas as a result denying the scientific character of their conclusions) as well as the erroneous scientological self-determination of religious-mystic concepts (which rouses natural scientists’ criticism extending to the whole philosophy) interferes with the circumstance which seems to be important that scientology as an approach to philosophy status definition has the logical propriety and socio-cultural value and should be reserved and what is more, the institutionalization of philosophy in modern Russian society and education should be based on it.

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## **SECTION 9. Philology**

### **ISSUES OF STUDYING CROSS-CULTURAL COMMUNICATION**

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In the current age of globalization one may see the active development of the processes of political, economic and cultural integration. Representatives of different countries interact with each other in all areas of life. We can say that a modern man's life really is an experience of cross-cultural communication. Carrying out these contacts requires studying foreign languages.

Language is the most efficient, however not the only one, means of human communication. The successful outcome of the communication, especially cross-cultural, is determined not only by

the fact how well an interlocutor understands the verbal speech, but by the ability to interpret non-verbal elements of communication correctly. These aspects of human behavior in the process of communication, the correlation of nonverbal language codes with natural language have not been studied properly and are of immediate interest at the moment. Gestures, facial expressions, posture, eye contact, clothes, interlocutors' tactile behavior, their use of spatial relations, sensory, etc. - all of them represent certain non-verbal messages that constitute a considerable part of the communication process, since it has been established that we transmit 65-70 % of the information through them. The ability to decode this kind of the interlocutor's elements of behavior helps to achieve better understanding. The elements of verbal and non-verbal communication can complement, duplicate, accentuate, amplify, contradict and replace each other.

There is a direct link between culture and non-verbal behavior. The culture has such a significant impact on non-verbal behavior as on verbal language. "Our culture, along with the biological characteristics, gender and personality traits, is one of the most important factors which affects the interpretation of nonverbal behavior; combined with the social environment and other cognitive and affective factors, it plays a crucial role in the overall perception of the person" [1]. People of all cultures learn to use and perceive non-verbal behavior when communicating with other individuals and they are guided by the system of basic rules universally adopted in their culture. Thanks to this system, the representatives of one culture interact without misunderstanding. Non-verbal code works successfully within the same culture. The culture's influence on non-verbal behavior is particularly noticeable in the process of intercultural communication.

The representatives of different cultures use their own rules to build their non-verbal behavior and apply the same rules for the interpretation of others' non-verbal behavior. Communicating with other cultures people often interpret their behavior in a wrong way. Like semantic barriers, cultural differences in the exchange of non-verbal information may create significant difficulties for understanding. In this article we consider the visual-kinetic system

(gestures, postures, facial expressions, looks) - to be more exact, the gestures. There is a discussion about whether some gestures are determined by genetic or cultural factors. For example, scratching or rubbing hands, yawning and others can be attributed to physiological gestures (gestures-adapters). However, most of the gestures are acquired, and the meaning of many movements and gestures are culturally determined and due to this the cross-cultural differences appear particularly obvious when we examine them. For example, different cultures have different ways to call a waiter. In the USA they raise their index finger saying "A waiter!" or "I'm sorry!". In Europe they lightly tap a glass with a spoon. In the Middle East one claps, and in Japan one should lift a hand, palm down, whereas in Spain and Latin America - it is palm up, clenching and unclenching the fingers. Similar to the difference of verbal languages depending on the culture, the non-verbal language of one nation differs from non-verbal language of another nation.

As a rule, the gestures are classified as follows: illustrators - expressive gestures accompanying speech; conventional gestures (emblems), which are used when greeting or bidding farewell, invitation, ban, insult etc.; modal gestures - gestures of approval, dissatisfaction, suffering, thinking, confusion, depression, frustration, joy, surprise, and the like, expressing the emotional state of a person, his emotions towards the background; religious gestures (e.g., gestures of Christians, Muslims, Jews during the prayer). This classification can be extended with social and professional gestures. Many cultures demonstrate differences in the use of illustrators. Some cultures (Jewish, Italian) encourage the use of expressive gestures while talking. Others (Japanese, Thai) tend to remain restraint in gesticulation. In his works M. Argyle studied the frequency and strength of gestures in different cultures (Finns gesticulating once per hour, Italians - 80, French - 20, Mexicans - 180). Cultural differences in the meaning of expressive gestures and acceptability of their use may form a negative impression in some people, which in the future may evolve into negative stereotypes.

There are many examples of cultural differences in the use of conventional gestures. For instance, because of the seemingly well-known and quite natural gestures such as "OK" (thumb raised up) or

head shaking, or the «V» sign, American travelers often got into difficult situations. We may recall a case, when an American politician was visiting Latin America. He was demonstrating his friendly attitude, stressed that the United States wanted to help that country, but the visit was unsuccessful due to a misunderstood gesture! The politician showed an American gesture "okay" which is extremely offensive and totally unacceptable in Latin America. The same gesture in the form of a circle should not be used in certain parts of Europe, where it is considered rude. In France it means "zero" or "nothing", in Japan - "money", in Tunisia - "I'll kill you", and in Venezuela this gestural form has an explicit offensive sexual connotation. On Malta this gesture metaphorically depicts a passive homosexual. Sign «V» is widely used in the United States meaning "victory" ("Victoria"). It is said that some of the Greek and American soldiers once insulted the British Prime Minister Winston Churchill, perhaps without realizing that fact, when they showed that gesture with their hands, turned to them, and not to the other person, inward. This gesture in England expresses neglect. The «V» sign is usually demonstrated with the palm turned outward. But in Greece, this gesture is considered offensive. It came from the custom of throwing road dirt and garbage into criminals when they were being driven along the streets. [1] A very common gesture in Russian culture called "figa" (fico) is even more controversial. In various cultures it is understood as a comic gesture, a mockery, a protective sign, as a symbol of fertility, an offensive gesture or as a sign of contempt, etc. Even now in Italy, Serbia, England, Scotland they attribute some protective force to fico and the members of Macumba religious movement in South America (in Brazil) wear fico images on a keychain on their neck. These cases are the most obvious examples of cross-cultural homonymy (cases when identical or similar things have different meanings in different cultures).

