SCIENTIFIC RESEARCH OF THE SCO COUNTRIES: SYNERGY AND INTEGRATION

上合组织国家的科学研究：协同和一体化

Materials of the International Conference

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国际会议

参与者的英文报告

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这些会议文集结合了会议的材料 – 研究论文和科学工作者的论文报告。 它考察了职业化人格的技术和社会学问题。一些文章涉及人格职业化研究问题的理论和方法论方法和原则。
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These Conference Proceedings combine materials of the conference – research papers and thesis reports of scientific workers. They examines tecnical and sociological issues of research issues. Some articles deal with theoretical and methodological approaches and principles of research questions of personality professionalization.

Authors are responsible for the accuracy of cited publications, facts, figures, quotations, statistics, proper names and other information.

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Foreword

We thank all participants of our conference "Scientific research of the SCO countries: synergy and integration" for the interest shown, for your speeches and reports. Such a wide range of participants, representing all the countries that are members of the Shanghai Cooperation Organization, speaks about the necessity and importance of this event. The reports of the participants cover a wide range of topical scientific problems and our joint interaction will contribute to the further development of both theoretical and applied modern scientific research by scientists from different countries. The result of the conference was the participation of 56 authors from 6 countries (China, Russia, Finland, Uzbekistan, Kazakhstan, Kyrgyzstan).

This conference was a result of the serious interest of the world academic community, the state authorities of China and the Chinese Communist Party to preserve and strengthen international cooperation in the field of science. We also thank our Russian partner Infinity Publishing House for assistance in organizing the conference, preparing and publishing the conference proceedings in Chinese Part and English Part.

I hope that the collection of this conference will be useful to a wide range of readers. It will help to consider issues, that would interest the public, under a new point of view. It will also allow to find contacts among scientists of common interests.

Fan Fukuan,
Chairman of the organizing committee of the conference
"Scientific research of the SCO countries: synergy and integration"
Full Professor, Doctor of Economic Sciences

前言

我们感谢所有参加本次会议的“上海合作组织国家的科学研究：协同作用和整合”，感谢您的演讲和报告。代表所有上海合作组织成员国的广泛参与者都谈到此次活动的必要性和重要性。参与者的报告涵盖了广泛的主题性科学问题，我们的联合互动将有助于不同国家的科学家进一步发展理论和应用的现代科学研究。会议结果是来自7个国家（中国，俄罗斯，乌兹别克斯坦，哈萨克斯坦，阿塞拜疆，塔吉克斯坦，吉尔吉斯斯坦）的83位作者的参与。

这次会议的召开，是学术界，中国国家权力机关和中国共产党对维护和加强科学领域国际合作的高度重视的结果。我们还要感谢我们的俄罗斯合作伙伴无限出版社协助组织会议，准备和发布中英文会议文集。

我希望会议的收集对广大读者有用，将有助于在新的观点下为读者提供有趣的问题，并且还将允许在共同利益的科学家中寻找联系。

范福宽，
教授，经济科学博士，中国科学院院士，会议组委会主席“上合组织国家科学研究：协同与融合”

石油生产国货币监管模型研究
STUDY OF MODELS OF MONETARY REGULATION IN OIL-PRODUCING COUNTRIES

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抽象。 本文介绍了石油生产国货币监管研究的结果。 公布了汇率形成，再融资工具的使用，反通胀政策的特征。 显示了这些国家货币政策组织基础的一些特征。 强调了国家货币政策有效性的标准。

关键词：中央银行，货币政策，通货膨胀，再融资，汇率。

Abstract. *This article presents the results of a study of monetary regulation in oil-producing countries. The features of exchange rate formation, the use of refinancing tools, anti-inflationary policies are disclosed. Some features of the organizational foundations of the monetary policy of these countries are shown. The criteria for the effectiveness of national monetary policy are highlighted.*

Keywords: *central bank, monetary policy, inflation, refinancing, exchange rate.*

Monetary policy of the state is an integral part of the overall economic mechanism of regulation of the economy. Being largely universal, it nevertheless experiences the influence of various macroeconomic factors of the national economy. One of such significant factors is the country's dependence on natural resources.

The main method of research is the formulation and verification of hypotheses of the study.

In the framework of this work, these include the following:

1. The degree of development of national bank refinancing instruments from access to external capital markets: the more developed the second instrument, the less diverse the refinancing instruments are and the less influence they have on the country's credit sector.

2. There is a strong influence of the level of the country's external debt (both corporate and state) on the stability of monetary policy instruments (hereinafter - the MP), including refinancing, the dynamics of the money supply and, as a consequence, inflation caused by monetary factors.

3. The dynamics of oil prices and the shares of oil and oil products in the structure of national exports is assumed to influence the stability of monetary regulation instruments and the effectiveness of the national MP as a whole

4. Dominant internal and external factors determine the type of exchange rate of the national currency in the country.

5. It is assumed that price expectations influence the dynamics of inflation in the country.

In the course of the study, an analysis of monetary regulation in countries such as Indonesia [2], Iran [3], Iraq [4], Kazakhstan [5], Canada [6], Qatar [7], Kuwait [8], Libya, Mexico [9], Nigeria, Norway, United Arab Emirates [10], Russia, Saudi Arabia, was conducted. The observation period includes 2002-2018.

Monetary regulation in these countries is actually implemented as part of the ongoing monetary policy. Thus, a continuous integration of banking and monetary regulation is ensured. In a number of these countries, this is used as one of the criteria for the effectiveness of monetary regulation (in particular, in Libya). Most often, the state institution that implements monetary policy is the national Central Bank, within which a committee can be set up to develop and implement a monetary policy. It should also be noted that in a number of countries monetary policy is considered as an integral part of banking policy (Libya, the United Arab Emirates, Mexico) [9, 10]. In certain countries, these bodies are responsible for the development of monetary and banking policies, as well as in the direct and indirect impact of monetary instruments on the country's economy as a whole. The directions and depth of interaction of monetary authorities with other state bodies are determined historically and legally and depend on the current level of independence of the national central bank.

As a result of statistical and empirical analysis of data on the current monetary policy in oil-producing countries, it was possible to obtain the following conclusions on the above hypotheses:

1. This dependence is observed for countries with respect to which various forms of foreign economic restrictions have been adopted (including sanctions); otherwise, the development of refinancing instruments is more influenced by the chosen targeting mode (MP refinancing instruments are most developed in the inflation targeting mode) and the type of financial system (bank-oriented, market-oriented, or Islamic banking).

2. This influence has been generally proven, but the influence of the factor of the country's geographical location on the manifestation of this pattern is noted. So, for the oil-producing countries of Africa, this dependence is traced to a lesser extent, but for the countries of Europe and Asia, on the contrary, it is significant. It should be noted that the effect on refinancing instruments is more pronounced than on the manifestation of the monetary inflation factor. Of the countries examined, this effect is manifested to a greater extent for the UAE, where in 2018 it was allowed to carry out external sovereign loans in national currency [10].

3. The influence of the dynamics of oil prices and the shares of oil and oil products in the structure of national exports on the stability of monetary regulation instruments and the effectiveness of the national MP as a whole is noted if the share of these products in exports is 50% or more: in other situations, this influence will be insignificant.

4. The chosen type of exchange rate formation is influenced to a greater extent not by macroeconomic factors, but by the adopted type of targeting: for example, when adopting the regime of the now popular "inflation targeting" in an oil-producing country, a free exchange rate regime of the national currency is established. In the case of the choice of other targeting modes (currency or monetary), the exchange rate regime is fixed or partially fixed. Moreover, when choosing the first targeting mode, the presence of the influence of the dynamics of external (imported) and internal factors on the dynamics of the exchange rate is noted. It should also be noted that within the framework of this hypothesis, the influence of the factor of the geographical location of the country on the manifestation of this pattern is also observed: so, for Norway and Russia, this hypothesis is quite fair.

5. The implementation of this hypothesis depends on the level of transparency of MP and the chosen level of targeting. Most of all, this trend is manifested for countries with effective MP, i.e., a high level of transparency and an inflationary targeting model.

So, the features of the monetary sphere of the studied group of countries include the following:

- a high level of interdependence between fiscal and monetary elements of financial policy — in particular, such an effect is observed to a greater extent in countries where there is a strong influence of the country's external debt on the stability of monetary policy instruments;
- presence of imported inflation factor;
- heterogeneity of development of financial and credit institutions from the position of financial services performed by them or territorial location;
- consideration of monetary regulation as a part of banking policy.

In the latter case, MP, in addition to traditional instruments, will include licensing requirements for financial institutions, types of regulated financial intermediaries, capital adequacy requirements and liquidity standards of financial and credit organizations, measures to combat money laundering, and financing of terrorism. This situation is typical for such countries as the UAE, Iran, Iraq, Libya, Kuwait, Indonesia, Saudi Arabia, Qatar. In our opinion, in fact, instruments of macroprudential regulation are included in monetary policy, which are not completely synonymous concepts. At present, it is customary to understand it as a set of measures aimed at increasing the level of economic security of the financial market, most often represented within the framework of financial regulation carried out by national institutions.

These features must be taken into account when developing an effective national model of monetary regulation. It should also be noted that in order to build this system, it is necessary to clearly define the role of various participants, for example, financial and credit organizations (including commercial banks), the central bank, and other monetary market regulators [1].

To assess the effectiveness of the monetary policy in these countries, the following criteria should be considered:

- interdependence and consistency of monetary policy instruments with other instruments of state regulation of the economy;
- price stability;
- monetary stability;
- availability of financing for various national economic institutions;
- the impact of direct and indirect instruments of monetary regulation on macroeconomic stability in general;
- transparency of monetary policy measures and its impact on price expectations of economic agents and institutions;
- achievement of MP goals (including inflation rate).

In turn, these criteria determine the level of risks inherent in the monetary sphere.

It should be noted that the complexity of anti-inflationary regulation in these countries is also due to the influence of the sovereign funds formed from additional oil revenues, since these funds affect the liquidity level.

Conclusions:

As a result of the study, the following conclusions were obtained:

- the monetary sphere of oil-exporting countries is characterized by a number of features due to the high dependence of the country's economy on the dynamics of the cost of raw materials in foreign markets;
- anti-inflation regulation has the most specific monetary regulation in these countries;
- a significant influence of the factor of the country's geographical location on the manifestation of certain features of monetary regulation (in particular, the development of refinancing instruments and the applied model of the exchange rate of the national currency) is noted;
- the connection between the selected targeting and exchange rate modes is traced;
- in a number of countries, monetary policy is represented by part of the banking policy and coincides with the macro-monetary policy of the monetary regulation institution;
- the influence of the dynamics of oil prices and the share of oil and oil products in the structure of national exports on the stability of monetary regulation instruments and the effectiveness of the national MP as a whole is noted if the share of these products in exports is 50% or more: in other situations, this influence will be insignificant;

- an effective national monetary policy model for these countries should be based on mechanisms to protect the monetary sector from fluctuations in oil prices and ways to protect the interests of direct and indirect participants in monetary relations.

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数字经济系统中的投资安全
INVESTMENT SECURITY IN THE DIGITAL ECONOMY SYSTEM

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抽象。本文致力于研究一个紧迫的科学和实际问题 – 数字经济发展系统中的投资保障。安全水平得到证实，分析了私人投资在这一发展中的重要性。该研究证实了建立有利投资环境的制度方法假设，确定了促进数字经济体系发展的支持者之间的根本差异。数字经济的基础是创造安全环境的方向，以及吸引各级经济发展项目中生产过程创新的投资，这使得该主题具有相关性。确定投资安全水平，降低数字经济中的风险，确保实现国家利益。该研究的目的是在制度方法的基础上确定数字经济系统中投资安全的优先领域。为实现这一目标，完成了以下任务，包括：确定数字经济的基本特征;分析数字经济投资的主要指标，确定基于制度方法的区域安全水平。

从制度方法的角度进行了经济分析：确定了对社会，政治和经济方面的影响程度;揭示了经济转型过程的特征。数字经济的发展是创新的强大催化剂，以确保区域发展中的经济增长和社会福祉。有效利用自然，原材料，人力资源，有可能实现上述领先技术地位的成果，为区域经济突破提供了机会。数字经济是科学技术进步的自然演化过程，技术基础设施的发展利用影响社会大规模数字化转型的大型数据库。

关键词：制度，投资安全，机制，数字经济，制度方法，经济分析。

Abstract. *The article is devoted to the study of an urgent scientific and practical problem - investment security in the system of development of the digital economy. Security levels are substantiated, the significance of private investment in this development is analyzed. The study substantiates the hypothesis of an institutional approach to creating a favorable investment climate, identifying the fundamental differences between the supporters promoting the development of the digital economy system. The digital economy is based on the direction of creating a safe environment, as well as attracting investment in the innovation of production processes in economic development projects at all its levels, which makes the topic relevant. Identification of the level of investment security, risk reduction in the digital economy ensures the realization of national interests. The aim of the study is to identify, on*

the basis of an institutional approach, the priority areas of investment security in the digital economy system. To achieve the goal, the following tasks were completed, which consist of: determining the essential characteristics of the digital economy; analysis of the main indicators of investments in the digital economy with the determination of the level of regional security based on the institutional approach.

An economic analysis was carried out from the perspective of an institutional approach: the levels of influence on social, political and economic aspects were determined; The characteristic features of the transformation processes of the economy are revealed. The development of the digital economy is a powerful catalyst for innovation to ensure economic growth and social well-being in the development of regions. It is possible to achieve the aforementioned results of leading technological positions with the effective use of natural, raw materials, human resources, wich provides a chance for a regional economic breakthrough. The digital economy is a natural evolutionary process of scientific and technological progress, the development of technological infrastructure making use of large databases that have influenced the large-scale digital transformation of society.

Keywords: *system, investment security, mechanism, digital economy, institutional approach, economic analysis.*

The relevance of the research topic is due to the level of security in the digital economy system, the attraction of private investment in digital economy development projects at all its levels. The study of this direction has its own significant peculiarities. Business is directly involved in the development of the digital economy and all its aspects, but there are still no sufficient private investments. Trends and patterns of development of the global economy make digitalization an object of increased attention: both among practitioners and in the scientific community [1; 2; 3; 4; 5]. This is evidenced by a large number of studies by foreign and Russian authors, the subject of which are various aspects of the implementation and realization of the digital economy programs, its consequences and dissemination [8; 9; 10; 11; 12]. The study of the investment security impact mechanisms in the digital economy will affect the realization of the national interests of the Russian Federation.

The institutional approach is considered in the form of economic analysis, which covers social, political and economic aspects, defining economic events, such as regulatory, legislative, interrelated events.

In the classical school, the methodology of investment security from the point of view of institutionalism is based on statistical indicators, experience and price analysis. The current methodology of investment security of institutionalism is based on the foundation of the classical school, complementing it with interconnections, determining the levels of economic, social, political, ethical, regulatory and legal interdependencies, where the institutional approach determines the functioning of an economic system based on planning and economic analysis. The

study was conducted using a set of methods: concretization - in identifying risks; system-structural analysis - in the study of problems; expert assessments - when conducting an analysis of the current state and levels of threats to investment security; statistical and graphical methods.

The formation of the theoretical foundations of investment security in the process of implementing the state program of the digital economy as an economic category in order to realize the national interests of the country is determined from the perspective of the institutional approach [8; 1; 5; 12]. From the perspective of this approach, the concept of "investment security of the digital economy" is a complex political and legal, organizational, technical, socio-cultural, economic system, which consists of a set of objects and subjects, tools and methods in order to maintain an appropriate level of protection of national interests, determining priority and mechanisms for protecting the interests of business entities [9; 10; 11]. The research results consist in substantiating the institutional approach, analyzing the main indicators of digitalization with determining their contribution to the development and ensuring the security of the economic and social growth of the region, reducing risks and ensuring stable and uninterrupted functioning of the system [5; 6; 7].

The digital economy dates back to 1950 and correlates to the radical changes caused by digital computing and communication technologies in the second half of the 20th century. The transition to new methods of large databases has begun. Their generation, processing, storage and transfer can reduce production costs and reduce the cost of product [1; 2]. An important consequence of investment development is the transformation of existing business models and the reduced role of intermediaries in the sale of goods and the provision of services. Digital technologies using an institutional approach help effectively connect suppliers directly with customers, which helps to develop a new individual approach to the formation of a management system for a business entity [3, 4]. This removes intermediary links, reduces time and increases productivity.

The object of the study is the analysis and assessment of the main indicators of investment security in the Republic of Crimea (hereinafter referred to as the region) in the process of implementing the "Digital Economy" program". This program involves the use of the digital format in production factors in all areas of the socio-economic and economic activities of the region; this approach will contribute to increasing the competitiveness of the state, the quality of life of citizens, ensuring economic growth and preserving national sovereignty [7, 11]. In order to increase the share of private investments in fixed assets, the Ministry of Finance of the Russian Federation in August 2018 developed a draft law "On the Protection and Promotion of Capital Investment", in accordance with which a working group was formed to select the most foreground investment projects. For this type of projects, it is planned to provide state support measures in the form of compen-

sation for investor expenses through tax revenues from the project, property tax and land tax benefits, preferential project financing, and stabilization of regulatory and tax conditions [10, 16]. For these purposes, it is envisaged to conclude agreements between the government and investors: regarding projects with a budget of 10 billion rub. no less than 3 billion rub. will be the share of the investor's own funds. The bill excludes the possibility of concluding such agreements with offshore companies. This bill provides for an agreement validity period of 6 years for projects whose own investment is up to 30 billion rubles, and a time lag of 12 years for more expensive projects. The term of the agreement can be extended for the next 6 years if the investor has accepted the obligation to reinvest the income received from the project on the territory of the Russian Federation. The state and private investors, when concluding agreements on the protection and promotion of investment in the future (APPI), will bear mutual legal responsibility [5].

Modern digital technologies are just beginning to be introduced into various fields of activity, adequate federal statistical monitoring of the processes of their penetration and use in various fields has not yet been established [13,16]. The level of investment security and GDP in the Russian economy in comparison with developed countries shows a lag in most positions (Table 1).

Table 1 - *Comparative analysis of the contribution of the digital economy to the GDP of some countries in 2017, (% of GDP)*

Indicator	**Russia**	**Czech Republic**	**Brazil**	**India**	**5 countries of Western Europe ***	**China**	**USA**	**The lag of the RF from the leading country**
Digital household spending	2,6	2,2	2,7	3,2	3,7	4,8	5,3	2,7
Companies digitization investments	2,2	2	3,6	2,7	3,9	1,8	5	2,8
Government spending on digitalization	0,5	0,5	0,8	0,6	1	0,4	1,3	0,8
ICT export	0,5	2,9	0,1	5,9	2,5	5,8	1,4	0,9
ICT import	-1,8	-2,1	-1	-6,1	-2,9	-2,7	-2,1	0,3
The size of the digital economy	3,9	5,5	6,2	6,3	8,2	10,0	10,9	7,0

** Great Britain, Germany, Italy, France, Sweden*

Source: compiled by the authors based on data of [14]

Thus, in terms of household spending in the digital sphere, Russia is in 6th place from 7 countries with an indicator equal to 2.6% of GDP.

In 2017, the share of new IT companies in Russia amounted to about 10%, and currently continues to grow. Almost 50% of IT companies already have offices or representative offices in other cities of Russia. Moreover, 15% - have representative offices in other CIS countries, and 8% - outside the CIS [17; 18].

According to expert assessments of specialists regarding the success of information technologies of the Government of the Republic of Crimea, at this stage there is significant progress in the development of infrastructure, the expansion of the range of public services provided in electronic form, the accelerated development of regional segments of federal information systems (interdepartmental electronic interaction environment, public services portal and other). At the same time, it is noted that so far many of the tasks set for digital transformation have not been realized and require a well-thought-out comprehensive system of measures.