Here are some more examples of cross-cultural synonymy (cases when the same idea can be encoded differently in different cultures). For example, the diverse ways of expressing a welcome gesture are extremely surprising. In various cultures, it can be expressed with a bow, a nod, raising one's eyebrows, a hand blow, a hug, beating the skull to the blood, etc. In Burma, Mongolia and

Lapland people sniff each other when greeting. In the Amazon people express greeting by mutual patting on the back and on the islands of the Torres they greet each other with their right hands bent in the shape of a hook and rub their hands together. Inuits greet strangers with a punch on the head or shoulder, where as Polynesians hug and rub the the interlocutor's back.

At present moment we can not do without cross-cultural communication at various levels. At the same time it's not enough to just know the language. People need to understand and correctly interpret non-verbal elements of communication. The "silent" language is an important and effective means of intercultural communication. There has been plenty of evidence that demonstrates how cultural differences in nonverbal behavior can affect various situations of everyday life. Recent cross-cultural studies confirm the important role of the non-verbal behavior in life and the ways of practical application of cultural differences data in this area.

For instance, Schneller studied cultural differences in nonverbal behavior of Ethiopian immigrants in Israel and the problems they had due to these while adapting to a new culture; Galloway pointed out the importance of understanding cultural differences in non-verbal behavior in communication between students and teachers, stating that "since non-verbal behavior has clear practical function for educators, it must be viewed from a multicultural perspective" [1], etc. The study of non-verbal language of different peoples equips us with a better understanding of the peculiarities of their national mentality and attitude. This knowledge will provide more opportunities for developing people's cultural competency. Teaching non-verbal language in the situations of cross-cultural communication is an urgent and important task, along with the study of the universal means of communication - verbal language.

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## **THE DEVELOPMENT OF THE NATIONAL DRAMA**

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Nazhim Daukaraev is the author of folk drama “Bozatau”, musical and lyrical play, Who does not know Aishu?, plays “Raushan”, “Worker’s heart”. Why N. Daukaraev changed for several times the play “Alpamys batyr”? In our opinion the reason for that was not to distant the events depicted in the play from national epos, but, on the contrary, to reinforce them and ignite in people patriotic feelings, make them quit dividing into small fierce groups, summon the whole nation to stand up for nation’s honour.

For the first time the play “Alpamys” was staged in Kara-Kalpak theatre named after Stanislavsky in 1942. Then in 1944, 1948, 1958 other edited variants of this play started to lead their life onstage. The Presidium of Supreme Court of Kara-Kalpak ASSR rewarded honor degrees to the actors who played main characters in this play.

It is known that the play “Alpamys” was seen not only by theatre audience. For example, in 1940 this play was published in the

collection works book “Revived Nation” in Russian language. It also was published in Kara-Kalpak language in the author’s collected edition in 1958, 1970.

It is possible that Decade of literature and art of the nations of Central Asia and Kazakhstan, which was organized in Moscow before Great Patriotic War influenced greatly the success of the play because the plays based on national eposes were in great demand at the Decade – such as “Kyz Zhibek”, “Leila and Mazhnun”, “Farkhad and Shyrin”, “Aishorek”.

Now we shall make analysis of the play ‘Alpamys’. As it was said above the writer did not take the events of the poem which were based on some folklore motives or were connected with religious notions of the poem. For example he leaves without attention the mythic line about transformation of Taiburyl with God’s help into a fast horse in one incomplete year’s time. We know from history that the Dzhungar and Kalmyk many times tried to conquer the people of Central Asia and killed many people. The people of Central Asia and Kazakhstan have never forgotten this suffering. Though poem Alpamys’ has several variants with different nationalities (ethnic groups) but all of them have the same theme – fighting against Kalmyk invasion. It seems that the base of this poem was spread among Kazakh people. And the poem “Alpamys” existing in Uzbek and Kara-Kalpak people’s epos is probably a modified variant of Kara- Kalpak poem. Regardless of the origin of the poem it is understood that main idea of it is the struggle against the Kalmyk.

N. Daukaraev changes the plot in his play. In the result of internal and tribal wars Baisary-bai takes an offence for trifling reasons in regard to his relative (father of daughter-in-law) Baibory and leaves his aul (mountain village) consisting of dozen thousand of houses and his land and moves to the aul of Kalmyk khan Taishakhan. The main purpose of his deed – not to let his daughter Gulbarshin marry Alpamys, and settle down with other nation, find the father of his son in law corresponding to the social status of Baisary, to marry off his daughter to the person whom he likes.

All people are against the Baisary’s leaving his native aul on such a trifling grounds and going to nowhere. They talk to each other angrily: We shall not move! But Baisary does not want to listen to



them. In the end everything happens as the bai (the master) wants it to happen – many thousands of people get ready to leave for nowhere, all of them must obey their Master. This drama is a music play. That is why the only daughter of Baisary, Gulbarshin sings a song full of sadness and pain before departure from her native land and people.

The significance of drama “Alpamys” – appeal to people to remain single whole entity. The author depicts Baisary not as a good man who instead of keeping his people united and friendly initiates inter-tribal discord. Having brought his exhausted and tired people to Taishakhan and given him a lot of presents Baisary is begging from him a plot of land where they can settle down.

And Taishakhan is depicted realistically. He is not a representative of ordinary grass-root people, he as a conqueror and thinks only about his own benefit, about how to reach his aim, in other words he is representative of the suppressors of people. He has no pity for Baisary who has come to him gifts and is begging to give him a shelter. On the contrary he wants to marry his only daughter Gulbarshin. This is the true portrait of the khan.

The play-writer deeply reveals Taishakhan’s character depicting his bad deeds. His attitude towards his only daughter Aiym is very bad: he does not want to understand her feelings. Aiym is in love with the batyr Kharaman. She openly confesses about that to her father.

Another batyr of Taishakhan, Kokaman, informed the khan: “Baisary is leaving his land and moving to us. He is going to give you many presents”. He also mentioned that Baisary had a beautiful daughter. The khan was interested and started to make enquiries about her. Then Kokaman said as follows:

Master, snow is falling down on the black earth,  
Look at this snow and you will see her skin.  
The blood will drip onto the now,  
Look at this blood and you will see her face,  
Here is a button made from gold,  
Look at this button and you will see her pretty head.  
There is four-facet sharp edge of uik,  
Look at it and you will see her eye-brows.

If you marry this girl, Master,  
All people will talk about her beauty [1].

We can come across with this extract (words said by Kokaman) not in Kazakh epos of “Alpamys” but in the epos ‘Er Targyn’. We observe this description in epos of Kara-kalpak people “Alpamys Batyr” – it is produced by Kokaman’s mouth. Of course this is distinct exchange of plots defined in the folklore science. It is possible that these words in “Alpamys” poem were taken from the poem “Er Targyn”.

In the poem Taishakhan is an enemy. He is a real beast which robs defenceless rural people and takes cattle from them. To take revenge for people’s honour and get back numerous cattle, Alpamys starts to fight. His army fight Kalmyk batyr Karazhan and defeats him. We observe another solution of this problem in the of N. Daukaraev “Alpamys”. Main conflict here is between Baisary and Baibory, which have quarreled and quarrel turned into big discord which results in Baisary’s moving to foreign land. Here big attention is paid not to the difference between two ethnic groups of people but to their traditions, customs and relationship.

Here Taishakhan is not so cruel. He is an ordinary khan. It is very characteristic of this group of people to live at the expense of ordinary people, suppress them. He has power, army. That is the reason by which his people can not fight him. Whatever orders he makes every of them is appropriate and fair because he is a khan. Baisary left native land and became his subordinate, but what has he found? His only daughter has become the thing to be sold. Idea expressed by the author – there is nothing dearer than native land, it is quite silly to leave motherland because of trifling quarrel and pretend that you defend your tribe’s honour: it is much better to protect native land from outside enemy, having united with other native groups, people must forget inter-tribal discord and become one single nation. Then you will never be defeated. “Love motherland, appreciate the unity, concord, close relationship, raise the banner of motherland higher in the sky!” [2] That is what the author wanted to show. Alpamys is depicted in the play as folklore batyr, who fights for peaceful life.

The same are direction and aim of life which batyr Alpamys strives to achieve. To preserve unity of people. Put an end to intertribal discord. To make such men as Baisary who makes something not taking into account the consequences for his people obey the rules and norms.

If in the poem Alpamys starts to fight for the sake of her beloved Gulbarshin, in the play it is not so. In the Alpamys is fighting for independence and freedom of his people, his motherland. He is depicted as beloved batyr of his native people. If in the poem Kalmyk batyr Karazhan is an enemy for Alpamys and they fight a duel with each other in the play they become friends in the end.

The author depicts Karazhan not as a representative of opposite side, on the contrary, he is shown as positive character. He proves that by his true deeds. For example, though Karazhan is a representative of other nationality and came from ordinary people thanks to his efforts he elevated socially from Taishakhan's slaves to his batyrs. Though he is fulfilling his duties honestly Taishakhan calls him a slave, humiliates him. Karazhan falls in love with Taishakhan's daughter Aiyim and this love is mutual. But Taishakhan does not want to marry off his daughter to him, on the contrary, he calls him a slave.

The author does not want to say that one nation is friendly, the other one – hostile. "The idea that there is no enemy-like nations, within every nation there are beasts and peaceful people – this is focus of the literary work" [3]. The play has serious advantages because of that.

Summarizing, it is obvious that the play-writer N. Daukaraev wrote a valuable piece of art of high level based on the epos "Alpamys" with distinct ideological and thematic task. "Though the base of the play is epos, the author gives dramatic description of characters not departing far from the original"[4]. He uses epos' people language in big amounts and very effectively. The play "Alpamys" is a great success of Kara-Kalpak play-writing, the play is a benchmark literary work both of Nazhim Daukaraev and Kara-Kalpak literature.

We know that "folklore is of great significance in forming, development of world drama" [5]. It is not only richest inexhaustible

material but the source of the brand new in the drama genre. It is well-known that “use of folklore traditions will bring great success and fame to any classical play-writers” [6].