Consider methods of determining the level of investment security of the state from the perspective of analyzing the implementation of measures to develop the digital economy in the Republic of Crimea. Significant financial investments were directed to the region, the amount of financing in the Republic of Crimea in 2017 reached 445736.7 thousand rubles. Dynamics of volumes of financing in the digital transformation of the Republic of Crimea is presented in Figure 1.

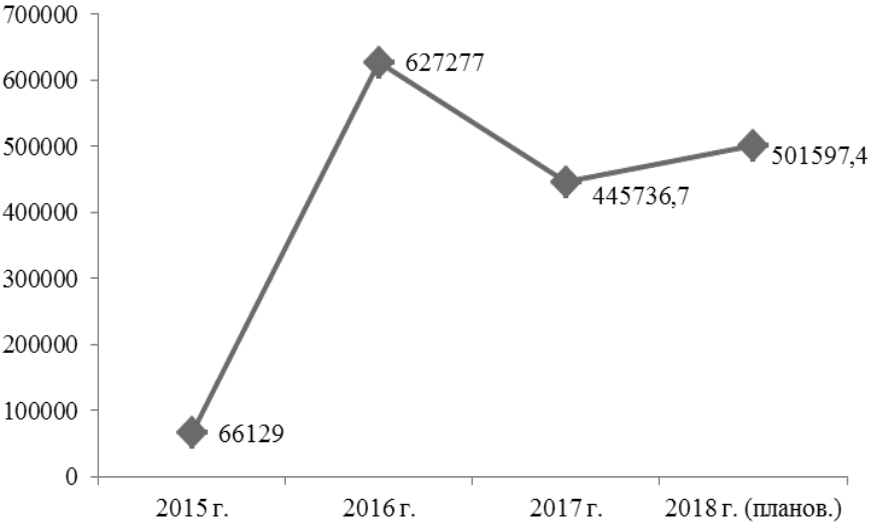

Figure 1 - *Dynamics of volumes of financing of the digital economy in the Republic of Crimea in 2015-2017 and planned 2018, thousand rub. Source: compiled by the authors based on data of [15;17;18].*

As can be seen from Figure 1, in 2017, the amount of funding decreased by 181,540 thousand rub. (or 29%) compared with 2016, and increased by 379,607.7 thousand rub. (or 74%) compared with the data for 2015. According to the planned indicators, in 2018 there is an increase of 55,860.7 thousand rub. (or 12.5%) [15; 18; 18].

Fulfilling the conditions for implementing the program for the Republic of Crimea and the city of Sevastopol on the basis of the institutional approach, let us formulate the main directions for the development of an effective management system for the development of the digital economy:

- identification of mechanisms for use in public private partnerships;
- providing financing for the development of digital economies;
- stakeholder participation in digital economy development management processes;
- personal responsibility of senior managers for the development of the digital economy;
- open cooperation with other regions and countries on the development of digital technologies;
- creation of domestic high-tech products and system programs.

However, regarding the personal responsibility of high-level leaders for the development of the digital economy, the availability and use of public-private partnership mechanisms (hereinafter - PPP), this process requires refinement with the definition of a clear implementation mechanism.

Thus, PPP mechanisms are an important tool for financing and implementing digital transformation projects. An example of the use of PPP mechanisms in the region and the city of Sevastopol is the signed concession agreement on the creation of the hardware complex of the "Safe City" fiscal system with surveillance cameras and paid parking. Also, these examples include the use of a concession agreement in the implementation of the "Smart City" project, which was signed in the first half of 2018 (a pilot project based on the city of Yevpatoriya) [15; 17; 18].

Conclusion

The modern digital economy of Russia is formed as a result of close interaction of 3 levels: markets, industries and their interactions.

The environment for the development of digital technologies depends on the creation of conditions for the development of platforms, technologies with the simultaneous formation of competencies for the development of markets and industries.

Important directions for preventing risks and threats in the investment sphere are: the growth of measures to create a favorable investment climate, the formation of entrepreneurial activity, which stimulates the influx of investments in the development of small and medium-sized enterprises.

Methods for determining the levels of investment security with the development of the digital economy have a positive effect on the business and investment climate by increasing the availability and efficiency of public services. The Republic of Crimea is an attractive investment region of Russia, it (the region) needs to launch high-tech industries that create the basis (in the form of fixed assets) for the digital economy.

As part of the state program of the digital economy, adopted in August 2017, it is necessary to form multiplying production chains with a reasonable allocation of resources with immediate replacement of imports for a whole set of instruments and equipment, computer equipment coming into the country.

Such an approach will make the digitalization program an element of a sound structural policy of economic growth based on new production factors. It should be noted that managing overflow of resources between sectors should be the main focus for macroeconomic policy, which would take into account the existence of tasks within the framework of adopted state development programs. Note that the changes taking place in the theory of the digital economy should be reflected in the content of continuing education courses in higher education.

Further areas of research will be devoted to the sustainable development of the financial system as the basis for reducing security.

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关于加强联合伏尔加河和长江深水运输系统加强“一带一路”倡议的建议
PROPOSAL FOR UNITED VOLGA AND YANGTZE DEEP-WATER TRANSPORTATION SYSTEMS TO STRENGTHEN THE BELT AND ROAD INITIATIVE

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在本文中，我们主张建立一个统一的伏尔加河和长江深水运输系统，以加强一带一路倡议和EAEU的多式联运系统。此后，我们概述了俄罗斯，中亚，南高加索和中国之间现有的交通走廊，为现有的物流提供了一些见解。上海合作组织（SCO）的参与者和欧亚经济联盟（EAEU）的成员国高度支持“一带一路”倡议。俄罗斯联邦总统弗拉基米尔·普京强调该倡议对其政府的吸引力，他说，他认为创建经济发展带可以促进亚洲和欧洲各国之间的有利贸易。普京的言论清楚地表明，俄罗斯有兴趣将欧亚经济联盟的框架与中国的BRI框架联系起来。

关键词：国际运输走廊，多式联运系统，深水运输系统，多式联运集装箱物流系统，公私合作伙伴关系（PPP）

Abstract*. In this article, we argue for a united Volga and Yangtze Deep-Water Transportation System to strengthen the Belt and Road Initiative and the intermodal systems of the EAEU. Hereafter, we outline existing transportation corridors between Russia, Central Asia, the South Caucasus and China, provide some insight in the existing logistics. The participants of the Shanghai Cooperation Organization (SCO) and the member states of the Eurasian Economic Union (EAEU)*

highly support the Belt and Road Initiative. President of the Russian Federation, Vladimir Putin, emphasized the initiative's appeal to his government by stating that he believes that the creation of a belt of economic development can lead to beneficial trade among countries in both Asia and Europe. Putin's remarks have made it clear that Russia is interested in linking together the Eurasian Economic Union's framework to that of China's BRI.

***Keywords**: international transport corridors, intermodal system, deep-water transportation system, intermodal containers logistic system,public-private partnership (PPP)*

INTRODUCTION

The participants of the Shanghai Cooperation Organization (SCO) and the member states of the Eurasian Economic Union (EAEU) highly support the Belt and Road Initiative. President of the Russian Federation, Vladimir Putin, emphasized the initiative's appeal to his government by stating that he believes that the creation of a belt of economic development can lead to beneficial trade among countries in both Asia and Europe. Putin's remarks have made it clear that Russia is interested in linking together the Eurasian Economic Union's framework to that of China's BRI.

In this article, we argue for a united Volga-Yangtze Deep-Water Transportation System to strengthen the Belt and Road Initiative and the intermodal systems of the EAEU. Hereafter, we outline existing transportation corridors between Russia, Central Asia, the South Caucasus and China, provide some insight in the existing logistics

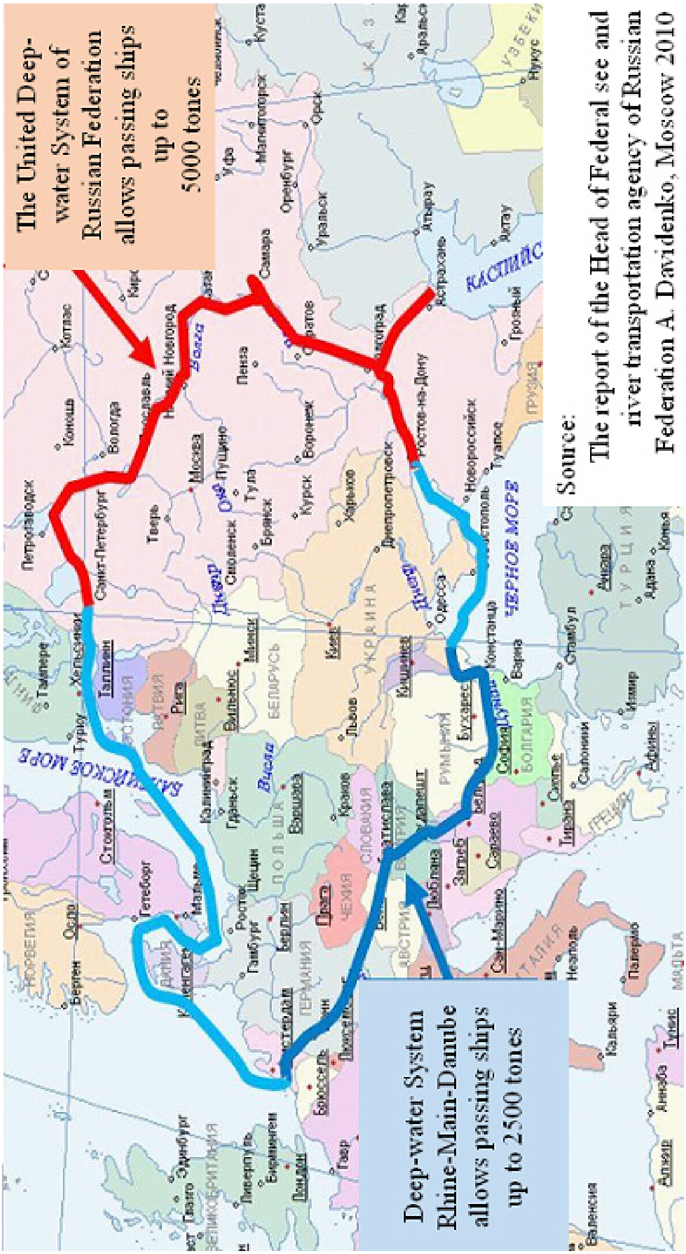
THE PROMISE OF A CHINA-RUSSIA BRI INTERMODAL TRANSPORTATION SYSTEM

EAEU Transportation Projects

The implementation of BRI initiative is already being carried out by the Russian Federation. Russia has started this process by reconstructing several railways that can and will find themselves playing a role in the revitalization of the "Silk Road". Work is being done on a northern corridor, a north-south corridor, and a passageway to the Arctic Sea. The country is also preparing joint infrastructure projects on roads and railways with both China and Mongolia. Furthermore, Russia is highly considering to make major investments on additional projects. One in particular that stands out is that of the Meridian Highway (the Russian section of the Beijing-Hamburg corridor between Kazakhstan and Belorussia sections), Europe-West China highway and the number of medium size projects in frames of the Complex Plan for the Modernization and Expanding of Backbone Infrastructure.

Several projects are also underway in the other EAEU member States. China and Kazakhstan have signed and implemented an agreement on the creation of a railway corridor between Beijing and Aktau with a pass through the border crossings of Alashankou-Dostyk and Khorgos-Altynkol. Logistic complexes are also being built with assistance of foreign investors [1].

Figure 1. *Major Trans-Eurasian Corridors. [1]*



Source:
The report of the Head of Federal see and river transportation agency of Russian Federation A. Davidenko, Moscow 2010

Figure 2. *The European deep-water transportation ring [3]*

Multimodal projects can easily help to flourish trade by facilitating transportation via land and sea. They would particularly be useful in easing the flow of goods via the difficult Northern Sea. Attention should also be paid to the use of inland water transportation. For example, the connection to the container railway corridors of Beijing to Aktau and the United Deep-water system of the European part of the Russian Federation can provide the fastest and most cost-effective route of delivery to the ports of Central, Southern and Eastern Europe [2, 3].

Furthermore, the United deepwater system of the European part of the Russian Federation could unite the Volga, Kama and Don rivers along with the Rhine-Main-Danube deepwater System in Europe [3].

The length of the inland water route from Aktau to St. Petersburg via Astrakhan is around 3500 km, the route from Aktau to Kerch via Azov is around 1700 km. Transportation along these routes are 5 to 6 days and 3 to 4 days long respectively. The ports of Rotterdam in the Netherlands and Constanta in Romania can also be seen as alternative end points to these water routes. Additionally, using the White Sea via the Baltic Canal allows for access to other ports in the region including that of Arkhangelsk.

Unifying this water system provides the opportunity to transport at least 420 million tons of cargo by inland waterways. Currently, the existing infrastructure of this water system carries an average of 80-100 million tons. This is around 4 times less than its potential if unified. Surely several parties would find such an increase to be beneficial to everyone involved. To ensure the efficiency of a unified water system it is important to create new cargo bases and integrate them on the peripheries of these routes. Particular attention should be paid to the Aktau to St. Petersburg route and the Aktau-Volgograd-Azov-Danube route via the Black sea as it can easily increase and optimize the flow of goods to several key ports [6,7,8].

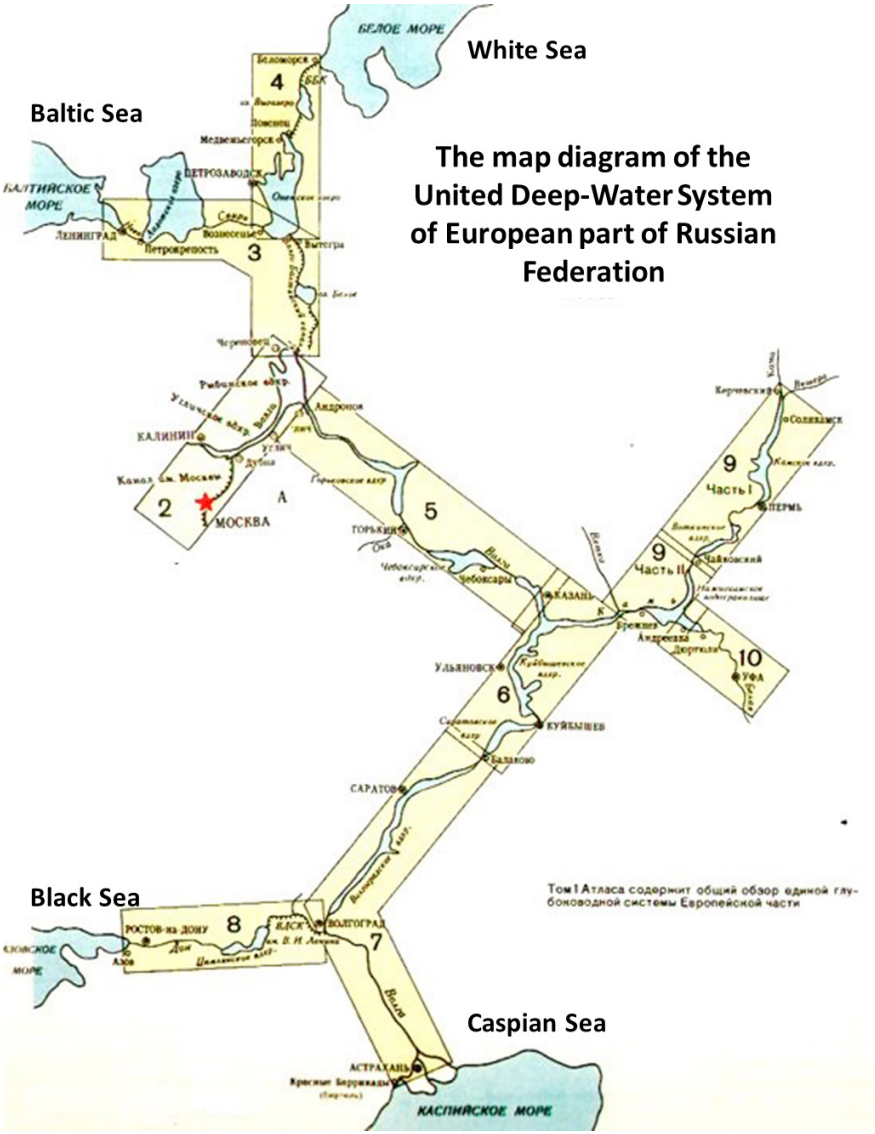


Figure 3. *Atlas of a Single Deepwater System of the European part of the Russian Federation [4]*

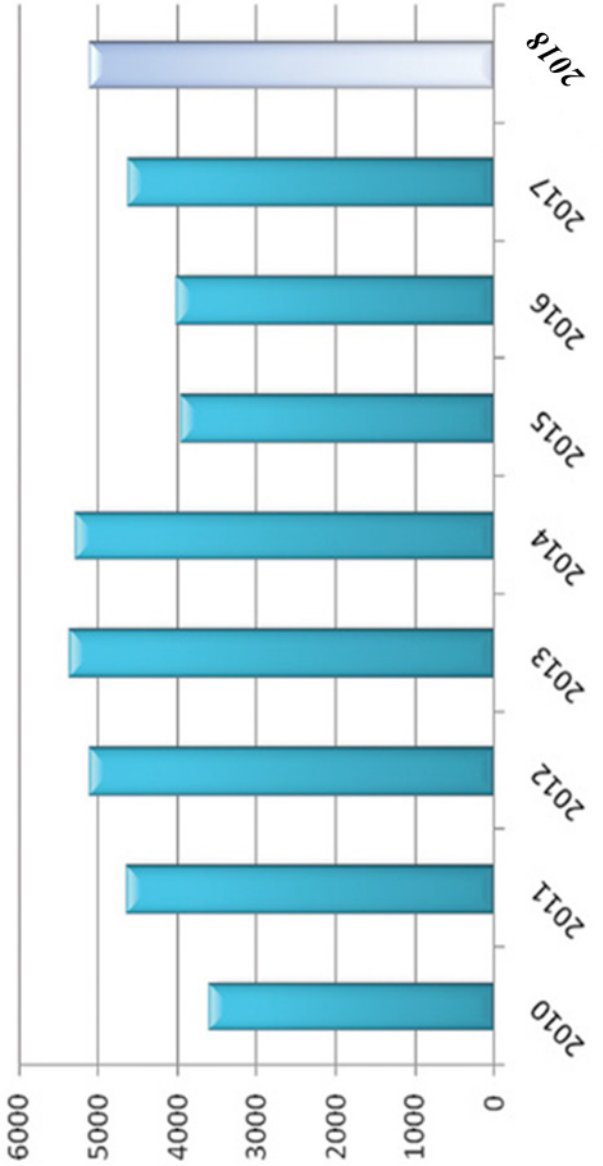


Figure 4. The volume of TEU reloading in the Russian ports.[5]

VOLGA-YANGTZE PROJECT: POTENTIAL ECONOMIC IMPACT AND CHALLENGES

Potential Economic Impact of Integration of EAEU and BRI Transportation Projects

Current situation and trends. "Most container traffic from Russia and other EAEU member states to China is multimodal traffic with the use of railway transport. In most cases, China-bound export cargoes (mostly originating from Russia) are delivered by railway containers to the ports of the Baltic Sea, Black Sea, Azov Sea, Barents Sea, or White Sea and transferred to ships. Only 10–20% of Russian export container traffic (11,000 FEU/21,000 TEU in 2016, according to Russian Railways) is transported directly to China by railway through border crossing points at Zabaykalsk (80–100%) and Grodekovo (18% in 2016)… The commodity structure of direct export railway container traffic from EAEU member states (mostly Russia) to China through land border crossing points is heavily dominated by one commodity group, "Other Cargoes": Metal Products (including empty return containers), Paper, Chemicals…In 2015–2016, there was a considerable increase in the commodity structure of Russian railway container shipments to China of exported "Timber Cargoes" (via Zabaykalsk), specifically Sawn Timber used to fill up empty return containers (a long-standing practice in Europe). The growth of container shipments exported through Grodekovo is also linked to the return to China of empty containers (classified in Russian Railways statistics as Metalware) due to a sharp increase in 2016 of the volume of container traffic from China to Russia through land crossing points and consequently, of the number of empty return containers" [2].