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## **SECTION 10. Jurisprudence**

### **THE CONTENTS OF THE RIGHT TO COURT IN THE CONTEXT OF EUROPEAN CONVENTION ON HUMAN RIGHTS (Article XI and Article XIII)**

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The modern era is based on the realization of the higher values as freedom and equality of citizens of the planet, the right to life and dignity of everyone. They are based on the recognition of the value of law. The law and court are of particular importance when their best incarnation begins to acquire an international character. It happens especially when the national government and the legal system admit voluntary action of this law.

The second half of the XX century is characterized by the emergence and establishment of international legal institutions and organizations designed to embody the rights guarantees into real life. The results of the development of a single legal space in Europe have been the establishment of a number of international institutions which, in particular, are referred by the Council of Europe founded in 1949 and bringing together almost all the countries of the continent.

In the framework of this organization the European Convention on Human Rights and Fundamental Freedoms [1] (hereinafter - the Convention) was signed. Having ratified in March 1998, Russia joined the Convention to the European human rights protection mechanism including the obligation to obey the rights stated in the document. The Convention opens inalienable rights and freedoms for everyone and requires States to guarantee those rights to every person who is under their jurisdiction. Moreover, the Russian Federation recognized the jurisdiction of the European Court of Human Rights (hereinafter - the European Court of Justice).

For example, Article VI of the Convention guarantees the right to a fair trial. In paragraph 1 of this Article establishes the right of

every person to a fair and public hearing of his case concerning civil rights and obligations, in the court of a Contracting State.

This Article with an additional protocol coincides with the Article VIII and X of the Universal Declaration of Human Rights and Freedoms [2] and the Article XIV of the International Covenant on Civil and Political Rights in its meaning and content. [3] These articles have a special place in the system of the norms on human rights and freedoms, because they are guaranteed the most reliable and effective mechanism for protecting the rights and freedoms granted - judicial protection mechanism [4, pp. 5].

The right to a trial in the sense of the Article VI of the Convention includes three elements:

- 1) an independent and impartial court should be established by law;
- 2) the court shall be competent to hear the dispute on Civil Rights;
- 3) everyone should have the access to justice.

The right of the access to court as a part of the right to trial means that the person concerned must be able to consider his case and it should not discourage excessive constraints expressed in legal and in another form.

The comments [5, P.95] to the Article VI of the Convention provide that in order to apply the Article VI, there are the following conditions:

- It is necessary to pass all the instances that have challenged the rights or duties, in accordance with the domestic law;
- In the outcome of the dispute must define these rights or obligations;
- Disputed rights or obligations should be civilian.

The first paragraph of the Article VI of the Convention is applicable to both civil and criminal proceedings. In connection with it we can distinguish two categories of cases: 1) "civil rights and obligations"; 2) "criminal charge".

The Convention provides a mechanism for the protection of the rights declared by the Court, considering individual complaints of violations of the Convention.

Revealing the meaning of the term "civil rights and obligations" under the convention is possible by exploring the practice of the European Court.

Thus, S. F. Afanasiev concludes in his monograph [6, p.56] that the practice of the European Court identified three criteria by which you can define "civil rights nature" under the Convention.

- 1) considering the definition of the private affairs of the order, the European Court of Human Rights is based on the "content material consequences arising from the provisions of domestic law," and not on the established classification of domestic law;
- 2) any rights under the Convention are "private" and interpreted as "civil";
- 3) in the case when rights are considered "public" in appliance with the domestic legislation the determining role of "private" and "public" is taken into account, and where there is predominance of "private" such rights are recognized as civil.

As a result, we can say that the concept of "civil rights" in appliance with the Convention is interpreted broadly. To some extent, the same applies to a broad interpretation of the term "criminal charge" in this definition include criminal law, criminal procedure and administrative penalties.

A fundamental element of the organization and conduction of the trial in compliance with the Convention is the right to access to justice and an effective remedy. In turn, ensuring the right to judicial protection and access to justice generate the obligations for States: 1) does not prevent the court to circulation; 2) access to a court to be practical and effective.

In the Art. XIII of the Convention states that everyone has the right to an effective remedy. The main focus of this article is on the domestic protection, i. e. States Parties shall ensure the proper functioning of state institutions whose remit includes the protection of human rights and fundamental freedoms.

The Article serves as a mechanism for the formation of legal protection in the State to ensure the harmonization of the different levels of legal protection offered by the states by demanding to meet certain international standards.

The Article XIII guarantees an effective remedy before a competent state authority to anyone who reasonably claims to be a

victim of a violation of the rights and freedoms protected by the Convention. If the complaint is unfounded in the true sense of the word or the right cannot be guaranteed by the Convention, the court may omit the question of the art. XIII at this stage and on these grounds. But even after the application was declared admissible, the conclusion, that none of the rights had not been violated does not exempt the court from the duty to raise the question of a possible violation of the Art. XIII. Actually, even if it is found no violation of rights and freedoms ultimately, the Contracting States are obliged to ensure the effective proceedings to identify the alleged violation.

The question of combining the Art. XIII with other procedural articles of the Convention on the Court's opinion has an unequivocal answer: in the case of a violation of a right consideration of the Art. XIII excluded. This attitude to the right to an effective remedy court explains that currently there is a broader understanding of the Article XIII, which is a key requirement of "due process" rights in the Convention.

The art. XIII refers to an effective remedy by referring to the "public authority", which may not be a "tribunal" within the meaning of paragraph 1 of the Art. VI. Moreover, an effective remedy has to deal with the violation of the rights guaranteed by the Convention, while the mentioned rules cover requirements relating to the first case to the existence or content of the "civil rights and obligations" or the definition of a criminal charge, and the second - to the legality of arrest or detention. It is important that these articles are not in the same area. The concept of "civil rights and obligations" are not a continuation of what is called "the rights and freedoms set forth in this Convention" (Article 13), even if there is some overlap.

The right to an effective remedy is important for media rights, fundamental freedoms and for the court. It is necessary to raise the standards of domestic remedies, because national institutions are more qualified than the treaty bodies, in order to offer an effective, affordable, fast and professional procedure that in cases of violation of the Convention rights must end with the actual recovery or compensation.

The decision of European Court of particular importance for the interpretation of the Articles VI and XIII of the Convention.



As D. Gomjen pointed out in his study [7, C.4] the supervisory bodies of Convention are bound by their decisions. In turn, I.A.Klepitsky pointed out that "the importance of the interpretation of the Convention by the European Court of Human Rights is due to the fact that the ability of any other is limited " [8, p.59]

T. N.Neshataeva [9, p.3-8] states that the European Court practice on approaching to the legal understanding of the specific rules of the Convention is very extensive, it is more than fifty years old. Furthermore, the European Court sticking the concept of "evolving precedent" gradually renews the established approaches influenced by the changing social environment. Thus, the precedents of the European Court in relation to specific articles of the Convention are a complex phenomenon, multi aspect and changing. These characteristics of authoritative interpretations complicate the task of studying the European Court. However, the solution is currently possible as there is a free access to the European Court [10]; there are serious works of foreign authors studying precedent decisions [11]. In connection with it we can talk about the important role played by the European Court.

By all the above we can say that the Convention, as a "constitutional instrument of European public order" [12, P.57] requires clarification of its content with the position of the evolutionary principle. In other words, the Convention "must be interpreted in the light of notions that prevail in democratic countries today ". [12, P.69] In this case the only limitation in understanding the meaning of the articles of this document is a result of the inability to create a new interpretation of the law not specified in the text of the Convention.

Thus, the "right to a court" within the meaning of the Convention has no specific detailed content. In general, it is understood under the definition of the mechanism (possible) public authorities to protect and restore in case of violation of the rights and freedoms of man and citizen. The protection of the right "is a means of ensuring the implementation of law, but only to the extent actually required for its implementation and in the manner prescribed by law" [13, P.63]. The mechanism of protection of the rights and freedoms can be defined as "jurisdictional activities of a state and public

bodies, and in the cases specified in the law and the people entitled to coercive measures and methods to facilitate the implementation of a real recovery and violated or disputed rights and interests protected by law" [13, С .69]. Naturally, the mechanism of protection of the right would not be complete if the government did not ensure its implementation totally. During the implementation of State responsibility to protect human rights and freedoms, the view of the authority involved in the process at some point or another may vary, some authorities may change depending on the other stage of the process and the specific of powers.

The right of access to justice is an implicit right and from the general meaning of the provisions of the Article VI and XIII of the Convention, i. e. the access to justice is a condition of the proper implementation of the right to trial. The access to justice as a prerequisite of its implementation, the part of the content of the rights supposed not to make the right to trial be of a declarative nature.

For the formation of a unified approach to the essence of the rights an analysis of decisions handed down by the European Courts required.

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## **SECTION 11. Educational Sciences**

### **THE SEARCH OF YOUR IDEAL LESSON (from the practical experience in designing math lessons in a secondary school, on the basis of the systematic-activity approach)**

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The main motive with which children come to a lesson is in most cases communication: communicating with their friends, teachers, "interaction" with science. They get the greatest joy and satisfaction performing tasks that allow them to express themselves, their abilities and talents. Their interest arises when they are being taught something significant, important for their life in general, and not just for a school mark. Teachers sometimes explain the failure of their students as a result of their laziness, unwillingness to learn, insufficient mental development. These factors do exist, but could it be changed if all of us were able to work at a high professional level? This concept, I believe, includes not only the knowledge of techniques and methods of training, their efficient use, but also the constant search of a lessons super-goal, the pursuit of which would add the significance, sublimity, festive atmosphere to the lesson.

This is a didactic problem which obsesses me - the problem of the lesson structure. You must not build lessons of the same design, it's just a shame to start a lesson in the same way all the time. But you would think that a teacher has a whole library of ready lesson structures and it is enough to stick to one of them. The reality is somewhat different: every time the teacher has to invent everything himself. For me, the search and selection of a lesson structure are connected with teaching skills of observation, analysis, synthesis, specification, hypothesizing, drawing conclusions, asking questions, arguing, defending his point of view, operating not only small portions of educational material, but also knowledge obtained by studying the whole topic.

In the 8th grade students learn the Pythagorean theorem. This theorem is considered the most important in the geometry course and deserves careful examination. It is the basis of solving multiple tasks and the base of studying the theoretical course in the future, as well as it contains a considerable amount of historical material that enables the development of pupils' cognitive interest, culture and creativity by means of mathematics and its history.

In modern teachers' syllabi based on the textbook by L.S. Atanasyan et al. the theorem is studied within the time limit of 6 hours, including a test [2]. In this time students should study the Pythagorean theorem and its inverse theorem, so that they can prove these theorems and apply them when solving problems. It is clear that these skills will be improved in the future while solving various geometry problems, but the first perception, the initial ability to apply the theorem, to my mind, is a very important issue in the learning process.