In the short term, by the end of 2019, container volumes will reach peak values of 2013: 5.4 million TEU. By 2021, the total volume of containers shipped will reach 6.3 million TEU thanks in part to the growth of export-based industries such as those that produce chemical, automotive, metallurgical and agricultural goods. [5].

Based on goods produced and manufactured in areas that would feed this unified water way, we would see an increase in the flow of building materials, paper, agricultural products, metal products, machines, chemicals, and petrochemical goods in the amount of at least 200 million tons. Statistics show that water transportation would be the most beneficial way to stimulate these export-based goods.

Furthermore, part of the cargo coming from Iran and India can also benefit from being connected to this unified water system. The Iranian port of Enzeli and the Indian port of Mumbai can feed the Eurasian corridor, ultimately increasing

Figure 5. *The example of the "scientific tourism". Source: http://conf.neuro.unn.ru/vnm-2018/*

Figure 6. *Universal vessel for both river and sea usage [11].*

the overall volume of goods. By using the Volga, the delay caused by using the existing ground routes can be avoided which should speed up transportation speed by around 20% [9].

Table 1. *Volumes of commodities reloaded through ports of European part of Russian Federation*

Commodities	2015	2016	2017	2018	2019	2021
Grain[1]	27,0**	30,0**	40,0**			
Fertilizers[2]	15,9	16,2	17,5			
Wood products[3]			3,9	4,1		
Metalls[4]	2,7	2,8	2,9	3,0*	3,1*	3,2*
Sources: [1]PwC [6], [2]Mortsentr [7], Morvesty [8] , [4]Bloomberg, IMF etc. [9]						

** Forecast*

*** This shows the shipment of grain arriving from Azov and going through inland waterways as well as being loaded again at deep-sea ports. Therefore, the total amount of shipment on this chart includes repeated counting of grain [6].*

Other than that is the opportunity for the tourism segment, where Volga & Channels routes were traditionally popular and where new sub segments (f.e. scientific tourism) are growing:

These transports and logistics facilities should be able to provide transportation for about 100-120 million tons of cargo during the navigation season on the Volga river. Winter would see a decreased service via the Astrakhan/Makhachkala – Aktau – Enzeli and/or the Black Sea routes. Foreign partners, including the Chinese, will still be able to gain access to transportation throughout the Russian Federation via the railways and Caspian Sea, the Baltic Sea and the Black Sea however.

Challenges

The creation of a specialized cargo and passenger fleet is important. Versatility in dealing with both rivers and sea is key. Currently, Russian and Chinese companies are working on developing ships with these capabilities. For example, the Oka Shipyard, in 2019, launched the third dry cargo ship [11].

Implementation

Active implementation of the second phase should begin by 2021 as is mentioned by the **"Strategy for the development of the inland water transport of the Russian Federation for the period till 2030"** [12]. The Institute of Vnesheconombank (VEB) has already started conceptualizing the project. Part of the plan is to create and attract international companies on public-private partnerships (PPP). This should cost around $15 billion and include the creation of ports, shipping infrastructure, navigation assistance infrastructure, custom depots, and other general infrastructure that will facilitate passage on both the inland waterways and the Caspian Sea. Furthermore, foreign investors are encouraged to create and introduce cargo and passenger fleets that can adapt to both rivers and sea. Specifications for such

vessels can be of around 5 million tons (about 1000 units with a deadweight of 5000 tons each). Terminals and hubs along the waterways may need to be readjusted for efficiency (for example in Astrakhan, Kazan, Nizhny Novgorod, Rostov, etc.).

The discussion of this topic during the some CIS countries meetings [13] and World Transport Convention in 2019 [14], revealed that there is significant interest among Chinese investors such as China Gezhuba Group, China Highway and Transportation Society, PowerChina and Cosco Shipping among others to participate in such projects on PPP terms. The confirmation of this interest was established with the creation of the Russian-Chinese Investment Fund for Regional Development. The main priority is the development of the "Volga-Yangtze" project [15].

CONCLUSION

In conclusion, by successfully fusing the water systems in western Russia, rivers such as the Ob, Irtysh, Yenisei, Lena, Amur, etc. can be used as highways for the flow of goods and people. Maintenance may be required however in the Siberian and far eastern regions at a more consistent rate. Increased commerce should make this task worthwhile. Russia's current icebreaking fleet should be able to clear up the North Sea but in time, as trade volume increases, it will may need to look for outside assistance.

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对俄罗斯市场上亚洲和欧洲生产商化妆品的光谱和消费者偏好的比较分析
COMPARATIVE ANALYSIS OF THE SPECTRUM AND CONSUMER PREFERENCES OF COSMETICS OF ASIAN AND EUROPEAN PRODUCERS IN THE RUSSIAN MARKET

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抽象。 近年来，俄罗斯消费者对亚洲制造商的产品，尤其是韩国化妆品的产品越来越感兴趣。 在这项工作中，我们检查了俄罗斯最具代表性的亚洲公司化妆品的品种和消费者特性，确定并制定了决定这些产品需求的因素，对欧洲皮肤护理化妆品的消费者特性进行了比较分析。 和亚洲制造商。

关键词：化妆品市场，化妆品系列，消费者特性，亚洲制造商的化妆品。

Abstract. *In recent years, there has been growing interest among Russian consumers of cosmetics in products of Asian manufacturers and, above all, in Korean cosmetics. In this work we examined the assortment and consumer properties of cosmetic products of the most represented Asian companies in Russia, identified and formulated the factors that determine the demand for these products, conducted a comparative analysis of the consumer properties of cosmetics for skin care in European and Asian manufacturers.*

Keywords: *cosmetic market, range of cosmetics, consumer properties, cosmetics of Asian manufacturers.*

In the past few years, the trend towards an increase in the share of cosmetic products offered by manufacturing companies from Asia: China, Japan, South Korea, Thailand, and the parallel displacement of European companies' products from the market have become more and more noticeable in the Russian perfumery and cosmetic (hereinafter referred to as PC) market. The greatest growth is observed in the segment of skin care products. For example, the volume of imports of South Korean face skin care products to Russia over the past 5 years has more than quadrupled. [1].

The most famous brands for cosmetics consumers in Russia are Sulwhasoo, Amore Pacific, Hera, Lirikos, The History of Whoo, OHui, MULE, Shiseido, Laura Mercier, Coreana, Zain Premium, Lavida, Sranrom, LG Household & Health Care. The results of studying the assortment of cosmetic products show that of the 6 most represented Asian companies in Russia, four are manufacturers from South Korea. (Table 1). It is also noted that the products of these manufacturers include offers in all price segments of the PC market.

Table 1 - *Brands of cosmetic products of various price categories offered by the most popular Asian manufacturers in Russia*

Manufacturing company	Country of origin	Premium class brand	Middle class brand	Mass market brand
Amore Pacific	Korea	Sulwhasoo, Hera, Lirikos	Hannule, Hyosiah, Laneige	Innisfree Etude House Happy Bath Mamonde
LG Household & Health Care	Korea	The History of Whoo, OHui, MULE	Su:m37, Belif, Isa Knox, Lacvert	The Face Shop Carezone Cathycat VoV
Shiseido Company, Limited	Japan	Shiseido, Laura Mercier	bareMinerals	Nars
Coreana	Korea	Coreana, Zain Premium, Lavida	Biodefense, Bi Hui Ga In, Majolica Majorca, Ettusais Maquillage	Ten Seconds, Senite, Aqua Label
Taesung Industry Co.	Korea	–	Tony Moly	Tony Moly
Sabai Co.	Thailand	Sranrom	Sabai-Arom	Sabai-Arom

An analysis of the assortment in the chain of specialized stores "Golden Apple" (Moscow) showed that in the segment of skin care products, the sales leaders for the first half of 2019 were moisturizing masks Gold foil mask and Cosworker partition mask-pakt of the Korean company Skin Needs. The highest rating of consumer properties using the method of calculating a group integrated quality indicator was received by a hydrogel moisturizing mask with collagen manufactured by Adwin Korea Corporation.

In order to find out the factors causing the ever-growing interest of Russian consumers in cosmetics of Asian manufacturers, a survey was conducted of the participants of the XXIIIth International Scientific and Practical Conference "Cosmetic Industry: A Look into the Future", held in Moscow in October 2018. The most common answers of respondents can be formulated in the form of the following points:

1. Provides a flawless appearance of the skin (facial skin of Asian women is usually very smooth and even);

2. Ability to choose innovative cosmetic products related to the most modern world trends in the beauty industry (“green” cosmetics, multifunctional and multistage cosmetics, complex-action cosmetics, etc.);

3. Ingredient composition of products (the use of predominantly natural ingredients; the presence of unique active components and patented innovative complexes);

4. Wide range of both professional cosmetics and home care products;

5. Solution to many skin problems, confirmed by laboratory and clinical studies;

6. Environmental friendliness of products (including minimalism in packaging, even for luxury and premium products);

7. Presence of a product line of various price categories (including effective high-quality cosmetics at affordable prices).

European and Asian approaches to skin care are different, cosmetics of Asian manufacturers have the following features.

Cosmetics from European manufacturers are often aimed at masking skin imperfections and giving it a beautiful appearance (today and now); Asian cosmetics are aimed at identifying the causes of changes in the structure and composition of the skin, treating and maintaining an optimal state, which is achieved with constant and long-term care for it.

In the approach of Asian manufacturers, skin care is a multi-stage process at each stage: cleansing, moisturizing, nutrition, special, including therapeutic effects, etc. Therefore, complex systems of products are often developed and offered, for example: a makeup removal and skin cleansing system; a multi-stage system for applying nourishing and moisturizing products, which includes basic care products (toner, emulsion, eye cream, face cream) and additional products (for example, serum, mask, etc.); system for night skin care; a skin care system using various masks (including textiles and other media), impregnated with restoring, soothing or nourishing serum; a separate system for removing keratinized cells of the stratum corneum of the epidermis (acid peels and peeling rolls); a system of means to reduce the secretion of sebaceous glands, etc.

It is known that, caring for the skin, various cosmetics are used daily in Korea, the number of which can reach up to 18 items or more. This is not at all characteristic of home facial skin care for an average Russian woman. Until recently, Russians preferred decorative cosmetics and perfumes. Today, the priorities of consumers of perfumes and cosmetics are changing and for many Russians, skin care is becoming paramount. However, the number of items of cosmetics used for these purposes in Russia is much less. As a rule, detergents and cleansers are used (liquid and solid toilet soap, cream foam, milk for removing makeup), alcohol lotions and tonics, day and evening creams, scrubs (or peels), various masks (including masks on sheets), special care products (serum in ampoules).

New innovative (including unique) skin care products that have no counterparts among the assortment of European manufacturers are constantly appearing in the lines of cosmetics for skin care products of Asian and especially South Korean manufacturers. These are BB-, SS- and DD- creams, peeling-rollers, hydrophilic oil, fabric masks, masks based on hydrogel and other media, multilayer (2- and 3-layer) masks with SPA effect, night masks. Over time, these products also appear in the lines of European manufacturers, but differ in performance from ergonomics (especially textures), aesthetics and other consumer properties from Asian products.

Asian cosmetics are applied to the skin with light movements using the pads of the fingers (without the use of cotton pads and sponges), without stretching it. Small amounts of the product are used (for example, a portion of cleansing foam - the size of a pea; a portion of tonic - a few drops, etc.).

The composition of the product is also a hallmark of Asian cosmetics. In Russia, the basis of the range of skin care cosmetics is composed of inexpensive traditional cosmetics, which include authorized and restricted to use natural, identical to natural, synthetic and artificial ingredients, according to technical regulations "On the safety of perfumes and cosmetics" [2]). Natural ingredients in cosmetics of Russian manufacturers are more often used as active additives (infusions and extracts of plants, essential oils) or as the basis of the mixture (animal fats and vegetable oils, their derivatives, various waxes, etc.). The composition of cosmetics of Korean manufacturers, despite a different price category, consists mainly of natural ingredients, which can reach up to 90% of the product (in the Russian PC market, such products are positioned separately as "organic" or "green" cosmetics). The compositions of Korean cosmetics contain a minimum of preservatives, synthetic dyes, fragrances, surfactants and emulsifiers; no oil products. As active components, it contains unique and exotic ingredients. For example, today in the Russian market, Korean cosmetics with an extract of mucus of grape snails (with snail mucin), with sea red and green algae, cosmetics based on hyaluronic acid are very popular.

Design features of packaging products of Asian companies take into account the preferences of various categories of consumers. Bright, unusual, often creative packaging - bright jars, cases and boxes in the form of various fruits and vegetables, animals, little men, etc. It is popular with a young audience of consumers, including high school students who are currently active consumers of cosmetics. For an older audience, cosmetics in traditional bottles, jars and tubes with a well-memorable design are offered.

Despite the fact that South Korean companies use innovative technologies and natural components, the prices of their products are distinctively democratic. This low cost (in comparison with similar products of well-known European brands) is due to the scale of production and a high degree of automation of production, the absence of huge investments in advertising, the absence of expensive and wasteful packaging, affordable points of sale (for example, network cosmetic stores) and other factors, which allow high-quality and effective cosmetics to be available to a wide range of customers. Traditional cosmetics of Russian manufacturers is mainly inexpensive cosmetics in the mass market segment, which are cheaper. However, modern domestic innovative skin care products (premium segment products), as a rule, are comparable in price to products of Korean manufacturers or even higher [3].

Thus, today there is an increase in demand for cosmetics by Asian manufacturers in the Russian perfumery and cosmetics market, which is based on its innovativeness, environmental friendliness, naturalness and accessibility.

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关于实施俄罗斯联邦国家项目任务的俄中科技合作的实际方向“2024年期间主要基础设施现代化和扩建的复杂计划”和“安全和高度” – 质量道路»

ABOUT THE ACTUAL DIRECTIONS OF THE RUSSIAN-CHINESE SCIENTIFIC AND TECHNICAL COOPERATION IN THE LIGHT OF IMPLEMENTATION OF TASKS OF NATIONAL PROJECTS OF THE RUSSIAN FEDERATION "THE COMPLEX PLAN OF MODERNIZATION AND EXPANSION OF THE MAIN INFRASTRUCTURE FOR THE PERIOD TILL 2024" AND «SAFE AND HIGH-QUALITY ROADS»

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俄罗斯联邦的13个国家项目正在计划实施，直到2024年底为上合组织国家之间的国际科技合作提供了额外的机会。 特殊的机会和任务是为交通基础设施领域的科技合作开放，其中两个是最大的国家项目，总资金超过11万亿卢布可由大学和公司之间的政府间和直接合作支持 “一带一路”倡议。 在本文中，作者回顾了俄罗斯和中国合作伙伴在运输和基础设施科学

与技术领域的合作声明以及最近的合作。

关键词：国家项目，政府间委员会，科技合作，运输基础设施，一带一路倡议。

Abstract*. 13 national projects in Russian Federation are planning with implementation till the end 2024 provides additional opportunities for the international scientific-technological cooperation between SCO countries. The special opportunities and tasks are opening for the scientific-technological collaborations in the field of transport infrastructure, where are two the largest national projects with the total funding more than 11 trillion rubles could be supported by intergovernmental and direct cooperation between Universities and companies in frames of Belt and Road Initiative. In this article authors review of the statement and the nearest prospective of collaborations between Russian and Chinese partners in the field of transport and infrastructure science and technologies.*

Keywords*: national projects, intergovernmental commissions, scientific-technological cooperation, transport infrastructure, Belt and Road Initiative.*

In accordance with the Decree of the President of the Russian Federation Vladimir Putin of May 7, 2018 №204 "On national goals and strategic objectives of the Russian Federation for the period up to 2024" [1] in 2019, the Russian Federation launched 13 large-scale national projects with a total budget of more than 20 trillion rubles. Among them, 2 largest national projects with a total budget of over 11 trillion rubles are directly devoted to the development of transport infrastructure [2,3], some of the activities indirectly affecting the transportation problem, are also envisaged in the framework of other projects – "Ecology", "Science", "Housing and the urban environment" and national program "Digital economy of the Russian Federation" [4,5,6,7].

The "Comprehensive plan for the modernization and expansion of trunk infrastructure for the period up to 2024," includes 11 the Federal projects aimed at the modernization and expansion of transport infrastructure, two of the Federal project aimed at the modernization and expansion of energy infrastructure. The implementation of the Comprehensive plan will ensure the development of the West – East and North – South transport corridors for the transportation of goods, increase the level of economic connectivity of the territory of Russia through the expansion and modernization of railway, aviation, road, sea and river infrastructure, guaranteed provision of affordable electricity, the development of high-speed rail links and the Northern sea route.

The national project "Safe and high-quality roads" includes the activities of Federal projects to improve the operational status of the road network and road safety in all regions of the Russian Federation, as well as the Federal project "system-wide measures for the development of the road sector", which provides a set

of measures for scientific, technological and organizational modernization of the road sector at the Federal and regional levels.

Within the framework of this project, a significant part of scientific and technological tasks is assigned to the Federal Autonomous institution "Russian road research Institute" (FAU "ROSDORNII»):

- creation (giving the functions of the FAU "Rosdornii") of a General Industry competence center for new materials and technologies for the construction, repair and maintenance of roads;

- participation in the development and implementation of new technical requirements and standards of road construction, including on the basis of digital technologies aimed at eliminating the concentration of road accidents;

- development and promotion of new mechanisms for the development and operation of the road network, including the use of life cycle contracts, best technologies and materials;

- creation of a system of advanced training for road workers, focused on training in the use of new and best technologies, materials and technological solutions for reuse.

In solving these large-scale and complex tasks, the most important role is given to scientific-technical regulatory and educational cooperation in key technological areas with Russia's strategic partner in the framework of the "One belt – one road" initiative of the People's Republic of China. The key areas for technological modernization of the road sector are:

- resource-efficient and environmentally friendly technologies for construction, repair and maintenance of roads, bridges and tunnels, including in complex hydrogeological, climatic and transport conditions;

- digital technologies for security, optimization of planning, design and management of transport facilities, traffic and cargo flows;

- harmonization of technical and educational standards with the member States of the Customs Union and the “Silk way”;

- establishment of scientific and information, scientific and educational exchanges, joint research, development and pilot tests with leading scientific and engineering centers of Russia and foreign countries.

In these areas, the collection, discussion and preparation of joint programs and projects in the framework of a number of intergovernmental commissions are currently under way:

• Russian-Chinese Commission for the preparation of regular meetings of heads of government including specialized sub-commissions:

- on scientific and technical cooperation, (co-Chairs: Deputy Minister of science and education of the Russian Federation A. V. Lopatin; Deputy Minister of science and technology of China Yin Hejun);

- on cooperation in the field of transport (co-chairs: Minister of transport of the Russian Federation, E. I., Dietrich; Minister of transport of China Yang Chuantan);

- on projects of important strategic cooperation in the field of satellite navigation between Russia and China (co-Chairs: Deputy General Director of Roscosmos M. N. Khaylov; Chairman of the Commission on the Chinese satellite navigation system Wang Li).

• Russian-Chinese Commission for humanitarian cooperation.

• Intergovernmental Russian-Chinese Commission on investment cooperation (from the Russian side the Commission is headed by First Deputy Prime Minister Igor Shuvalov, with the Chinese Vice Premier of the State Council of the people's Republic of China Zhang gaoli).

• Intergovernmental Commission for cooperation in the development of the Eastern territories.