So, this is a traditional topic, but how can we make it special? One can use the historical material. The historical reference, of course, will add to the expressiveness of the lesson. Certainly, this material should be prepared in advance by children who got this task from their teacher a week prior to that. The teacher selects the most interesting facts and suggests presenting them in the classroom. The material can be as follows: "It is not known how Pythagoras proved his theorem. Undoubtedly, the only thing we know is that he discovered it under the strong influence of Egyptian science. A special case of the Pythagorean Theorem - the properties of a triangle with sides 3, 4 and 5 - had been known to the builders of the pyramids long before the Pythagoras's birth, at the same time he spent more than 20 years learning from the Egyptian priests. There is a legend which says that having proved his famous theorem, he sacrificed a bull or according to other sources, even 100 bulls. [4]

However, this contradicts the information about the moral and religious views of Pythagoras. In the texts we may read that he *"forbade even to kill animals, say nothing of eating them since animals have a soul like ours."* Pythagoras ate only honey, bread, vegetables and sometimes fish. In this regard, the following fact can be considered more plausible: *"... and even when he discovered that*

*the hypotenuse of a right triangle complies with its legs, he sacrificed a bull made of dough". [4]*

The research "This well-known Pythagoras" is particularly relevant in 2014 - the year of the Sochi-2014 Olympic Games. Students are encouraged to find different facts from Pythagoras biography (580-500 BC). They will find many interesting things, but one fact is of the greatest importance: Pythagoras was an Olympic champion. The judges of one of the Olympics would not allow this strong young man with a stubborn neck and a short nose, this brawler to participate in the fist fight - they said he was not tall enough. However, Pythagoras broke through and defeated all his opponents. It was about 2548 years ago. [5]

It seems to be very good, in my opinion, when literary material fits in the geometry lesson. Here I give my own examples of the various types of material which may be presented to students:

- a humorous statement of the theorem:  
"If we are given a triangle, this of a right angle kind,  
Then the hypotenuse square we will easily find:  
Legs squared, the sum of powers obtained,  
We reached the result without any strain"[3].
- in the book by A. Okunev "Childern, thanks for the lesson!" there is a fairy tale "A house", in which the heroes - a girl named Hypotenuse, a male Right Angle and his sons Legs are redecorating the house. They play "hide and seek" and discover the pattern, which is then called the Pythagorean theorem [5].
- You can give different translations of the theorem from Greek, Latin, German, old Russian; in the first Russian translation of Euclidean "Principia" Pythagorean theorem is stated as follows: "in a right triangle the square of the side opposite the right angle equals the sum of the squares of the sides containing the right angle" [3].

Modern teaching methods are based on research. Studying the Pythagorean Theorem is a very suitable material for students to make their "own" discoveries when with a teacher's hint they find an application of the theorem. For example, students are given a short piece of rope divided into 12 parts with the knots. Students

build the Egyptian triangle with the help of this device, i.e. a triangle with sides 3, 4, 5, which is sure to have a right angle. This fact is often used in construction, and students explain how.

Another research involves finding triples of integers that define the length of the sides of the legs and the hypotenuse. Not all right triangles with the ratio of the legs being integers have the hypotenuse also expressed as an integer: it is impossible to find such a measure, which would correlate evenly with both the leg and the hypotenuse. This denotes the great discovery of the Pythagorean mathematicians who posed the problem of finding "whole-numbered" right-angled triangles, that is, such triples that  $a^2 + b^2 = c^2$ . They can be found from the formulas:  $b = \frac{a^2 - 1}{2}$ ;  $c = \frac{a^2 + 1}{2}$ .

These are the Pythagorean triples:

a	3	5	6	7	9	11	13	15	17	19
b	4	12	8	24	40	60	84	112	144	180
c	5	13	10	25	41	61	85	113	145	181

However, the most interesting part is different ways of proving the theorem. The textbook by L.S. Atanasyan et al. *Geometry* gives two ways of accomplishing this: via finding the area of a square constructed on the hypotenuse and the areas of the triangles that make up the area of the square; and through the use of proportional segments and relations between the sides and the angles of a right triangle (after studying the concepts of sine, cosine and tangent of an acute angle in a right triangle). [1]

Students must find other methods of proving the theorem and present them for the class discussion with the question "Which proof is more interesting?". There are more than 100 ways, but students can obtain just 6-8 of them using various sources, including the Internet:

- geometric construction of the areas of squared triangles; in ancient India there was a way to prove the theorem without a word which was called "Look";

- through the similarity of triangles and the ratio of the areas of triangles as the squares of the congruent sides;
- Garfield's proof through the use of additional constructions and the area of a trapezoid ;
- famous "Pythagoras's pants" - a proof suggested by Euclid, presented in the famous "Elements" and is considered the most difficult;
- algebraic method (proposed by Indian mathematician Bhaskara);
- Melmann's proof (using the radius of the inscribed circle).

Possessing such a rich material teachers can design different types of lessons. A lesson of presenting a new material can be built using the material considered above, applying it onto all stages of the lesson: a pre-study, covering new material and summing-up. Following it, the lessons of revision can be designed in the form of didactic games, club meetings, conferences, workshops, etc. [3].

Educators have collected truly enormous material on how to structure educational material effectively. However, there is a problem that their great ideas often are not reflected in the methodology of teaching the main topics of the school course. Each teacher is different and may use the same methods, techniques, but apply them so that they "light up" the lesson quite unexpectedly. It is great, when a student is in a constant internal dialogue with the teacher in the classroom, there are arguments in his head and he agrees only when he has clearly understood the teacher's every idea.

There are no miracles in education. All we've got is a huge and very difficult, sometimes unbearably difficult, but incredibly rewarding work.

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## **INDEPENDENT WORK OF STUDENTS AS A FACTOR OF THE QUALITY OF TRAINING**

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In recent years, the role of the competent approaches to the training specialist who is fluent in their profession, able to effectively work at international standards and ready for continuous professional growth is becoming more important.

The solution of these problems is impossible without increasing the role of independent work of students on educational material, increasing the responsibility of teachers for the development of skills of independent work and raising their creativity and initiative.

This issue is of special attention in psychology, pedagogy, teaching methods literature showing that the classroom and extracurricular organization of independent work in the learning process, the formation of skills of educational work is the basis for further training. Thus, students should be trained to subsequent self-education, and the means of achieving this goal is an independent work.

Independent work of students (CDS) - is the various types of individual and collective activity of students led by the teacher, but without the direct involvement of the teacher in especially reserved for this classroom or extracurricular time. [2]

Independent work helps students to acquire knowledge ( reading the text , the work with reference books , use computers and the Internet) ; consolidate and organize knowledge (work with lecture notes, prepare answers to test questions , preparation of

reports , presentations) ; forming ability (decision situational problems , perform calculations) . Organization run by students for a variety of objectives and content of individual works contribute to the development of their cognitive and creative abilities, the development of thinking.

The crucial role in the organization of the CDS belongs to the teacher. He needs to take into account the individual characteristics of each student, systematically improve their skills to be an example for the student as a professional. Work of the teacher should be aimed at creating conditions for a conscious choice student " educational path "; to clarify the goals set by the student ; to help in the planning of its activities ; advice on the use of specific training tools , techniques and methods . To increase student's interest in obtaining additional knowledge on their own the teacher should:

- use (e. g, game trainings), stimulating interest in knowledge as explanation of cognitive activity;
- create a situation in the classroom (e. g, business forms of employment, including the use of computers) requiring wider knowledge than those that already exist;
- facilitate the participation of students in creative activities: research activities, competitions, conferences in various academic disciplines;
- use motivators knowledge control (cumulative assessment, rating);
- encourage students for academic excellence and creative activity (bonuses, incentive points) and to impose sanctions for poor study.

Among the main CDS those are traditionally distinguished: preparing for lectures, seminars, tests and exams, presentations and reports; Writing essays, laboratory work and examinations; decision cases and case studies; conducting business games; participate in scientific work.

Independent work can be carried out individually or in groups of students depending on the purpose, scope, complexity and job category. [3]

Teamwork enhances motivator and mutual intellectual activity, increases the efficiency of cognitive activity of students

through a mutual control. Participation of a partner essentially rebuilds psychology of a student [1].

The important aspects of the organization of the CDS are a scientific and educational-methodical and methodological support, which should consist of:

- working training program (RUP) disciplines;
- textbooks and corresponding RUP;
- course or lecture notes;
- plan semester classes provided RUE;
- methodical instructions to implement practical and laboratory work;
- methodical instructions to implement the course (diploma) work;
- home semester jobs - Topics abstracts provided RUE for full-time students;
- list of tasks and guidelines for the implementation of the educational plan of control works for part-time students;
- the set of examination papers and questions for examinations;
- test items to assess residual knowledge in the discipline;
- guidelines for conducting of educational, industrial and other practices;
- the set of application software.

Methodological support for students is primarily a source of subject knowledge and skills. In addition, the task of teaching aids is to develop the intellectual, emotional, motivational future professional spheres.

An independent work carried out systematically in its proper organization helps students to obtain a deeper and strong knowledge compared with those who are reported ready knowledge from the teacher and accelerates the formation of skills, practical, and this in turn has a positive effect on the formation of competences.

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## **SECTION 12. Ecology**

### **ASSESSMENT OF URBAN ENVIRONMENT FROM THE POSITION CONCEPT OF A BIOSPHERE COMPATIBILITY**

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The modern environmental legislation in Russia cannot decide ecological problems of city planning. For effective management of city planning we need a new ways of assessment of the environment. One of this ways is the concept of biosphere compatibility [1, 55].

The concept of biosphere compatibility is means the balance of biosphere and technosphere, for evaluation of this balance we can use as indicators of environmental pollution traditional values of industrial emissions compared to maximum permissible concentration, green areas, the intensity of a cleaner environment by recreational areas and other indicators of the anthropogenic impact on the biosphere [1, 57].

According to this concept to the balance of bio-and technosphere as indicators of environmental pollution may be use traditional values of industrial emissions compared to MAC ,

landscaping area, the intensity of a cleaner environment by various recreational areas and other indicators to assess the anthropogenic impact on the biosphere. By calculating the pollution from each of the sources we can determine the integral indicator of biospheric Compatibility [2, 26].