Along with this, cooperation between Russian and Chinese organizations and companies in a number of "transport" areas has already been started.

Since 2011, under the auspices of the Institute of strategic cooperation between China and Russia (ISSKR), established in 2011 at Tsinghua University with the participation of the Russian University of transport (MIIT), such scientific and educational projects as "Strategies and tactics of development of the innovative University" and "Transfer of innovation in education and transport"have been implemented. In consequence, the Institute of international transport communications of the Russian University of transport (MIIT) has become a partner of ISSCR at Tsinghua University on performance of scientific works in the framework of the project "New silk Way".

For several years, the Cooperation is being performed between the Chinese research center for automotive technology (China Automotive Technology & Research Center – CATARC), the Center for computer engineering of St. Petersburg State University and CompMechLab® group of companies (Russia) in the field of solving science-intensive and resource-intensive transport and industrial tasks that require significant resource-intensive numerical solutions based on the "harmonious triad" Brainware & Software & Hardware using supercomputer engineering [8].

After the May 2017 meetings "Russian-Chinese innovative cooperation in the transport sector" with the participation of state corporations ROSATOM and RUSNANO, Russian University of transport MIIT, National research and technology University "MISIS" (NUST MISIS), Moscow Institute of Physics and Technology (MIPhT) and a number of Chinese institutions and companies under the leadership of China Highway & Transportation Society, including transport administrations, large engineering, Contracting and scientific organizations of a number of provinces and cities of China (Shaanxi, Wuhan, Chongqing Chuandong

Photos of the participants of the meeting of representatives of CATARC, BAIC, St. Petersburg State University and CompMechLab on August 30, 2017 in St. Petersburg [8]

Participants of the meeting "Russian-Chinese innovative cooperation in the transport sector" in May 2017 in NUST MISIS (Moscow) [9]

et al.), Russian-Chinese cooperation on the creation of the International transport Alliance "One belt – One road" ("Belt and Road International transport Alliance") has began and its symposia was held within the framework of the World Transport Convention [9].

Following the events of the World Transport Convention in 2017 and 2018 [10], a number of agreements were concluded, including:

• FAU "ROSDORNII" and NUST "MISIS" has signed an agreement with the Office for design, monitoring and quality control of transport facilities of the Autonomous district of Inner Mongolia of China and Tianjin Hitech Environment Development Co. on the development of resource-efficient technologies for the construction and repair of roads in regions with complicated climatic and hydrogeological conditions (these include the regions of the Arctic zone, the Far East of Russia, the Autonomous region of Inner Mongolia and Tibet in China, etc.).);

• Between NUST MISIS, Saratov State Technological University name's Yuri Gagarin and Tianjin Hitech Environment Development signed an agreement on cooperation in the development of technologies for nanomodification of bitumen and self-healing asphalt concrete with the planned use of the developments of the Russian-Chinese research Institute of graphene, established in 2016 with the participation of Tambov state technical University (Russia), Harbin engineering University, Institute of chemistry and environment and the company "Huashen" (China) [11];

• Chongquing University, Technical University MADI and the company "Bitumen" signed an agreement on the development of technologies for the modification of rubber-bitumen binders by the processing of waste natural oils.

Significant steps towards practical cooperation in the transport sector were made in 2018 in the organization of navigation support of cross-border transport:

- started pilot cross-border road transport China-Mongolia-Russia;

- an agreement was signed between Roscosmos (Russia) and BeiDou (China) corporations.

Important and large-scale directions of scientific and technical cooperation in the field of transport and logistics were discussed during the international meeting on the organization of scientific and technical cooperation in the framework of the development of the "Silk way" held in MARCH 2019":

• with a welcoming speech from the Chinese side and a detailed presentation on the new

Professor Zhu Qiangping, head of the China-Russia center for research and regional cooperation of Jilin University, spoke on the opportunities and directions of development of scientific and technical cooperation in the light of the creation under the auspices of the State Committee for development and reforms of the PRC of a new Fund for financing joint projects for the development of the Far East

Participants of the meeting in the Bureau for design, monitoring and quality control of transport facilities of the Autonomous region of Inner Mongolia of China in the city of Hohhot in 2018

Professor, Chongquing University Dong Ruikin Gunung and Director of the CIS office of Tenda Co. (China) with colleagues from ROSDORNII, RUT MIIT and MADI (Moscow, 2018.) [12]

of the Russian Federation;

• on the development of the concept of the project of transmodal container transport "Volga-Yangtze" in the framework of transboundary corridors Europe-Western China and the "North-South" spoke the Director of the Institute of Vnesheconombank Yulia Zvorykina and Advisor to the General Director of the FAE "ROSDORNII", member of the Board of the International transport Alliance "One belt and one road" Stanislav Mamulat;

• on the tasks of creating an industry-Wide competence center and Scientific-the educational center for new materials and technologies of road construction within the framework of the national project "Safe and high-quality roads" spoke Sergey Popov, adviser to the General Director of FAE "ROSDORNII";

• with a presentation on the experience and challenges of information technology Alexander Boreyko, member of the Subcommittee on transport of the Committee for international cooperation of the Russian Union of Industrialists and entrepreneurs, Director General of IntelTech and Sergey Burago, President of the silk road Association and Director General of Sovtransavto-Moscow spoke about the projects of cross-border traffic of motor transport";

• about tasks and experience of development of the information environment of scientific and technological cooperation between Russia and China spoke the General Director of the company "Base Technology" Andrei Ushakov and Director of strategic development of the Publishing house "Mir" Julia Korotkova;

• head of information and telecommunication technologies Department of OKB MEI Andrey Averyanov spoke about the possibilities of scientific and technological cooperation in the creation of the Eurasian system of high-precision navigation "Moscow time" on the principles of radio interferometric observation systems with super-long bases in the framework of the implementation of the agreement signed in November 2018 between the corporations Roscosmos and Bei-Dou;

• Moscow representative of the POWERCHINA Corporation Mr. Liu E briefly reported on the company's experience in designing a bridge across the Lena river in Yakutsk and the company's technologies for the use of secondary materials (ash coal power plants) for the construction of hydraulic engineering and transport facilities;

• head of Moscow representative office of Tianjin Hitech Environment Development

Van Hainan reported on the experience of preparing high-tech implementation projects with Russian engineering companies and Universities.

During the events of the World Transport Convention 2019, held under the motto Green and Intelligent Mobility for Future Transport [14], the interim results of the implementation of a number of cooperation projects in the field of "green technologies", fully consistent with the declared agenda of the forum, were summed up and the plans for cooperation on projects with the Bureau for design, monitoring and quality control of transport facilities of the Autonomous region of Inner Mongolia of the PRC were updated.

International meeting on the organization of scientific and technical cooperation in the development of the "silk road" March 7 at the Russian University of transport MIIT [13].

Within the framework of the V International conference "Innovations in the road industry" held in July 2019. Sochi vector of Russian-Chinese cooperation in the field of green technologies for transport was supported by the signing of a Protocol between the ANO "Institute VEB", FAA "ROSDORNII" and the company POWERCHINA on the feasibility study of the application in the construction of road and hydraulic structures of the route "Meridian" (highway on the Russian section of the route Hamburg-Beijing) materials, modified materials with the use of ash and slag waste coal power plants, which promises to promote the expansion of the "green" approach and investment [15, 18].

Among the next events, developing further, and dedicated to the celebration of the 70th anniversary of the establishment of diplomatic relations between the parties, the following can be called:

- sessions "Digital transport corridors of Russia – China", "Green transport" and "Digitalization of the urban environment" included in the program of the business forum "Digital economy – development without borders" https://chinafestival ahhh!moscow/#/business_forum held on September 13, 2019 at the Festival of China in Moscow;

- International conference "Innovative technologies for resource-efficient and safe development of transport infrastructure", held on September 24, 2019 at the Institute of international transport communications of the Russian University of transport "MIIT".

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基于专家评估的克拉斯诺达尔地区建筑业发展分析与预测
ANALYSIS AND FORECAST OF THE KRASNODAR REGION CONSTRUCTION INDUSTRY DEVELOPMENT BASED ON EXPERT ASSESSMENTS

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抽象。 本文致力于简要回顾克拉斯诺达尔地区建筑业的现状。 对该地区建筑业的经济状况进行了分析，确定了影响该地区建筑业进一步发展的主要因素。根据专家估计，预测“近期建筑行业的工作量”。 使用基于标准化分数处理的方法确定专家能力。

关键词：建筑业现状，专家方法，标准化分数，专家能力评估，建筑业发展预测

Abstract*. The article is devoted to a brief review of the current state of the construction industry in the Krasnodar Territory. The analysis of the economic state of the construction industry in the region is carried out and the main factors affecting the further development of construction in the region are identified. The forecast "The volume of work in the construction industry" for the near future based on expert estimates is made. Expert competence is determined using an approach based on the processing of normalized scores.*

Keywords*: current state of the construction industry, expert methods, standardized scores, expert competency assessment, forecast of the construction industry development*

Despite all the economic difficulties, the construction industry has long been one of the most stable and dynamically developing sectors of the economy of the Krasnodar Territory. Macroeconomic factors have a significant impact on the construction industry as a whole and on the financial and economic indicators of construction companies, which include the economic growth rate of the region and the country as a whole, inflation, changes in interest rates of the Central Bank of the Russian Federation, changes in exchange rates, political stability.

Table 1 presents the main indicators of socio-economic development of the Krasnodar Territory [2].

Table 1. *The main indicators of socio-economic development of the Krasnodar Territory*

Indicators	2017	2018
GRP growth (estimate), in% of the corresponding period of the previous year	103,1	101,9
Industrial production index,% of the corresponding period of the previous year	104,4	104,2
Consumer price index,% of the corresponding period of the previous year	104,0	102,5

According to the Ministry of Economy of the Krasnodar Territory, the volume of GRP, as well as the industrial production index in the region over the past two years, has been increasing by 2-3% and 4%, respectively. However, stable growth of the consumer price index from year to year should also be noted. Inflation can be a serious threat to the industry. The increase in the cost of production and sales of products leads to higher prices. Inflation leads to the depreciation of existing stocks of raw materials and semi-finished products, to the depreciation of monetary funds of the population.

The standard of living of the population is a significant indicator for most business sectors. Data on the standard of living of the population of the Krasnodar Territory are presented in table 2.

Table 2. *The standard of living of the population of the Krasnodar Territory [1]*

Indicators	2017		2018	
	values	growth rate,%	values	growth rate,%
Population at the end of the year, thousand people	5603,1	100,6	5647,7	100,8
Average monthly per capita cash income, rubles.	33136	101,0	33904	102,7
Real disposable cash income,% of the corresponding period of the previous year	-	97,9	-	99,7
The registered unemployment rate, in% of the labor force	0,6	-	0,5	-

According to official statistics, the population of the Krasnodar Territory is increasing from year to year, and per capita cash incomes are also increasing. However, due to inflation, the real disposable cash income of the population is declining annually. A decrease in the level of registered unemployment should also be noted, which positively affects the economy of the subject and the Russian Federation as a whole.

The region and especially Krasnodar are attractive for life, migration flows and, accordingly, the need for new housing do not subside.

The mortgage remains the main impulse for the construction of the housing stock. Acceptable financing provided by a credit institution remains a critical factor in market capacity.

At one of the meetings of the State Council devoted to the development of the construction complex and the improvement of urban development, the head of state V.V. Putin called the construction industry "the most important strategic direction of the country's socio-economic development" [5] and proposed lowering mortgage rates without additional burden on the budget. The President sent this appeal to the Government of the Russian Federation and the Central Bank of the country and instructed to develop a modern housing rental system in large cities and protect the rights of equity holders. The President issued a number of decrees aimed at developing the construction sector, as He considers this industry a "driver" to overcome the economic crisis.

Data on housing lending in the region are presented in table 3.

Table 3. *Housing lending in the Krasnodar Territory [3]*

Indicators	2017	2018
Total amount, million rubles	253125	355019
Number of loans issued	27100	39065

A significant increase in the number and size of loans issued in 2018 compared with the previous year should be noted.

A decrease in the interest rate of the mortgage is a strong motivator for considering housing loans in order to improve housing conditions for the population. Data on the weighted average interest rate in the Krasnodar Territory are presented in table 4.

Table 4. *Weighted average mortgage rate in the Krasnodar Territory [3]*

Year	Weighted Average Rate, %
2016	11,95
2017	10,03
2018	9,62

Such a reduction in the interest rate on housing loans provides an understanding of the state's strategy regarding the construction industry and characterizes a further rise in the real estate market.

Speaking about the protection of the rights of citizens, participants in shared construction, it is impossible not to mention the introduction in the Federal Law of December 30, 2004 № 214-FL (as amended on December 25, 2018) "On the participation in shared construction of apartment buildings and other real estate and on amendments to some legislative acts of the Russian Federation "of the article 23.2" Protection of the rights of citizens participating in shared construction "of the Federal Law of July 29, 2017 № 218-FL.

In order to implement the state housing policy aimed at increasing the guarantee of protection of the rights and legitimate interests of citizens - participants in shared construction, the functions of forming a compensation fund for shared construction through mandatory deductions (contributions) of developers are carried out created in accordance with the Federal Law "On Public Law Companies on the protection of the rights of citizens - participants in shared construction in the event of insolvency (bankruptcy) of developers and on amendments to individual laws acts of the Russian Federation "public law company" Fund for the Protection of the Rights of Citizens - Participants in Shared Construction "(hereinafter referred to as the Fund).

At the request of the Fund, developers are required to submit accounting (financial) statements and documents (information) to the Fund within ten days from the date of receipt of the request, confirming the accuracy of the data.

Compensation is paid to citizens participating in shared construction under shared construction contracts providing for the transfer of residential premises in accordance with the Federal Law "On a Public Law Company to Protect the Rights of Citizens - Participants in Shared Construction in the Insolvency (Bankruptcy) of Developers and on Amending separate legislative acts of the Russian Federation."

A person, including the beneficial owner, who has the actual ability to determine the actions of the builder, including the ability to give instructions to the person acting as the sole executive body, or to a member of the collegial management bodies of the builder, bears subsidiary liability with the builder for losses caused to citizens by their fault - to participants in shared construction (part 4 was introduced by the Federal Law of July 1, 2018 № 175-FL; as amended by the Federal Law of December 25, 2018 № 478-FL) [4].

These changes are designed to ensure the confidence of people and the safety of their funds when buying new housing.

Veniamin Kondratyev, Governor of the Krasnodar Territory, in early 2018 announced the replacement of equity in construction financing with project financing. With its help, the Russian government eliminates both fraudulent developers and those who simply do not know how to manage money. The new scheme is carried out at a commercial rate determined by the bank. In this case, the developer must work and make payments without cash flow.

It should be noted that most of the presidential decrees are being implemented and statistics confirm this. Thus, among the advantages of the new project financing system is the simplification of mortgage registration. Since it implies accreditation with the bank, the availability of loans for the purchase of apartments will increase.

Krasnodar Territory has a fairly impressive number of construction companies. In total, there are about 17.5 thousand registered companies and organizations in the construction industry. Moreover, almost half of the region's construction organizations are located in the capital. Key indicators of the construction industry in the Krasnodar Territory in 2017-2018 are given in table 5.

Table 5. *Indicators of the Construction sector of the Krasnodar Territory in 2017-2018*

Indicators	2017		2018	
	values	growth rate, %	values	growth rate, %
The volume of construction work, billion rubles	308,7	113,5	287,8	88,5
The commissioning of residential buildings, thous. sq. m.	4728	105,0	4391	92,9

The pace in the field of construction in the region in 2018 amounted to 88.5% compared to the previous year. The decline in industry performance compared to 2017 is due primarily to a reduction in the commissioning of residential buildings. The reason for this was a reduction in the number of permits issued due to increased control over the construction of multi-unit housing. And this is good for both home buyers and reliable developers.

Table 6 shows the values of the volume of work in value terms of the construction industry in the region in 2010-2018.

Table 6. *The volume of work performed by type of economic activity "Construction" in the Krasnodar Territory [2]*

Year	Total, million rubles
2010	299575
2011	399397
2012	442397
2013	480664
2014	316186
2015	275550
2016	252093
2017	308669
2018	287804

To fully solve the problem of forecasting the volume of work in the medium term, an integrated approach to describing the situation should be used, if possible, involving the use of forecasting based on the analysis, statistics and opinions of independent experts.

If experts are equal, that is, each expert opinion has the same effect on the study and is accepted without taking into account the authority of the expert himself, then the simplest group assessment of the i-th object is presented in the formula:

$$x_i = \frac{1}{n}\sum_{j=1}^{n} x_{ij}\,, \qquad (1)$$

where n is the number of experts (i.e., average rating).

If you want to take into account the competence, objectivity, ' owledge of the experts, then we introduce the weight indicators of competence q_j for the *j*-th expert, then formula (1) takes the form:

$$x_i = \sum_{j=1}^{n} q_j x_{ij}, \quad (2)$$

So, before relying on the opinion of an expert, you need to assess how much he is competent in this matter. An expert's competence is the degree of his qualification in a certain field of knowledge. To select experts for the expert group, a control examination was carried out under the assumption that the correct answers to the questions posed are not known in advance. In this case, an approach based on the processing of normalized scores [6] was used.

In the control examination, experts should assess the problem of increasing the profitability of the industry by setting ratings on a 10-point scale for the importance of those factors that will positively affect the activities of construction companies: issuing housing loans to the population a_1, state policy to support the construction industry a_2 and the tendency to develop new lands a_3. Table 7 presents expert ratings

Table 7. *Expert ratings*

Expert	Rated elements			
	a_1	a_2	a_3	$a_1 + a_2 + a_3$
1	10	4	8	22
2	9	5	10	24
3	6	3	7	16
4	10	2	6	18
5	7	5	10	22

To assess the competence of experts, normalized point expert scores, weighted amounts of relative point scores, and expert competence coefficients are calculated.

Table 8. *Normalized scores*

Expert	Rated elements		
	a_1	a_2	a_3
1	0,455	0,182	0,364
2	0,375	0,208	0,417
3	0,375	0,188	0,438
4	0,556	0,111	0,333
5	0,318	0,227	0,455
Average scores	0,416	0,183	0,401

Normalized scores for each expert are determined by dividing each scoring by the total score for this expert.

The calculation of the weighted sums of the relative scores will be given on the example of the first expert:

$$0{,}455 \cdot 0{,}416 + 0{,}182 \cdot 0{,}183 + 0{,}364 \cdot 0{,}401 = 0{,}368, \quad (3)$$

The sum of the weighted scores obtained is 1,836.

Next, the competency ratios of experts should be calculated. For example, for the first expert, the calculation is presented in the formula:

$$0{,}368/1{,}836 = 0{,}2005, \quad (4)$$

Table 9 presents the data of the competence coefficient of experts.

Table 9. *Expert Competency Ratios*

Expert	Weighted relative scores	Expert competency ratios	Deviation from average group competency
1	0,368	0,2005	0,0005
2	0,361	0,197	-0,003
3	0,366	0,199	-0,001
4	0,385	0,210	0,010
5	0,356	0,194	-0,006
Total	1,836	1	-

The average group competency is 0.2. The competency coefficients of all five experts deviate slightly from the average group competence, therefore, we can assume that all of them are quite competent experts.

To assess the predicted values of the volume of work in the construction industry in 2019, experts should express their opinion in the form of an interval. Then, when calculating the group foreca alue according to formula (2), the middle of the interval should be taken as x_{ij} The results of expert responses are presented in the following table.