In this approach, the numerical value of the biospheric compatibility is defined as follows:

$$\eta = \sum_n \sum_i (\mathcal{D}_{in} \cdot \xi_{in}^* \cdot \Theta_{in} - A_{in} \cdot \gamma_{in} \cdot m_{in})$$

where the right side is a relative index of pure (devoid of contaminants) environment; left - a relative indicator of pollution from the technosphere with maximum concentrations that allow the development,  $\mathcal{D}_{in}$  - The ratio of the required area of the biosphere to the area calculated territory necessary to neutralize the pollution from the technosphere is based on the i-th job in the n-th function of the city;  $\xi_{in}^*$  - Uniformity coefficient of the biosphere, taking into account the different intensities of pollutants;  $\Theta_{in}$  - the required number of jobs, pollution from which calculated on the territory can be absorbed by the biosphere, in relation to the number of jobs in the zone of influence of the i-th source in the implementation of the function n-city;  $A_{in}$  - A value of pollution from the i-th source in the implementation of the function n-city distance for the territory of distribution of pollution;  $\gamma_{in}$  - The coefficient of reduction of

pollution parameters to the same source;  $m_{in}$  - The relative number of jobs, pollution from which must be absorbed by the biosphere territory calculated in relation to the total number of workers met in the zone of influence of the i-th source in the implementation of the n-th function of the city [2, 27].

Calculating the ratio area of the biosphere to the territory area district of the city or settlement required to neutralize contaminants from the ( $\mathcal{D}_{in}$ ) by the formula:

$$\mathcal{D}_{in} = \{(V_{in} / \Theta_{in}) / k_{in}\} / S_{o\delta u}$$

where  $V_{in}$  - volume of contaminants from the i-th source for implementing the n-th function of city kg/year;  $k_{in}$  - the number one

pollutant disposition  $m^2$  biosphere, kg/year;  $S_{обш}$  - required area of calculated territory per one workplace ( $m^2$ ) [2, 27].

The value of parameter pollution from the  $i$ -th source in the implementation of the  $n$ -th function of the city ( $A_{in}$ ) is calculated by the formula:

$$A_{in} = (S_{нол} / \Theta_{in}) / S_{обш}$$

where  $S_{нол}$  - the area of contamination from the  $i$ -th pollutant in the implementation of the  $n$ -th function of the city,  $m^2$ .

Based on the principle described the conception criterion expanded reproduction of the main productive forces can be written as:

$$\eta > 0; \quad (4)$$

$$\eta \leq 0 \quad (5)$$

With a positive balance of bio-and technosphere (see formula 4) provided the main productive force growth and natural population growth, otherwise (see formula 5) holds regressive development of territory [2, 27].

As an example, we have analyzed the land territory Oryol city as a typical regional center of Central Federal District of Russia.

In Orel in 2013, the total emissions in atmosphere amounted to 117,000 tons, of which the share of stationary source emissions had 8.2% , the share of mobile sources ( transport) - 91.8% (including road transport - 85 %). About 67 % of the points near highways and busy roads did not meet hygienic standards , the excess was , on average, 24% MPC (dust and CO) . The electric power of Oryol city accounted for 8 % of total gross emissions of stationary sources. The share of machinery industry accounts for 9.2% of total emissions from stationary sources. Metallurgy - 9% of the total emissions of stationary sources; production of building materials - 20%; enterprises of housing and communal services - 15%; companies in other industries - 38 %.

When calculating the relative rate of biospheric compatibility of Oryol in the first approximation as the main source of pollution considered air pollution from mobile sources . According to the environmental services of the city emissions vehicles accounting for 85% of total emissions. Average car emits 200 kg per year of CO, 60

kg NO, 2 kg of SO<sub>2</sub>, etc. [3, 58]. The analysis was conducted on the most easily controlled and takes the largest share in the total vehicle emissions and other sources of pollutants – CO.

In Oryol far recorded 55,262 passenger cars, which emit 11,052,599 kg/year of CO, respectively, for each of the 160,000 residents in the zone of influence of this source of pollution (50% of the total population) accounted for 69 kg/year of CO. Since 1 ha plantation consumes CO 80300 kg/year, it accumulates 1 m<sup>2</sup> 8.03 kg/year. To neutralize this amount of pollutant by the formula (2) we find that the relative importance of the required area of the biosphere in ratio to the calculated area that necessary to neutralize the pollution from the technosphere:

$$D_{i=1} = \{(V_{i=1} / \Theta_{i=1}) / k_{i=1}\} / S_{o\delta u} = \{(11052599 / 1600) / 8,03\} / 9 = 0,9$$

Uniformity coefficient of the biosphere, to account for the varying intensity of the absorption of pollutants in one form of pollution sources  $\xi_{in} = 1$ . The required number of jobs, pollution from which must be absorbed by the biosphere calculated territory  $\Theta_{in} = 160000 = 100\% = 1$ .

According to the general plan of the city expects to territory occupied by the transport area was 654,000 m<sup>2</sup>. By formula (3), we find the relative value calculated from pollution source (i = 1) for implementation of the first functions of the city (n = 1), calculated on the basis of the spread of contamination to the level of that allow the development:

$$A_{i=1} = (S_{no\lambda} / \Theta_{i=1}) / S_{o\delta u} = (654000 / 160000) / 9 = 0,45$$

The relative value of the index biosphere compatibility according to formula (1) is:

$$\eta = \sum_{n=1} \sum_{i=1} (D \cdot \xi \cdot \Theta) - (A \cdot \gamma \cdot m) = (0,9 \cdot 1 \cdot 1) - (0,45 \cdot 1 \cdot 1) = 0,45.$$

From the obtained values of the biosphere compatibility ( $\eta > 0$ ) we can conclude that the current state of the biosphere compatibility of Oryol indicator is calculated by (i = 1) admits the existence of the main productive force - clean part of the biosphere. Nevertheless, the

numerical value of this parameter ( $\eta = 0,45$ ) indicates the presence of degradation processes due to anthropogenic impacts that the biosphere can not fully accumulate and regenerate the city ecosystem.

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