Table 10. *Results of expert responses*

Expert №	q_j	Forecast interval in% to the level of 2018	Left end of the interval	Right end of the interval	Middle of the interval x_{ij}	$q_j x_{ij}$
1	0,2005	100-115	287804	330974,6	309389,3	62032,55
2	0,197	110-120	316584,4	345364,8	330974,6	65202
3	0,199	105-115	302194,2	330974,6	316584,4	63000,3
4	0,210	110-125	316584,4	359755	338169,7	71015,64
5	0,194	105-120	302194,2	345364,8	323779,5	62813,22
Total						**324063,7**

Thus, the forecast value of the volume of work in the construction industry in 2019, according to experts, is 324,063.7 million rubles. This suggests that the dynamics of the volume of construction work in the Krasnodar Territory in the near future will be positive. A significant impact on the forecasted indicator is provided by the formation of the affordable housing market - one of the priority areas of socio-economic development of the Krasnodar Territory. An increase in the volume of construction will provide the local population and guests of the region with modern and high-quality housing and will create a solid foundation for realizing human potential.

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论资产阶级和苏维埃时期宗教组织物权范围内俄罗斯立法的发展
ON THE DEVELOPMENT OF RUSSIAN LEGISLATION IN THE SPHERE OF REAL RIGHTS OF RELIGIOUS ORGANIZATIONS OF THE BOURGEOIS AND SOVIET PERIODS

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抽象。 在十九世纪和二十世纪之交，宗教组织已成为民事关系的一个组成部分，但它们仍然受到严密的行政控制。 1917年的革命爆发打破了二十世纪初的积极但主要相互矛盾的改革主义，剥夺了宗教组织的法律实体地位，引入了其他限制，这些限制严重导致侵犯宗教公民权利组织。

关键词：宗教组织，财产法，财产。

Abstract. *Religious organizations have become an integral part of civil relations at the turn of the nineteenth and twentieth centuries, but they continued to be under close administrative control. The positive but largely contradictory reformism of the beginning of the twentieth century was interrupted by the revolutionary explosion of 1917, which deprived religious organizations of the status of a legal entity, introduced other restrictions, which sharply led to the infringement of the civil rights of religious organizations.*

Keywords*: religious organization, property law, property.*

The rapid development of capitalism in Russia after 1861 launched a new flywheel of social opposition in the course of which a more free society could emerge in a relatively democratic state. The judicial reform of 1864 set an example in which direction Russian law, including civil law, should be reformed and developed.

Before the dominant elite at the turn of the nineteenth – twentieth century there were two alternatives. The first alternative is the completion of political reforms from above, which will lead to the loss of political dominance of the feudal elite and the abolition of autocracy with the regime of sole power of Nicholas II, the former elite retains the greatest privileges in unity with the bourgeoisie, the monarchy acts as a constitutional, limited, decorative monarchy.

Nicholas II was forced to carry out transformations of a bourgeois nature, to which he was prompted by a social explosion on January 9, 1905. The emperor allows democratic reforms that formally limit autocratic power with a claim to form a limited monarchy. The manifesto of October 17, 1905 is constitutional in content[1]; the activities of the legislative body - the State Duma and the State Council are implementing a liberal project of M.M. Speransky on endowing subjects with the fullness of civil and political rights; the activity of political parties is permitted; after the completion of the revolution of 1905-1907 the "bourgeois" rights and freedoms proclaimed by the manifesto of October 17 are not canceled.

The appearance of truly civil legislation regulating, in particular, the property rights of religious organizations could have occurred at the beginning of the 20th century, when in 1906 a draft Civil Code[2] appeared, developed on the model of German civil law. This project was prepared by the previous social development during the outlined transition from an agrarian type of society to an industrial one. A distant “predecessor” is the current code of laws of the Russian Empire, systematized by the liberal M. M. Speransky.

The formal reason for the refusal to accept the Civil Code is the false opinion that his articles are “not sufficiently developed”. The main reason is the manifestation of the elements of a conservative government policy in the conditions of the defeat of the revolution of 1905-1907. The social revolution of 1917 does not allow further development of the legislation of property rights in this direction; truncated civil legislation is being formed under the conditions of the overwhelming domination of the socialist state over society. The principles laid down in the Civil Code were returned only over the historical century in 1994, when the first part of the Civil Code of the Russian Federation was adopted. Despite the constantly introduced changes to the current code, it played an important role in stabilizing civil legislation in Russia.

After the defeat of the revolution of 1905–1907, Nicholas II made a strategic mistake by suspending the systematic implementation of bourgeois reforms, including the reform of civil law. The sovereign refused to support the course of the great reformers S.Yu. Witte and then P.A. Stolypin, who acted on the principle: "First, calm, then reform." In addition to agrarian transformations, P.A. Stolypin suggested the implementation of a number of reforms - a real version of the evolutionary path of transition from autocracy to a true limited monarchy, organization of a democratic society based on bourgeois values.

The February revolution of 1917 was to become a breakthrough towards the real emergence of civil legislation of a bourgeois nature, but then the Bolshevik

[1]Dorskaya, A. A. Influence of the ideas of the manifesto October 17, 1905 On the realization of freedom of conscience in Russia // Scientific Search. - 2016. - № 1.2. - P. 11-14.

[2]Dorskaya, A. A. Influence of the ideas of the manifesto October 17, 1905 On the realization of freedom of conscience in Russia // Scientific Search. - 2016. - № 1.2. - P. 11-14.

revolution and the establishment of Soviet power followed. Soviet Russia, having inherited a large territory of the Russian Empire with the peoples living on it, began to form a single Soviet community in which the religious factor was seen as a significant obstacle. The peoples of European Russia professed Orthodox, Old Believers and Uniate. The peoples of the North Caucasus and the Volga region professed Islam, which was divided into Sunni and Shiism. The peoples of Eastern Siberia and Kalmykia were adherents of Buddhism.

Since 1917, there has been a rejection of the formation of civil legislation on the basis of bourgeois values, which continues until 1990. A.R. Valitova writes: "With the advent of the theory of Marxism in Russia, and then in the Soviet Union, property began to be considered from an economic point of view"[3]. The value of property rights in the life of citizens drops sharply in 1918, followed by the "renaissance" of the 1920s, when the Civil Code was adopted, with a truncated interpretation of property under liquidation in the direct and figurative sense of private property.

Property of citizens continues to exist, but only as personal property. G.A. Mangul notes: "So, in the Civil Code of the RSFSR of 1922, state (nationalized and municipalized), cooperative and private property was established..."[4]. The real predominance of state property was covered by the formal existence of an extensive sector of cooperative ownership in the form of collective farms, supplemented by other forms of rural cooperation. The rejection of Stalinism and the subsequent democratization in the USSR developed other forms of ownership (public organizations).

The CPC decree of January 20 (February 2) 1918 perceived existing religious organizations as "societies", calling them "church and religious societies" in article 10 and extended to them general provisions on private societies and unions. The most significant is article 12, which deprives religious societies of a legal entity and the right to own property. Religious societies lose potential subsidies from government[5]. O.N. Petyukova notes: "Church property was declared public property. The nationalized and municipalized property was partially transferred to the church on the basis of gratuitous rental contracts as liturgical property "[6]. The decree by article 13 deprives religious societies of all property, declaring it as pub-

[3]Slyshenkov, V. A. The draft Civil Code of 1905 and its place in the history of Russian law: dis. Drs. legal Sciences: 12.00.01. - dis. ... cand. jurid. Sciences: - Moscow, 2003.

[4]Valitova, A. R. The category of "property" in the legal thought of the Soviet period // Legal science and practice: Bulletin of the Nizhny Novgorod Academy of the Ministry of Internal Affairs of Russia. - 2013. - № 21. – P. 198.

[5]Mantul, G.A. Institute of Property in the Soviet State // Philosophy of Law. - 2014. - № 5 (66). - P. 81.

[6]Decree on freedom of conscience, church and religious societies of January 20 (February 2) 1918 // Decrees of the Soviet government. - Vol. I. – Moscow, 1957. - P. 373-374.

lic property. Movable and immovable things in the form of church buildings and objects intended for liturgical purposes, that is, now "public property" was transferred to the free use of religious societies by decision of state or local authorities.

The formal deprivation of religious organizations of the status of legal entity by decree on January 20, 1918 by the end of the 1920s was somewhat mitigated through the registration of a priest with a religious group and the principle of permitted activity. Ritual practices within the territory and places of worship of a religious group were allowed without additional approval, and economic activity was regulated by control and authorization measures. A registered religious group could obtain permission to repair a temple, purchase building materials, etc.

It should be noted that during the NEP it is allowed to use the term "religious organization", despite the fact that such associations were formally deprived of the status of a legal entity. The fact is that a religious group was appropriately registered as a parish with an authorized Soviet body. The priest also passed the appropriate registration.

The religious organization took part in the economic turnover. On the basis of a circular - by-laws, in 1929 the People's Commissariat of Finance introduced a commercial and income tax on the sale of objects of worship (candles, icons, etc.), and the tax on religious buildings was increased from 1/8 to 1/2 percent of the building cost according to Gosstrakh[7]. Religious organizations were forced to adapt to the conditions when they were considered as a "feudal remnant" and a transitional phenomenon. With the formation of the Soviet Peace Fund, all religious communities began to pseudo-voluntarily transfer part of the funds to its activities.

In 1920-1930, a powerful blow was inflicted on religious organizations in the country during the anti-religious campaign, as well as the struggle against kulaks, nationalism, and collectivization of agriculture. Religious organizations and their participants were subjected to almost physical suppression. The main blow was taken by the Russian Orthodox Church, who assessed the authorities' policies as persecution, which in scale exceeded the previously known persecution of Christians. This direction has been studied quite well to this date. The limitation of the size of the article forces us to circumvent these events, which ranged from the forcible seizure of church values to the killing of priests and other believers. Let us dwell on the situation of religious organizations of Islam and Buddhism, which were subjected to persecution and restriction of activities similar to the Christian-Orthodox denomination.

In 1926, in the Buryat-Mongol Autonomous Republic, nationalization of the datsans' property took place, theological schools were liquidated. The collectivization of agriculture in 1929 led to the loss of land by the datsans. Religious build-

[7]Petyukova, O. N. Legal forms of relations between the Soviet state and the Russian Orthodox Church in 1917-1945: abst. dis. Drs. Jur. sci: 12.00.03. - Moscow, 2011. - P. 29.

ings were destroyed, works of Buddhist art were stolen and destroyed, as well as books and manuscripts. In 1936-1938 repression intensifies, for example by 1938 from 1800 to 15000 representatives of the Lamaist clergy were arrested [8]. Since 1929, in Kalmykia, repression has been gradually intensified, spiritual schools have been eliminated, and arrests have been made.

In the Tuvan People's Republic, religious organizations are also being persecuted. As a result, by 1937 there were 5 huree in Tuva and with the number of lamas no more than 50-70, which had been eliminated by the beginning of the 1940s. By the beginning of World War II, not a single Buddhist monastery remained on the territory of the USSR, as well as the Tuvan People's Republic, llamas carried out religious activities in the underground. It can be argued that by the beginning of the 1940s, the religious organization of the Buddhist religion was completely destroyed.

In 1945 in conditions of relief in the field of the religious question, two datsans are restored - the Ivolginsky and Aginsky monasteries. In 1946, an authorized congress of lamas takes place, which adopted the Regulation on Buddhist clergy in the USSR, based on the principle of active cooperation of a religious organization with the state. The Central Spiritual Administration of the Buddhists of the USSR (CSAB) was restored under the chairmanship of Candido-hambo-lama P. Dorji. Further development of religious organization becomes possible during the period of "perestroika".

On October 1, 1990, the USSR Law On Freedom of Conscience and Religious Organizations was adopted. The leadership of CSAB was not satisfied by it, because it did not grant the powers of a legal entity as a single organization. On October 25, 1990, the Supreme Council of the RSFSR adopted in its final form, without discussion, the law of the RSFSR "On Freedom of Religion"[9]. In 1991, the Central Spiritual Administration of Buddhists (CSAB), by decision of the Ministry of Culture of Russia, received from the Museum of the History of Buryatia for free use more than 2,000 objects of worship, including a sandalwood statue of Zandan Zhuu. The international Buddhist center "Zandan Zhuu Shrine" was established, which, on the basis of a decision of the Government of the Republic of Buryatia "On providing state support to the International Buddhist Center - Zandan Zhuu Shrine", was exempted from rent[10].

[8]Khakimov, R. Sh. Property of religious communities and its transformation in the Soviet period (by the example of Muslim communities of the Urals) // XX century and Russia: society, reform, revolution. - 2015. - № 3. - P. 90.

[9]Zhitenev, T. E. Buddhism in Russia: milestones in history // Bulletin of the Volga University. V.N. Tatishchev. - 2011. - № 7. - P. 198.

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In the Russian Federation, a number of entities are Muslim republics: Adygea, Dagestan, Ingushetia, Kabardino-Balkaria, Karachay-Cherkess and Chechen republics, Bashkortostan and Tatarstan. The supporters of Islam partially include the population of North Ossetia (Alania). Regions with a fairly dense settlement of Muslims are traditionally the North Caucasus, the Volga region and the Center of the European part. According to various sources, 10-20 million Muslims live in Russia[11].

The funds of mosques were replenished from voluntary donations and by performance of religious rites. The receipts could be in the form of a gift or donation of material objects, dishes, animals for sacrifice. Possible fees for various needs of the community of believers were not allowed by the authorized representative of the Council for Religious Cults. During the anti-religious campaign of the 1930s. most mosques were liquidated, but Islam moved from a legal state and an active phase to existence at the level of family tradition and everyday life.

The Muslim helped the religious community in the form of a zakat, which amounted to 1/40 of all annual incomes, and he could also voluntarily give alms in form of saadak. Under the collective farm system, the incomes of Muslim collective farmers were initially meager. Only during the years of World War II was a partial relaxation made - it was decided to open some mosques. However, the total number of mosques in the country did not exceed three hundred. State and local authorities in the Soviet period secured the right to withdraw from the community the building of a church or mosque. Communities retained the right of limited use. Property was devoid of two main features - ownership and disposal. Tight control over the use of finance of religious communities was in effect [12].

This period of development of property rights is extremely controversial. The systematic and deep lag in the development of domestic civil legislation in the nineteenth century from the advanced European countries, including property rights of religious organizations, was partially offset by administrative law, but by the beginning of the twentieth century, the prerequisites were created for eliminating this lag, formed during the revolutionary process of 1917.

The emergence of true civil legislation regulating, including, property rights of religious organizations, could have occurred in the early twentieth century, when in 1906 a draft of Civil Code appeared, developed on the model of German civil law. The formal reason for the refusal to accept the Civil Code is the false opinion that its articles were “not sufficiently developed”.

[11]ib. – P. 56.

[12]Sokolov, A.N., Starostina, S.A. Islam in the state-legal policy of Russia // Bulletin of the Kaliningrad branch of the St. Petersburg University of the Ministry of Internal Affairs of Russia. - 2008. - № 1. - P. 215.

The February Revolution of 1917 was to become a breakthrough towards the real emergence of civil legislation of a bourgeois nature. The backwardness of the revolution is determined by its main tasks and, in part, the driving force. The peasant-communal understanding of the right to property, primarily land, was not based on recognition of private property rights, but on the belief that "the land belongs to the God." Since 1917, there is a rejection of the formation of civil legislation on the basis of bourgeois values, which continues until 1990.

The formal deprivation of religious organizations of the status of a legal entity by decree ofJanuary 20, 1918 by the end of the 1920s was somewhat mitigated through the registration of a priest with a religious group and the principle of permitted activity. It should be noted that during the NEP it was allowed to start using the term “religious organization”, despite the fact that such associations were formally deprived of the status of legal entity. The fact is that a religious group was appropriately registered as a parish with an authorized Soviet body. The priest also passed the appropriate registration. During World War II, there is some easing on the religious issue. In the post-war period, the situation of religious organizations stabilized.

承认和执行芬兰和俄罗斯联邦外国法院的决定
RECOGNITION AND ENFORCEMENT OF DECISIONS OF FOREIGN COURTS IN FINLAND AND THE RUSSIAN FEDERATION

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抽象。本文讨论了对芬兰和俄罗斯外国法院判决的考虑的比较分析，特别是关于赡养费索赔的例子，儿童与父母会面的权利，收债和承认外国法院的决定。芬兰和俄罗斯联邦的国际法律法案和国家立法的基础。根据欧盟法规№2201/2003“关于管辖，承认和执行家庭事务判决和父母义务案件以及取消第1347/2000号条例”或根据对芬兰具有约束力的国际协议，必须在芬兰作出决定。在审议承认和执行外国判决的案件时，主管法院确定存在另一项外国司法行为的可能性是客观上有限的，其内容将证明没有法律确定性。在这种情况下，反驳声称存在这种司法行为的一方的论点的责任在于相反的一方。在有争议的问题上确立法律确定性和外国法院判决的终结性将排除可能滥用权利的情况，这反过来又是拒绝承认和执行外国法院裁决的依据。司法行为的终结性及其在有争议的问题上形成的法律确定性是普遍公认的合法性原则的要素，作为国家公共秩序的一部分。

与食品义务有关的国际公约可以快速审查申请，并可以使用普遍，负担得起，有效和易于使用的程序来收回赡养费。

关键词：承认和执行外国法院的决定，国际条约，执法实践。

Abstract. *The article discusses a comparative analysis of the consideration of foreign courts decisions in Finland and Russia, in particular, on the examples of claims for alimony, the right of a child to meet with a parent, debt collection and recognition of decisions of foreign courts on the basis of international legal acts and national legislation of Finland and the Russian Federation. On the basis of European Union Regulation № 2201/2003 “On jurisdiction, recognition and enforcement of judgments in family matters and cases of parental obligations and the annulment of Regulation № 1347/2000” or on the basis of an international agreement binding upon Finland, a decision must be made in Finland. When considering cases on the recognition and enforcement of foreign judgments, the pos-*

sibility of a competent court establishing the existence of another foreign judicial act, the content of which will establish the absence of legal certainty, is objectively limited. In this case, the burden of refuting the arguments of the party alleging the existence of such a judicial act rests with the opposite side. The establishment of legal certainty on a controversial issue and the finality of a foreign court decision will exclude cases of possible abuse of the right, which in turn is the basis for the refusal to recognize and enforce a decision of a foreign court. The finality of the judicial act and the legal certainty formed by it on a controversial issue are elements of the universally recognized principle of legality as part of national public order.

International conventions relating to alimentary obligations provide a quick review of applications and make it possible to use universal, affordable, effective and easy-to-use procedures to recover alimony.

***Keywords**: recognition and enforcement of decisions of foreign courts, international treaties, law enforcement practice.*

Between Russia and Finland, by virtue of the succession, the 1978 agreement concluded with the USSR on legal protection and legal assistance in civil, family and criminal cases is valid, however, the provisions of this agreement do not provide for mutual recognition and enforcement of court decisions, including in cases of recovery alimony.

At the same time, in accordance with its national legislation, the Law on the Recognition and Enforcement of Foreign Judgment of the Recovery of Alimony of 1983 and the Law on the Central Authority of Finland in International Alimony Recovery Affairs, Finland recognizes and implements the decisions on the recovery of alimony issued in countries what are non-participants to the above conventions. The enforcement functions in Finland are assigned to the State Compulsory Enforcement Service, subordinate to the Ministry of Justice. In order to enforce a foreign judgment to recover alimony, it is necessary for the Helsinki Court of Appeal to recognize the decision and adopt regulations on the enforcement of the decision in Finland.

The study examined the analysis of legislation and judicial practice in Russia and Finland on the recognition and enforcement of decisions in civil matters relating to family law and commercial matters. Finnish law recognizes reciprocity as a condition for the recognition and enforcement of decisions of foreign courts. The Code of Civil Procedure of the Russian Federation does not contain a requirement for reciprocity. To execute a decision of a foreign court on the territory of the Russian Federation, it is necessary to recognize a foreign court in the Russian Federation to enforce its decision and enforce a foreign court on the territory of the Russian Federation through the enforcement proceedings.

In the Russian legal proceedings, the decision of a foreign court or a foreign arbitral award may be brought for enforcement in a period not exceeding three years from the date of its entry into force. But according to article 246 of the APC

of the Russian Federation, if the specified period is missed, it can be restored at the request of the collector by the arbitration court[1]. The same procedure is provided for by the Code of Civil Procedure of the Russian Federation, that is, a period missed for good reason can be restored by the court[2] as well as in the Federal Law of October 2, 2007 N 229-ФЗ "On Enforcement Proceedings".

The burden of proving timely and proper notice lies with the person declaring the recognition and enforcement of the foreign decision (paragraph 3 of part 3 of article 242 of APC; paragraph 4 of part 2 of article 411 of the Code of Civil Procedure).

Obligation in the territory of the Russian Federation of decisions of foreign courts, international courts and arbitrations is subject to execution in the event of the existence of an international legal act providing for such an opportunity.

The jurisprudence of the Supreme Court of the Russian Federation directs the courts to establish compliance with not only the requirements of international law and the legal aid agreement, but also the procedural legislation of a foreign state, whose decision is subject to recognition and enforcement in Russia. According to Part 3 of Art. 6 of the Federal Constitutional Law of December 31, 1996 N 1-ФКЗ "On the Judicial System of the Russian Federation" established the norm according to which "the binding on the territory of the Russian Federation of decisions of foreign courts, international courts and arbitrations is determined by international treaties of the Russian Federation".

The Hague Convention of 1996 in Finland entered into force on 1.3.2011 and in the Russian Federation on 1.6.2012.

Of interest is the decision of the Shchelkovo City Court of the Moscow region in respect of Russian citizens permanently residing in Finland and consideration of the issue of living a child born in Finland with a mother. So, by a decision of 10.10.2017, the Shchelkovo City Court of the Moscow region stated the residence of the child with the mother after the family breaks up. According to paragraph 5 of the Resolution of the Plenum of the Supreme Court of the Russian Federation "On the application by the courts of the law when resolving disputes related to raising children", when deciding on the place of residence of a minor child when his parents live separately, it must be borne in mind that the child's place of residence is determined based on his interests, and also the mandatory opinion of a child who has reached the age of 10 years, provided that this does not contradict his interests (clause 3 of article 65 and article 57 of the Family Code of the Russian Federation). Parents and the child have the citizenship of the Russian Federation and permanent registration on its territory, at the same time they have a residence

[1]The Arbitration Procedure Code of the Russian Federation dated 07.24.2002 № 95-ФЗ (as amended on 12.25.2018) (as amended and supplemented, entered into force on 12.25.2018).
[2]The Code of Civil Procedure of the Russian Federation dated November 14, 2002 № 138-ФЗ (as amended on July 26, 2019) (as amended and supplemented, entered into force on August 6, 2019).

permit in Finland.

The Shchelkovo City Court of the Moscow region decided to determine the place of residence of the minor daughter with her mother.

In her appeal to the Helsinki Court of Appeal on July 18, 2018, applicant L. requested that the above court decision, which entered into force on March 5, 2018, be enforced in Finland. The Helsinki Disrict Court referred to Section 25, Clause 1 of the Finnish Law on Custody of a Child and the Right to Meetings whereby a court decision made in a state other than Iceland, Norway, Sweden and Denmark is recognized in Finland without a separate court decision[3]. Having analyzed in aggregate the materials submitted by the applicants, as well as their arguments set out at the hearing, the court determined the residence of the child with the mother. Helsinki Court of Appeal upheld the decision of the Helsinki District Court [4].

In Finland, decisions of foreign courts, international courts and arbitrations are examined in a Helsinki district court with the possibility of appealing to the Helsinki Court of Appeal.

In Finland, as well as in the Russian Federation, the claimant's application for the enforcement of a foreign court is considered at the place of residence or location of the debtor. If the debtor does not have a place of residence or if his location is unknown, the court shall consider cases at the location of the debtor's property.

On the basis of the decision of the foreign court and the court ruling on the enforcement of this decision that has entered into force, a writ of execution is issued, which is sent to the person in whose favor the decision was made[5].

In Finland, after considering a request to enforce a decision of a foreign court, the Helsinki district court issues a decision on the enforcement of a decision of a foreign court or on refusal to do so. On the basis of the court ruling on the enforcement of this decision that has entered into legal force, a writ of execution is issued, which is sent to the court at the place of execution of the decision of the foreign court.

Note that decisions of foreign courts that do not require enforcement are recognized without judicial proceedings, provided that the defendant does not object. As an example, the decision of the Helsinki District Court of 14.1.2015 on the recognition of the decision of the Limassol District Court of 11/18/2014. The recoverer - an offshore company registered in Cyprus, has requested the recognition of a defendant who has entered into force with permanent registration in Helsinki and has entered into force a decision of a foreign court. An appendix to the application submitted to the court a certified translation into Finnish of the decision of the Limassol court in the case of the claimant - an offshore company of Cyprus to the defendant - another offshore company

[3]Desision of Helsinki District Court H 18/35251, 15.10.2018.

[4]Decision of District Court of Helsinki, H 18/2737, 5.4.2019.

[5]Civil Procedure Code of the Russian Federation. Article 412, part 9 (introduced by the Federal Law of December 29, 2015 № 409-ФЗ).

together with a company registered in Finland and filed in violation of the application deadline[6]. The Helsinki District Court recognized the decision of the Limassol District Court of November 18, 2014 № 4504/14 in accordance with the Regulation of the Council of the European Union 44/2001 on jurisdiction, recognition and enforcement of judgments in civil and commercial cases, referring to Articles 39,41,43 and 53[7].

It is important to note that the absence of an international treaty cannot serve as a basis by a Finnish court for refusing to consider the petition of an interested person for recognition and enforcement of a foreign court decision.

Thus, the Helsinki District Court noted that the United States did not ratify the Hague Convention of 10/19/1996, therefore, in the case, it is necessary to determine the application of the law on custody of the child and the right to meet[8].

However, in accordance with Art. 15 clause 2 of the Hague Convention, to the extent required by the protection of the person or property of the child, the courts may, as an exception, apply or take into account the law of another state with which the situation is most closely related.

The county court determined that the recognition and enforcement of this decision would not lead to a result that would contradict the fundamental principles of the Finnish law and order regarding family and children. In addition, there are no obstacles to the recognition and enforcement of a judgment that could be contrary to the interests of the child.

A mother with a 12-year-old child moved from Texas to Finland on 27.6.2018, and the collector appealed to the Helsinki district court to recognize the court decision made in the United States and be enforce it in Finland in accordance with the procedure provided for by the law of the latter state[9]. The parents of the child signed an agreement on the maintenance of the child and meetings with him after moving to Finland. When deciding on the application of measures to protect children, the county court applied the provisions of the law on custody of the child and the right to meet[10]. A decision made in a foreign country, with the exception of those made in the Nordic countries, is recognized in Finland without separate confirmation. However, the Helsinki Disrict Court may confirm whether the decision is recognized in Finland. According to clause 2 of the same article, a decision that is recognized in Finland in accordance with clause 1 and can be enforced in the state of origin, if the Helsinki district court confirms that the decision is enforceable.

According to paragraph 3 of Article 25 of the above law, when a court recognizes that a decision of a foreign state can be enforced in Finland, it can at the same time change or clarify the conditions of the meeting or circumstances specified in

[6]Decision of District Court of Limasol, Action No. 4504/2014.

[7]Decision of Helsinki District Court H 14/54327, dated 14.1.2014.

[8]Decision of Helsinki District Court H 18/36035, dated 31.1.2019.

[9]Decision on District Court of Limassol, Action № 4504/2014.

[10]Decision of 245th Judicial District Court of Harris County, July 18, 2018.

the decision, which it considers necessary in the best interests of the child.

According to Article 29a, the law only applies subject to the provisions of the European Union Regulation (Brussel I) or on the basis of an international agreement binding upon Finland.

The court ruled that in the case all circumstances were taken into account and there is no reason for a change or clarification for meetings with the child according to the court decision in the United States [11].

The Ministry of Justice of Finland is the central competent authority under the New York Convention on the Collection of Alimony Abroad from 20.06.1956 and the Hague Conventions of 1958 and 1973 (hereinafter the Hague Convention of 2007).

Helsinki court proceedings in the Helsinki Disrict Court are the most frequent foreign court cases. For the enforcement in Finland of a foreign court decision on the recovery of alimony, it is necessary to recognize the decision by the Helsinki Court of Appeal and adopt a decision on the enforcement of the decision in Finland. Based on the submitted documents, the Ministry of Justice of Finland draws up a petition for the recognition and enforcement of the judgment and submits it with the necessary annexes to the Helsinki Court of Appeal.

For example, on the basis of a court decision in the Russian Federation, applicant O. applied to the Helsinki district court for recognition and enforcement of the decision to recover alimony from A. who lives in Finland. The applicant referred to the Convention on the Collection of Alimony Abroad, adopted in 1956 in New York.

The county court ruled that the decision of the foreign court was not contrary to Finnish law and that the enforcement of the decision of the Russian court was not contrary to the principles of Finnish law, citing a previous judgment of the Supreme Court (KKO: 1991: 135). Guided by the articles of the law on the recognition and enforcement of court decisions on alimony issued abroad[12] (4 § p. 1, 5 § p.1, 7 § sp. 1 and 2, 11 § and 12 §) the court ordered the defendant to pay alimony in ¼ part of all types of earnings and other income of the payer in the amount of 738.21 euros, starting from 12.10.2006 until the child reaches the age of majority[13].

A similar decision was made by the Supreme Court of Finland (KKO: 2001: 109). The court determined that the consideration of the claim for the recovery of alimony for the maintenance of a Russian child born into a lawful marriage and living in Finland is within the competence of the Finnish court, despite the fact that the person obligated to pay alimony is a citizen of the Russian Federation and

[11]Decision of District Court of Helsinki, H 18/36036, 6.6.2019.

[12]Laki lapsen huollosta ja tapaamisoikeudesta 8.4.1983/361.

[13]Decision of Helsinki District Court H 16/9339, dated 12.7.2017.

lives in the territory of Russia.

Since January 1, 2011, the functions of the central body of Finland for the collection of alimony have been transferred to the Ministry of Justice from the Ministry of Foreign Affairs. We also note that the applicant does not bear any costs of the procedure in Finland, if the case for the collection of alimony is administered by the Ministry of Justice of Finland.

According to Article 23 of the Convention, the protective measures adopted in one Contracting State are recognized by virtue of the effect of law in all other Contracting States. The recognition "by virtue of the law" means that such measures are in accordance with the requirements for recognition in the requested State.

Thus, Article 24 of the Hague Convention provides that, without prejudice to the provisions of paragraph 1 of Article 23, any interested person may request the competent authorities of a Contracting State to recognize or not recognize the measure adopted in the other Contracting State. This procedure is governed by the law of the requested State.

In accordance with the Hague Convention, the judicial authorities of the Contracting State in which the child resides have jurisdiction in accordance with the Convention. In accordance with Article 25 of the Hague Convention, an assessment of the facts on which the competent authority of a Contracting State which has taken a measure based on its jurisdiction is mandatory for the authority of the requested state.

The Helsinki Disrict Court also considers applications for the recognition of decisions of foreign courts to recover damages. So, OÜ Aktiva Finants applied to the Helsinki district court for the recognition of the decision of the foreign court and for the enforcement of the decision of the Harju county court in Estonia on 6.6.2016 and for legal costs. The Helsinki Disrict Court found that the defendant's place of residence is Helsinki and that the court is competent to consider enforcement in this case.

According to the Code of Procedure of Finland § 21, the losing party of the litigation is responsible for covering all reasonable costs incurred [14].

In accordance with Council Regulation of the European Union 44/2001 on jurisdiction, recognition and enforcement of judgments in civil and commercial matters, it is defined in Articles 39,41,43 and 53. The county court found that Regulation I, which was repealed by EU Regulation 1215/2012, will continue to apply to decisions made in the course of the proceedings, to documents drawn up or registered as genuine documents, and to court decisions that were made or concluded before January 10, 2015 and fall within the scope of this Regulation.

The court ruled on the recognition of the Harju court ruling dated 6.6.2016[15]. The Court of Appeal upheld the decision.

[14]Oikeudenkäymiskaari Code of Judicial Procedure), 1.1.1734/4, 21 luku § 1 (26.11.1993/1013).

[15]Decision of Harju District Court 2-14-30368, dated 6.6.2016.

Summing up, it should be admitted that the recognition and enforcement of judicial decisions of foreign states is carried out in Finland in accordance with international treaties and the national legislation of the country of execution. If the necessary international agreement is missing, then the recognition and enforcement of decisions is implemented on the basis of reciprocity. Finland, as well as the Russian Federation, has established contractual relations with a number of states that provide for the mutual recognition and enforcement of judgments in family and civil matters.

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6. *Helsinki County Court Decision H 14/54327 dated 14.1.2015.*
7. *Decision of 245th Judicial District Court of Harris County, July 18.*
8. *Decision of Harju District Court 2-14-30368, dated 6.6.2016.*

教育环境作为吸收文化经验和个性发展的社会背景
THE EDUCATIONAL ENVIRONMENT AS A SOCIAL CONTEXT FOR ASSIMILATION OF CULTURAL EXPERIENCE AND DEVELOPMENT OF THE PERSONALITY

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抽象。 从价值论的角度出发，描述了人格与教育环境相互作用的机制。 教育环境是地方文化的整合形成，是多元价值观的内在源泉，它们定义了一般人格自我决定的载体。

关键词：价值论，专业自我决定，跨文化互动，文化，地方文化

Abstract. *From the point of view of axiological approach, the mechanism of interaction of the personality and the educational environment is described. The educational environment is presented as the integrated formation of local cultures, which are immanent sources of versatile values, which define a vector of self-determination of the personality in general.*

Keywords: *axiology, professional self-determination, cross-cultural interaction, culture, local culture*

The sociocultural environment is a concrete, directly given social space in which the individual is actively included in the cultural ties of society. This is a combination of various (macro and micro) living conditions and social (role) behavior of an individual. A specific feature of the sociocultural environment is that it always in one form or another confronts the individual and is in some kind of opposition to his self-development, since it is in it (in the environment) that all social contradictions are manifested. Opposition varies in character and forms - it can be indirect and subtle, it can disguise itself and take absurd forms, however, it always stimulates the need for each member of the community to preserve and protect their individuality and sovereignty of their being and at the same time stimulates its constant activity. [2].

Educational as an element of the sociocultural environment is a zone of interaction between educational systems, their elements, educational material and subjects of educational processes. The educational environment has a great degree of com-

plexity, since it has several levels - from federal and regional to primary - its primary element - the educational environment of a particular educational institution. This environment is emerging in the interaction of new educational complexes-systems, innovative and traditional models, complex systems of educational standards, the complex integrating content of curricula and plans, high-tech educational tools and educational material and, most importantly, a new quality of relationships, dialogic communication between subjects of education: students , educators, society.

The ambiguity of the term “culture”, the breadth of its interpretation and the versatility of its application explain the presence of various theoretical principles in the interpretation of the concept of culture. But behind the variety of definitions, two semantic dominants, two images of culture, are clearly visible. A generalized reflection of reality in the form of knowledge about it and about methods for changing it, scientific theories and artistic images, on the one hand, and the actual life interaction of a person with reality, a socially historically determined reflection of the forms and methods of such interaction in the inner world of people, their beliefs, beliefs , tastes, in their behavior, everyday life, relationships, habits, mores, on the other. Culture in the broad sense is an area of meeting different people, the mentality of peoples, their customs, beliefs and traditions, from different times. Social consciousness is the core of culture, in contact with it a separate individual expands the boundaries of his coexistence with the "Life World", affirms his subjective beginning, living in harmony with the deep truth the essence of his being. Culture as a form of expression of the aggregate social consciousness is a connecting link between different civilizations, because it is constantly in search of a more complete answer to its mental and cultural needs. Culture as an independent supra-individual phenomenon is an inexhaustible source of satisfying the needs of both an individual person and a group of people in the manifestation of their meaningful orderly existence.

Accordingly, culture, on the one hand, can act as a means of providing a mechanism for human adaptation in society, and, on the other hand, as an independently existing phenomenon of being that determines the worldview of a people. Culture consists of “internally contained and externally manifested norms that define behavior mastered and mediated by means of symbols; it arises as a result of people's activities, including its embodiment in material means [3]. The essential core of culture is made up of traditional (historically established) ideas, primarily those to which special value is attributed. Cultural systems can be considered, on the one hand, as the results of people's activities, and on the other, as its regulators ”[2].

In the scientific literature, the term “cultural environment” of a particular educational institution is often used, which is understood as the space of cultural development of the student’s personality in society, which incorporates the same basic environmental parameters that have already been mentioned above - relationships, values, symbols, things, objects.

The cultural environment of an educational institution largely depends on the prevailing cultural environment of the region - that particular atmosphere and conditions that contribute to the development of cultural environments of specific educational systems or restrain it (within conventional boundaries).

In each region, certain conditions of community life are formed, its attitude to the problems and needs of the spheres of culture and education is being formed. The transformation of this environment can contribute to the formation of a different cultural type of education, a different cultural lifestyle of the institution.

A single educational space acts as such a basic environment - a “place” where many relationships and connections are subjectively set, where special activities of various systems (state, public and mixed) are carried out to develop the individual and his socialization. It is also possible and internally formed, individual educational space, the formation of which occurs in the experience of everyone.

The introduction of this term into scientific circulation is associated with the rejection of previously accepted (within the framework of the previous paradigm) ideas about educational processes as a line, trajectory or a certain channel along which a student should move normatively. Using the term popular since the time of Plato and Aristotle, we can say that the idea of educational space sets the boundaries of education. It is important that the idea of a complex and multi-level spatial organization and self-organization serves as a link between a simple empirical representation of an educational institution (such as an institution) and its representation as a system. For a socially oriented concept of education, this is crucial because it allows you to:

- personalities are self-determined in various fields of activity and in interaction with different communities;
- the teaching staff to create conditions for the socialization of young students in a wide social and cultural context;
- society (as a customer) to actively participate in the creation of a wide range of diverse educational services;
- administrations make management decisions with a focus on a variety of educational interests and conditions.

Thus, we must consider the educational institution as an integral part of the unified educational space of Russia. That is why the concept of the development of education of the Russian Federation until 2020 notes: "The potential of an educational institution, first of all, should be used to maintain the unity of the sociocultural space of our homeland ...".

In this regard, the educational institution is called upon to form a kind of “force field” inside, a socio-educational space that actively forms the external sociocultural environment that ensures social self-determination and holistic development of the individual through the organization of its various types of activities - cognitive, value-orientational, communicative, creative, leisure, etc.

The socio-educational environment is a manifestation of a multidimensional sociocultural space in which the formation of personality takes place. This is the environment where all the components of the lifestyle (human potential) and the corresponding spheres of life (modes) are formed and implemented. This environment has various manifestations: professional, spiritual, moral, socio-psychological, etc. It is a carrier of rich, diverse information that affects the mind, feelings, emotions, faith of the individual, therefore, provides the possibility of his access to living knowledge. In this understanding, the environment appears in the form of a laboratory of a person's spiritual, social, professional experience, and the algorithm for studying it is synchronized with the process of personality formation [2].

That is why the socio-educational environment of an educational institution should be considered as a direct sphere of the formation of social qualities of an individual. It is in the educational environment that a person acquires patterns of self-organization and the geometry of human behavior. A synergistic education operates undercover. This is a formation that stimulates one's own, not yet manifested, possibilities of personality development. The synergetic aspect of education is a non-linear situation of open dialogue, the motivation of an individual's own forces, gaining oneself, or cooperation with oneself and other people [2].

In applied sociology, the environment is considered within the framework of the social microenvironment - objective social reality, which is a combination of material, political, ideological and socio-psychological factors that directly interact with the personality in the process of its life and have an active influence on it. In this case, the microenvironment is a specific manifestation of the general social environment (macroenvironment) and one of the components of the macroenvironment system - microenvironment - the individual.

The social microenvironment acts as a link between society and the individual. This means that the process of interaction between society and the individual does not go directly, but through a direct circle of communication, through acquired individual experience.

Based on the socio-psychological positions, in practical work one should focus on the social environment, which includes the whole society, the forms and types of relations characteristic of it in a given period (macroenvironment), as well as direct and direct contacts with the teaching staff, family and friends (including reference) environment (microenvironment) [1]. Both spheres of influence play various roles, the leading of which are formative, controlling, psychotherapeutic, and sociotechnical. They form the views, attitudes, relationships of a person with the social environment, collectives and individuals.

In the process of cultural evolution, scenarios of the interaction of a person with reality are generalized and become able to acquire the status of personal values. Thus, the person, selecting significant ways of interacting with the outside world on the basis of complementarity, fixes them, first in personal, then social, and, finally, universal human experience. The indicated process of such selective selection, on the one hand, is carried out independently of a particular person, and on the other, only thanks to her, which ultimately leads to the emergence of at least two plans of cultures: external, formalized in the minds of the people, and internal, reflected in the symbols of the subject's preferred choice of scenarios of interaction with the world. Understanding the value of these methods determines the success of a person's social interaction with the world and himself.

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高等教育机构的福利环境作为学生民事能力形成的因素
WELFARE ENVIRONMENT OF HIGHER EDUCATION INSTITUTION AS FACTOR OF FORMATION OF CIVIL COMPETENCE OF PUPILS

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The socio-cultural development of the student's personality is determined by the environment in which he is immersed. In addition to the family, the immediate environment, the media, the educational space plays a huge role in building the personality and shaping its leading qualities. High school through the system of upbringing and education transmits economic and political phenomena occurring in society. For some time, Russian society was in a tense atmosphere of searching for a new system of values and a new ideology in the light of the negative costs of transforming the post-Soviet space. Low level of consolidation, ideological schism, loss of spiritual and moral guidelines - all this led to social tension, a drop in the level of culture of the country's citizens.

The very concept of "citizen" and its derivatives "citizenship", "civic education", "civic position" have also undergone a number of changes. Until now, there is no single understanding of the essence of these concepts, approaches to their content and organization have not been defined, common criteria and conditions for the formation of citizenship and civil competence have not been identified within the framework of the educational and educational system.

The issues of youth civic education are reflected in the State Program "Patriotic Education of Citizens of the Russian Federation for 2016-2020", "National Doctrine of the Development of Education in the Russian Federation until 2025", "Concepts for the Modernization of Russian Education for the Period until 2020".

The National Doctrine of Education in the Russian Federation for the period up to 2025 dated October 4, 2000 No. 751 states that the education system is designed to ensure the historical continuity of generations: the preservation, dissemination and development of national culture, and the upholding of a careful attitude to the

historical and cultural heritage of the peoples of Russia. In this document, special attention is paid to the education of citizens of a legal, democratic state, capable of socialization in a civil society, respecting the rights and freedoms of the individual, with high morality. [4]

This direction has been widely reflected in numerous regulatory documents in the framework of the implementation of the federal target program "Youth of Russia", in the Law on State Support for Youth and Children's Associations, in the Concept of State Youth Policy in the Russian Federation, the activities of a number of advisory bodies under the President and the Government of the Russian Federation , youth committees in the structure of the Council of the Federation and the State Duma of the Russian Federation, as well as in the constituent entities of the Russian Federation.

The modernization of the higher education system over the past few years has identified new challenges for the content of higher education in the framework of the competency-based approach. Civil competencies do not imply so much familiarization with the civil rights and obligations of the student's personality as they orient the young person towards independent decision-making with an active citizenship.

From the point of view of the competency-based approach, the concept of "citizen" includes the following: possessing a high level of civic culture, respect for the rights and freedoms of the individual, the history of his state, respect and respect for the cultural heritage of the country and its traditions, the possession of high morality, social responsibility. The formation of the listed civil qualities directly depends on the conditions in which the person exists. In the framework of our topic, we are talking about the potential of the university in becoming an individual as a citizen of a country with an active civic position. In the process of educational activity, interaction with other subjects of educational activity, educational and extracurricular activities of the institution, the formation and development of civic qualities occurs through the prism of social, political and social relations in the country.

Youth is a potential carrier of subjectivity due to its special socially determined position in the structure of society. Youth is an object of socialization and politics. Each ruling regime directs the process of socialization of the young generation, as well as the process of forming a civic position, taking into account the existing political and ideological direction. This provision indicates the need to develop technologies for the formation of an active civic position of student youth as an instrument of directed state influence. We know examples of powerful state influence from history, such as Nazi Germany in relation to the young generation, the "party of the young" Mussolini, "Chinese nationalism", as well as Pioneer and Komsomol in the Soviet Union. [3, p. 44]

Today we are witnessing negative unrest in the youth environment, where it is the students who are very actively involved. Many researchers have noted the penetration into the consciousness of young people of the values of pragmatism, consumption, individualism and personal success, which contradicts the traditional moral values of Russian society. [6, p. 430-435.]

The civic position is formed under the influence of the conditions in which the person is, and, accordingly, is realized in social activity through the social activity of the person, as well as manifestations of his civic qualities. The provided sociocultural conditions at the university for the most complete and effective self-actualization and self-actualization of the student's personality as a mirror reflect all social, political and social processes taking place both in the country and in the world.

The upbringing and education of the young generation is today one of the most important tasks of the state. In the Federal target program for the development of education 2016-2020. noted: "it is important to continue the already begun transformations, designed to ensure the transition from the mass education system .... to ... continuous individualized education for all, the development of education related to world and domestic fundamental science, focused on the formation of a creative socially responsible person." Today, new opportunities have been outlined for the development of culture, education, and the socio-cultural environment, and the main stake in this complex multi-aspect process is made, first of all, on youth. [2, p.2]

The Universal Declaration of Human Rights defines the following: "Citizenship - Responsible Fulfillment of a Civil Debt." In turn, "civic duty is a requirement for a person in the form of obligations to the collective, classes and society as a whole" [7, p.24–29] However, do not forget that the fulfillment of civic duty is not only participation in the elections. This is a complex of knowledge, values, moral qualities of a person, which reflects a socially determined attitude of a person to society, the state and himself, and also it is a conscious action of a person in relation to the world around him. Quite interesting in this context, we consider the provisions of the researcher S.V. Anokhin. The author speaks extremely negatively about the fact that citizenship is "remembered during periods of ideological pluralism, impassability", it is remembered as something "possessing a timeless, universal human value uniting universally valid political and legal ideas." [1, 27]

Unfortunately, as practice shows, in most cases, the plan of civic education in universities is limited to the military-patriotic direction according to calendar thematic holidays and actions of volunteer movements, which are also confined mainly to certain established dates.

You can evaluate the contribution of a particular institution of higher education to the formation of the personality of a competent and socially responsible citizen of the country by analyzing the conditions of the social and cultural environment of this university.

The concept of "socio-cultural environment" today does not have a single definition, but is widely used in modern scientific literature. The socio-cultural environment of the university includes the entire educational system of the educational institution, the system of relations between all subjects of educational activity, the educational activity itself and the system for implementing the moral, aesthetic and other aspirations of both students and other participants in the educational process. Also, the socio-cultural environment, in addition to intangible elements, includes material resources (productive assets). In other words, the socio-cultural environment of the university is an organic combination of material and intangible resources and assets of the institution. [five].

But do not forget that the socio-cultural environment of the university from the point of view of the direct impact on the student's personality as a system consists of several microenvironments, namely faculties and departments. It is also worth noting that, first of all, the personality is formed by the personality, because the leading means of forming the civic competence of students is the faculty and service staff of each microenvironment. First of all, it is the teacher and his image, starting from appearance, speech, ending with pedagogical mastery, that has value in the overall picture of the formation of the personality of a young man in the educational process. Directly the ideas, attitudes, values and moral guidelines of the teacher, his personal attitude to the ongoing processes in society, his attitude to himself and students, affect the effectiveness of civic education and education of students. The Federal State educational standard carries a guideline on the formation of a democratic type of personality that can think, make decisions, take responsibility, protect the heritage and increase the country's well-being, including tangible and intangible (spiritual and moral values) resources.

Thus, it is the faculty, in the first place, that should become the bearer of the best values of the individual, must create the conditions for the disclosure of creative abilities, the revival of intellectual and spiritual and moral potential, and the development of tolerance among young people.

However, as practice and the current state of affairs in the country show, the university does not have enough real conditions and experience for the development of the civic culture of young people, and therefore the formation of the civic position of students occurs spontaneously and is not corrected by targeted socializing activities on the part of the institution. Despite a number of positive shifts and trends in the system of civic education and upbringing, today there is still no single sufficiently effective system of civic socialization of university students. Also, the parameters and criteria for assessing the level of formation of the civic competence of university students are not defined, the practice of civic education and upbringing in higher education is not fully analyzed and studied.

According to the results of studies (Yu. R. Vishnevsky, D.V. Trynov, V.T. Shapko), the majority of students have a normative approach to understanding the role of a citizen, the main qualities of which are the implementation of laws, and the fulfillment of civic duty and duties as a citizen lower steps of the rank ladder of civic qualities. A significant part of the students is characterized by contradictory opinions and opinions, not a desire to actively resist the manifestations of extremism and nationalism, it is distinguished by a low level of legal awareness.

The analysis of available sociological studies allows us to conclude that the civic culture of student youth is fagmentary. It manifests itself in the fact that, on the one hand, students are more or less familiar with the fundamentals of Russian legislation, government, social moral standards, and on the other hand, they are far from always ready to follow these standards, comply with laws, and fulfill their civic duty and responsibilities, be socially active and tolerant. In the student community are observed: manifestations of political negativism and absenteeism, legal nihilism; the development of antisocial and deviant phenomena; the spread of a pragmatic orientation, the desire for prosperity at all costs; the penetration of nationalist and extremist views. From the point of view of political stability, democratic development of society, its spiritual renewal, these phenomena are extremely dangerous.

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雅库特语中雪的术语
THE TERMS FOR THE SNOW IN YAKUTIAN LANGUAGE

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抽象。众所周知的Sepir-Whorf假设认为，生活在北方的人们的姓名与中间地带居民的数量相比应该更加多样化，这是非常合乎逻辑的，似乎可以通过爱斯基摩人的例子得到证实。乌戈尔语和萨摩耶语[Norman 2007：175]。

在本文中，我们考虑雅库特语。雅库特语的有趣之处在于它属于突厥语，但是，与其亲属早期分离后，它与其他突厥语言隔离开来，与蒙古语，通古斯 - 满族语言接触，有很长的发展方向。在这个时候，雅库特人占据了俄罗斯东北部的广阔领土，这是全球有人居住的最冷点。

我们的假设是，在向北移动的过程中，以及在现今领土长达数百年的发展过程中，雅库特语言可能充满了表示雪及其变种的新词。

关键词：雅库特语，突厥语，雪名，蒙古语和通古斯 - 满语。

Abstract. *The well-known Sepir-Whorf hypothesis that the names of the peoples living in the north should be more diverse in comparison with their number among the inhabitants of the middle strip is quite logical and seems to be confirmed by examples from the Eskimo, Ob-Ugric and Samoyed languages [Norman 2007: 175].*

In this article we consider the Yakut language. The Yakut language is interesting in that it belongs to the Turkic languages, but, having early separated from its relatives, it went a long way of development in isolation from other Turkic languages, coming into contact with the Mongolian, Tungus-Manchu languages. At this time, the Yakuts occupy a vast territory in northeast Russia, which is the coldest point of the inhabited part of the globe.

Our hypothesis is that in the course of moving to the north, as well as in the centuries-old development of the present territory, the Yakut language was probably enriched with new words denoting snow and its varieties.

Keywords: *Yakut language, Turkic languages, names of snow, Mongolian and Tungus-Manchu languages.*

The Yakut word *хаар* ‘snow’ dates back to the Pratürkic *qār*.

The names of the varieties of snow in the Yakut language are diverse:

ала хаар ‘snow with thaw’, mid.:hack. *ala xar* ‘thaw’, kaz., tat. *ala qar* ‘rare pieces of snow, gray spring snow’, kirg. *xary qar* ‘snow in the mountains in early spring or late summer’ [Musaev 2008:53]; from *ала* ‘piebald’; ‘motley‘ and *хаар* ‘snow’;

ардах быыстаах хаар ‘snow with rain’ (lit. ` snow with variable rain)`;

бөдөҥ хаар ‘hail’ [Pek III, 1959: 3329], from *бөдөҥ* ‘big’, *хаар* ‘snow’; Pekarsky compares the word *бөдөҥ* with mong.bur. *бидиӈ(п)* ‘fat’ and manch. *бэдунь*;

буордаах хаар ‘snow, mixed with dust, blown by the so-called dust winds’ [Pek I, 1959: 562]; from *буор* ‘dirt’+*лаах*, *хаар* ‘snow’; mid.: *симиин хаар*;

инчэҕэй хаар 1. ‘wet snow’; 2. ‘ slush ’. From *инчэҕэй* ‘wet’.

кириэстээх хаар from *кириэс* ‘cross’ +тээх, *хаар* ‘snow’ (lit. ‘snow having a cross’ or ‘snow with crosses’), see. *көбүөрүнньүк хаар*; recorded only in Nyurba ulus [DDYL II, 1995:85, Ivanov 2017:174] and in meaning corresponds to the more common *көбүөрүнньүк хаар*;

көбүөрүнньүк хаар ‘soft fluffy snow’ [DDYL II, 1995:87; Ivanov 2017:175]; *көбүөрүнньүк* apparently from *көп* ‘ loose; chubby, lush, furry, woolly, fluffy ’ [Pek. I, 1959:1153; YRD 1972:180];

көмнөх ‘snow, settled on tree branches and bushes’ [Pek. I, 1959:1138]. Pekarsky compares it with bur. *көбэнэк*;

көмнөх хаар ‘thick, heavy snow flakes’ [LEDYL IV, 2007:255];

көмнүө хаар ‘first sleigh snow’, recorded only in Olekminsky ulus [DDYL II, 1995:87; Ivanov 2017:175];

көмүк ‘deep snow’ [Boetl. 1990:498; Pek. I, 1959:1141];

көмүк хаар ‘deep snow, covering the ground whole winter’ [YRD 1972:177; Ivanov 2017:175];

көмүк кыраһа ‘ thick powder (thicker than *үүт кыраһа*)’ [Pek. I, 1959:1141]. ‘thick soft snow; heavy snow’ [LEDYL V, 2008:313];

көмүрүө хаар ‘spring snow, already turned into balls under the ice crust’ [Pek. I, 1959:1142]; ‘ loose coarse snow ’ [YRD 1972:178];

куобах быһаҕа [Ivanov 2017:175], *куобах баһаҕа* [DDYL II, 1995:92], see.: *көбүөрүнньүк хаар*;

куобах кутуруга хаар (high.-kol.) ‘fluffy snow’ [DDYL I, 1976:124; Ivanov 2017:362]; from *куобах* ‘hare’+*кутурук-а* ‘his-tail’;

куобах түүтэ хаар (bod., len., sunt.) ‘soft fluffy snow’ [DDYL II:92], mid.: көбүөрүнньүк хаар;

күрдьүк хаар ‘a pile of snow scooped up with a shovel; snowdrift, shaft’ [Pek. II, 1959:1331]; ‘snow raked into a pile, snowdrift’ [LEDYL XIII, 2016:123];

күһүҥҥү хаар ‘autumn snow’. Yakuts distinguish between autumn and spring snow. Autumn is cleaner, softer, where animal traces remain most clearly, by which experienced hunters accurately determine when and which animal passed, mid.: *сааскы хаар*;

кыйыр хаар ‘trampled creaky snow’ [LEDYL XIII, 2016:123]; *кыйыр* ‘to crunch’ [Pek. II, 1959:1372];

кырамай хаар (high.,meng.-kang.) ‘light snow’ [Pek. II, 1959:1407];

кыраһа, *кыраһа хаар* ‘a layer of fresh snow’. This is the main common Turkic meaning. In the Yakut language, this basic meaning can acquire nuances, shades, and therefore have a different name. Mid., e.g..: *кырамай хаар*, *кырпай хаар*, *кырымах хаар*;

кырпай хаар ‘first fine snow’ [DDYL I:137; Ivanov 2017:175]; ‘powder’ [Pek. II, 1959:1418];

кырпах хаар see. *кырпай хаар*; *qyrpaq* found in all areas of the Turkic languages with the main meaning ‘ first, usually thin / light /lightweight snow, powder’ [Musaev 2008:53], In which there is a basis *qyr*- ‘crumble, grind’ and aff. -*paq* [ib.];

кырса хаар ‘snow falling in large flakes, covering the ground with a thick layer’ [LEDYL XIII, 2016:124]; from *кырса* ‘arctic fox’, *хаар* ‘snow’;

кырыа, *кырыа хаар*. 1. ‘kurzhevina, kurzhak, hoarfrost, frost, humidity, frozen on walls, trees and so on. on wet cold days’; 2. ‘snow, snow powder’ [Pek. II, 1959:1421-1422]; 1. ‘frost’; 2. ‘ snow (as the main sign of winter)’; e.g.: *кыһыны кырыатынан билэн* ‘recognizing winter by falling snow’ [LEDYL V, 2008:355; Ivanov 2017:174]; this word is common Turkic. The single name of hoarfrost in the Turkic languages from the ancient period to the present is common in all areas [Musaev 2008:55];

кырымах хаар ‘first autumn fine snow, powder’. mid.: mong. *кирмах* ‘first fine snow’, kazakh. *кырбах* powder, snow groats’; *кырымах* in form of *кырымахтаах* used as an adjective and means ‘powdered, sprinkled with snow’;

кыс хаар, *кыстык хаар* ‘autumn snow, lying until spring; the snow that remains to lie for the winter and no longer melts’ [Pek. II, 1959:1436; LEDYL V, 2008:354,357; Ivanov 2017:175];

мочуо (*bod*.) ‘soft, deep snow, first powder’, recorded only in the Bodaibo district of the Irkutsk region [DDYL II, 1995:125; Ivanov 2017:175];

муустаах хаар ‘ snow with ice, hail of iverns (*not round, as if with fragments*) ’ [Pek. II, 1959:1642];

муус тоҥот ‘strong crust, thick glaciation of snow, ice’ [LEDYL X, 2013:454]; from *муус* ‘ice’, *тоҥот* ‘crust’;

ньуолах хаар ‘soft fluffy snow, smoothly falling in large flakes’ [LEDYL XIII, 2016:124]; *ньуолах* ‘gentle; gentle fluff; soft silky grass’;

обуой (aby, kol., mom.) ‘hardened snow drift, snowdrift’ // *собуой хаар*, *һобуой*, *угуой*; from rus. dial. *сувой* (snowdrift, formed by swirling snow) [DDYL I, 1976:182-183; Ivanov 2017:175];

олуу хаар (high-wil.) ‘deep virgin land snow’, mid.: *тоҥуу хаар* [DDYL I, 1976:186; Ivanov 2017:175];

өксүөн ‘snow groats’ [Pek. II, 1959:1925];

өксүөн хаар ‘snow interspersed with rain in late autumn, autumn rain with snow’ [LEDYL XIII, 2016:124];

өлүк хаар (high-wil.) ‘virgin land snow’ [DDYL I, 1976:193], mid.: *өлүҥ*.

өлүҥ (olen.) ‘pristine, virgin land snow’ – from evenk. *элуҥ*; even. *элэн* ‘snowy virgin land ’ [DDYL I, 1976:194; Ivanov 2017:175];

өнньүөс хаар (kol.) ‘thawing, soft semi-liquid snow’;

сааскы хаар ‘весенний снег’, mid.: *күһүҥҥү хаар*. Unlike the autumn *сааскы хаар* can be hard, weathered or grainy, which makes it difficult for hunters to clearly determine when and which beast passed; mid.: *күһүҥҥү хаар*;

симиин хаар (kol.) ‘snow crystals fragmented by strong winds’ [DDYL II, 1995:161; Ivanov 2017:175], mid.: *буордаах хаар*;

саҥа хаар ‘fresh snow that covered the ground’ [LEDYL XIII, 2016:124-125]; (lit. ‘new snow’);

сиҥэ хаара ‘melted watery snow during the spring thaw, snow with water’ [LEDYL XIII, 2016:125]; Pekarsky compares *сиҥэ* with bur. *шиҥген* and mong. *сиҥген* ‘liquid’ [Pek. II, 1959: 2231].

сис хаара ‘deep snow in the forest’ (*melts later than on the plain*); [LEDYL XIII, 2016:125]; from *сис* ‘highland forest, mountainous forest +хаар-а snow- its ’;

собуой хаар (anab.); *һобуой* (dolg.,yessey.)’ [DDYL I, 1976:210, 227; Ivanov 2017:175], see.: *обуой*;

сойуо хаар(а) ‘crust; snow suitable for chasing the beast’ [Pek. II, 1959:2264; LEDYL VIII, 2011:500], *һойуо* (bod.) ‘crust’ [DDYL II, 1995:175];

сомунах (ust-yan.) ‘fluffy snow that covered the ground’ [DDYL II, 1995:164; LEDYL XIII, 2016:125; Ivanov 2017:175];

сонор, *сонор хаар* ‘the first autumn snow, which is convenient to trace a beast’ [Pek. II, 1959:2279: LEDYL VIII, 2011:523-524], mid.: kirg. *сонор* ‘powder, a thin layer of snow’, karakalp., kaz. *сонар* ‘hunt’, chuv. *сунар*, bashk. *һынар*;

сөгүрүөп хаар (mid.-kol.) ‘pile of snow’, from rus. ‘сугроб’ [DDYL I, 1976:212; Ivanov, 2017:175];

суо (абый, mid-kol., high.-kol) ‘crust’, mid.: *сойуо хаара*, *тоҥот*.

сыарҕа хаара ‘snow layer for sleigh rides’, fromт *сыарҕа* ‘ sleigh’ and *хаара* ‘snow+its ’ [LEDYL IX, 2012:356];

сыа хаар ‘freshly fallen soft snow’; from *сыа* ‘fat’ and *хаар* ‘snow’ [LEDYL IX, 2012:342]; ‘soft snow, upper soft snow’ [Pek. II, 1959:2421]; ‘top soft snow’ [Ivanov 2017:175], mid.: *хаар сыата*;

сылбыйа ‘ spring thaw; snow turned into slurry [YRD 1972:357];

сыһыат (dial.) ‘spring melting of snow when melt snow clings to the runners of the sleigh; spring scale’ [Pek. II, 1959:2498];

сэкириэнньик хаар (kol.) ‘soft snow falling in large flakes’, mid.: *сомунах* [DDYL II, 1995:172; Ivanov 2017:175];

тибии ‘hard snow crust produced by the wind’, mid.: *моҥот* [Boetl. 1990:558]; ‘snow blockage formed by a snowdrift from a storm; snow or sand’ [Pek. III, 1959:2660]; from *тип* ‘cover’+*ии* (word-forming from the verb action name affix). mid.: osm. *mini*, *dini* ‘snowstorm, blizzard’;

тобурах ‘1. shallow snow hail’; 2. in songs: ‘snow’ [Pek. III, 1959:2696]; ‘precipitation in the form of rounded particles of ice, hail’ [LEDYL X, 2013:409]. mid.: dr.-turk, turk. *топрак*, *тупрак*, *тофрак*, *тобрак*; bur. *топрак*, mong. *тобрак*;

толон ‘hail; unclear air condition during heavy rain and snow’ [Pek. III, 1959:2716]; ‘large hail’ [LEDYL X, 2013:434]. mid.: dr.-turk. *толы*, turk. *долу*, *дблы*, *толу* ‘hail’;

моҥот, *моҥот хаар* 1. ‘freshly frozen snow (thin ice on snow), crust’; 2. ‘sleet’, mid.: *хаптаһын моҥот* [Pek. III, 1959:2731] ‘ice cover on the surface of the snow, crust’ [LEDYL X, 2013:454] Pekarsky compares it to karag. *моҥар* ‘snow bark’, tel. *моҥдок* ‘frozen snow’, koib. *мӧт* ‘snow surface’;

моҥоруу ‘spring autumn frosts’ [LEDYL X, 2013:454];

моҥуу хаар ‘solid, fresh, untrodden deep snow’ [Pek. III, 1959:2732; LEDYL X, 2013:459]; deep pristine snow [Ivanov 2017:175];

моҥ хаар ‘winter snow hardened from cold’ [LEDYL XIII, 2016:125];

түүмэх кыраһа хаар ‘rare, sparse powder, barely covering the ground; light sparkling snow’ [LEDYL V, 2008:313];

туллук хаара ‘fine spring snow falling during the arrival of snow bunting’ [LEDYL XIII, 2016:125];

тураах хаара ‘spring snow falling in large flakes during the arrival of the crow’ [LEDYL XIII, 2016:125], from *тураах* ‘ crow’ and *хаара* ‘snow-its’;

уллук хаар (dial.) ‘above the knee deep snow’; *уллук* ` upper half of the hind leg of the animal, thigh` [Pek. III, 1959: 3002-3003];

уу-хаар ‘ snows turnining into water during the spring thaw’; ‘liquid mud from snowmelt’ [LEDYL XII, 2015:391], from *уу* ‘water’and *хаар* ‘melt’;

үөк ‘first snow for sleigh ride’ [Pek. III, 1959:3138; DDYL I, 1976:269; Ivanov 2017:175];

үүт кыраһа (*хаар*) ‘light heavy snowfall’ [LEDYL V, 2008:313], from *үүт* ‘milk’ and *кыраһа* ‘powder’ (*хаар* ‘snow’);

хаар алдьаныыта ‘spring thaw period as a result of snow melting’ [LEDYL XIII, 2016:126];

хаар кыырпаҕа ‘snowflake’ [LEDYL XIII, 2016:126; РЯС 1968:591];

хаар охтуута (high.) ‘spring snowmelt’ [DDYL I, 1976:273; Ivanov 2017: 376] – from *хаар* ‘snow’+*охтуу-та* ‘fall-its’ (*i.e. snow fall*);

хаар-самыыр ‘precipitation in the form of snow and rain alternately’ [LEDYL XIII, 2016:131];

хаар-сиир ‘rain and snow, slush’; ‘thick snow’ [LEDYL XIII, 2016:131];

хаар сиэһиитэ ‘thawed patches appearing in the spring when snow begins to melt’ (*beginning of April*) [LEDYL cXIII, 2016:126];

хаар сыата ‘soft top layer of snow’ [LEDYL XIII, 2016:126] – from *хаар* ‘snow’+*сыа-та* ‘fat-its’;

хаар уута ‘spring flood caused by snowmelt’ [LEDYL XIII, 2016:127]; from *хаар* ‘snow +*уу-та* ‘water-its’;

хаар хаһыҥ ‘large frosts with a thick layer of hoarfrost forming a snow cover on the ground in the fall or late spring (*sometimes even later*)’ [LEDYL XIII, 2016:127]; from *хаар* ‘snow’+*хаһыҥ* ‘freeze, frost’;

хайыҥ ‘snow piled near the house’ [Boetl. 1990:]; ‘snow, which fills the cracks between the window ice and the deck; snow blockage around the yurt to protect it from the cold’ [Pek. III, 1959:3249]; ‘pile of snow or ice’; *дьиэ хайыҥа* ‘snow block’, *ойбон хайыҥа* ‘fine ice thrown out of the fishing hole’ [YRD 1972:475]; from *хай* ‘to throw (fill) with snow, plug a hole with snow’+ыҥ;

хаптаһын тоҥот (high., T.) ‘a thin layer of icy snow adhering to the ground’– ‘spring strong crust’; [Pek. III, 1959:2731; DDYL I, 1976:280; LEDYL XIII, 2016:330]; from *хаптаһын* ‘board’+*тоҥот* ‘crust’;

хаһыҥ ‘frost, hoarfrost, vapors frozen in the air; summer frost, early frosts [Pek. III, 1959:3392]; light morning frost in autumn, spring, frost [LEDYL XIII, 2016:435];

хатаҥа (дьэн.) 1. ‘crust’ [DDYL I, 1976:285]; 2. ‘morning frost in spring and autumn, soon melting from the sun’ [Pek. III, 1959:3400]; ‘ fast melting hoarfrost, freeze snow (*fall, spring*)’ [LEDYL XIII, 2016:457]; from *хатаа* ‘to close, lock; nailing; to keep in memory’ +*ҥа* (*word-forming aff.*);

хобор ‘spring bubbly ice (*after the ice water has gone*)’ [YRD 1972:491]; ‘fragile, porous, crumbling ice on the river, lake in front of the ice’ [LEDYL XIII, 2016:496], mid.: bur. *хобор*, mong. *хобур* ‘scarce, poor, inadequate; rare’ [Pek. III, 1959:3428:3429];

хомурах ‘wind blown pile of snow, snow drift, snowdrift [Pek. III, 1959:3475]; ‘a large pile of snow marked by the wind, as well as snow drift, snowdrift’ [LEDYL XIII, 2016:565]; ‘snowdrift, snow drift’ [YRD 1972:496]; mid.: bur. *хонгорок*, *күнгэрэк*, mong. *хунгар*;

хомурах хаар ‘lower loose layer of snow in the form of ice grains (*usually in springtime*)’ [LEDYL XIII, 2016:128];

чабыы (dial.) ‘ice after the first snow’ [LEDYL XIV, 2017:83];

чигди ‘trodden hard snow, trodden outcropping; cleaned place around the house (*at winter*)’ [Pek. III, 1959:3617]; ‘trampled, hardened snow; trampled or cleared of snow winter yard’ [LEDYL XIV, 2017:131];

эҕир ‘a snow shaft in the form of steps, outlined by the wind in an open area (*e.g. in the tundra*) ’ [LEDYL XV, 2018:149].

So what do these mean? Firstly, they, it seems to us, completely confirm our hypothesis that the Yakut language, being Turkic, when moving to the north, as well as during the centuries-old development of the current vast territory, was really enriched with new words and terminological stable combinations meaning snow and its varieties.

At the same time, it is noteworthy that the basic Turkic concepts of snow and its varieties of the type: *хаар* ` snow `, *кыраһа* ` powder `, *кырыа* ` frost `, *толон* ` hail `, *күрдьүк* `snowdrift, snow drift`, *тоҥот* `crust`, *сонор хаар* ` the first snow, which is associated with the beginning of hunting`, etc., is still preserved practically unchanged, despite the long and long migration of native speakers of the Yakut language to the north-east of the Asian continent.

According to our calculations, there are 87 words for snow and its varieties in the Yakut language. Interestingly, on the way to the north, the Yakut language, in contact with the Mongolian, Evenk, Even, Yukagir languages, almost did not borrow words and terminological phrases that mean snow and its varieties.

As Mongolian (-Buryat) borrowings can be considered: бөдөҥ хаар, көмнөх хаар, синэ хаара, хомурах. Such a negligible amount of Mongolian borrowings denoting varieties of snow can be explained by the fact that the Yakuts contacted the Mongols and lived in an area with a climate very close to their original place of residence. And how to explain those literally single borrowed words of Evenk and Even origin, denoting varieties of snow? Apparently, the Yakuts arrived north long after the Evenks and Evens, simultaneously creating many terms of the natural environment from the reserves of their language. A.N.Myreeva, a well-known researcher of the Evenki language, who specially studied the names of snow, counts up to 50 names of varieties of snow in it [Myreeva, 2008, p. 41-46].

According to Yu.V. Normanskaya, "several millennia must pass before a large number of new lexemes appear in the language for a common description of the specifics of the natural environment of native speakers." [Normanskaya 2007: 177]. Based on our data, which demonstrate a large number of various lexemes of Yakut origin along with an insignificant amount of borrowings from Evenki and Even languages, it can be assumed that native speakers of the Yakut language arrived long ago.

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论20世纪80年代中国公共行政转型的政治因素
ON THE POLITICAL FACTOR OF THE TRANSFORMATION OF CHINA'S PUBLIC ADMINISTRATION IN THE 1980S

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抽象。 改革开放以来，形成了公共行政体制的人员和组织，实施了“无产阶级专政下的革命”。 “文化大革命”结束后，共产党和国家机关工作的重心从“无产阶级专政下的阶级斗争”政策转向社会主义现代化政策。 社会主义现代化始于农村，政治上具有“直接自由化”的形式，影响了新兴的政府体制。 1989年6月事件发生后，政治自由化的方向停止了，但公共行政体制的许多变化得以保留并继续发展。

关键词：公共行政体制，社会主义现代化，“定向自由化”，国家行政，计划，市场。

Abstract*. By the beginning of the reform policy, the personnel and organization of the public administration system were formed to implement the “revolution under the dictatorship of the proletariat”. After the end of the “cultural revolution”, the center of gravity of the work of the Communist Party and state authorities was shifted from the policy of “class struggle under the dictatorship of the proletariat” to the policy of socialist modernization. Socialist modernization began in the countryside and politically had the form of “directed liberalization”, which affected the emerging system of government. After the events of June 1989, the direction towards the liberalization of politics was stopped, but many changes in the system of public administration were retained and continued to develop.*

Keywords*: public administration system, socialist modernization, “directed liberalization”, state administration, plan, market.*

By the beginning of the reform policy, the public administration system existed in a deformed form, its personnel and organization were formed to carry out the “revolution under the dictatorship of the proletariat”. The revolutionary-mobilizing attitude opposed the creative mood in government, the leadership positions continued to be held by people who made a career due to their active participation in the destructive actions of the "cultural revolution", and not because of their professional effectiveness.

In the course of the acute internal political struggle that unfolded after the end of the “cultural revolution”, the supporters of shifting the center of gravity of the work of the Communist Party and state power and administration bodies from pursuing a policy of “class struggle under the dictatorship of the proletariat” to a policy of socialist modernization, following Mao Zedong’s policy - "politics - command force" to the idea of" politics should serve the economy " took over. At the 3rd plenum of the Central Committee of the CPC of the 11th convocation (December 1978), economy construction was defined as the main direction of socialist modernization [1]

The orientation to the implementation of the "class struggle under the dictatorship of the proletariat" was a factor in the formation and reproduction of the ruling class of China. In order to form a new ruling class, the class of reformers, it was necessary to replace this idea with another, and Deng Xiaoping's attitude about the liberation of consciousness played a major role in solving this problem.

The main task of state reform policy was to restore economic management to address socio-economic issues. At the same time, the leadership of the CPC did not have any clarity or unity regarding the concept of reforms, there were disagreements on the nature and depth of transformations in the economy.[2] The depth was determined by two questions - the measure of changes in state planning and the measure of market freedoms.

For various reasons, market transformations began in villages, cities began to change later and had more difficulties, including the fact that the public sector of the economy was the economic basis of the regime of the Communist Party. The policy of reforms in the countryside began from below and was largely the result of the self-organization of the peasants. The point of view of Huang Yasheng is noteworthy, according to which two factors contributed to self-organization: chinese village's institutional predisposition to capitalism and entrepreneurship [4] and trust in Deng Xiaoping as a representative of a government focused on a long-term reform policy. [3]

These circumstances played an important role in imparting both economic transformations and the system of state administration in the village of a liberal orientation.

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[1]Zhongguo Gunchandan Di Shiijie Zhongyang Weiyuanhui Di Sansy Quanti Hui Gunbao (Communiqué of the 3rd Plenum of the Central Committee of the CPC of the 11th convocation). 12/22. 1978. http://cpc.people.com.cn/GB/64162/64168/64563/65371/4441902.html.

[2]Berger Y.M. The economic strategy of China. - Moscow: Publishing House "FORUM", 2009. p. 105.

[3] Huang Yasheng. Capitalism in Chinese: State and Business / Yasheng Huang; Trans. from English - 2nd ed. - Moscow: Alpina Publisher, 2012. P.55.

[4]Huang Yasheng. Spec. Works., P. 61-62.

The course of the economic reform of the village, the role of the factor of self-organization in it, was ahead of the possibilities of the public administration system to adequately respond to innovations. There was no experience in combining the mechanism of state planning and the emerging mechanism of market regulation by economic and social development.

The previous model of state administration, built in relation to a planned economy, at first could respond to the challenges of the new socio-economic reality only by applying extensive methods of administration, namely by expanding the staff and increasing the number of government bodies. In the short time after the decisions of the 3rd plenary session of the Central Committee of the CPC of the 11th convocation (December 1978), which laid the foundation for the implementation of the reform policy, the structure of the State Council of the PRC grew and amounted to 100 structural units in 1981, including 52 ministries, 43 direct reporting authority and 5 offices[5]. However, by the end of 1981, it became clear to the leadership of the PRC that the bulky and numerous state administration apparatus was not very sensitive to the needs of a rapidly changing socio-economic situation and in itself needed to be reformed. At the end of 1981, at the 4th session of the NPC of the 5th convocation, an excessively large number of structural divisions were duplicated; bloated staff; low efficiency of the apparatus. By its decision, the NPC session decided to carry out structural reform of the administrative apparatus[6]. In the history of public administration of the PRC, this decision is associated with the beginning of a series of regularly conducted administrative reforms, with a frequency of approximately 5 years, as an integral part of the state reform policy[7].

In accordance with the decision of the 4th session of the NPC of the 5th convocation, in order to make the reform more dynamic, the Permanent Committee of the NPC received the right to reorganize the structure of the State Council between sessions. Corresponding work was carried out in several main areas:

intermediate links and concurrency in the work of structural units were eliminated;

the total number of management personnel was reduced;

new employees of administrative bodies were selected in accordance with business qualities and skill level;

a search was made for the right solution to the issue of party leadership in government[8].

[5]Guangming Ribao. 14.12.1981; It was noted above that one of the offices performed, after the transformations of the mid-1970s, the role of the secretariat of the State Council - Author's Note.

[6]Guangming Ribao. 14.12.1981.

[7]Structural reform refers to one of the components of administrative reform. – Author's Note.

[8]The political system of the People's Republic of China. - Moscow: Publishing house "Nauka". The main edition of oriental literature, 1988.P. 194.

At a meeting of the Politburo of the Central Committee in January 1982, Deng Xiaoping announced the need to carry out a “revolutionary act”, to reduce the central administrative apparatus by one third in 6–9 months, and to reduce managers at all levels in 2–3 years. In both cases, Deng Xiaoping ment a reduction in the apparatus of state and party administration and the management of mass organizations. At the same time, he offered a criterion for the selection of candidates for managerial positions: not to nominate "people of three categories" (who fomented group activity, engaged in factional struggle or participated in purges during the years of the "cultural revolution"), do not nominate antagonists of the course of the 3rd plenum of the Central Committee of CPC 1978; do not nominate people who have committed crimes in the economic sphere. A month later, in February 1982, the “Decree on the Retirement Procedure for Elderly Personnel Workers” abolished the system of almost lifetime executives in their posts[9].

On the basis of the report on the reorganization of the structure of the State Council made by the Prime Minister of the State Council Zhao Ziyang, the NPC SC on March 8, 1982, at its 22nd meeting, adopted a Resolution on the reform of the structure of the State Council. The implementation of the Decree led to a reduction in the apparatus of the State Council from 49 to 32 thousand people, the average age of heads of ministries and departments decreased from 64 to 57 years, the number of ministries and departments decreased from 98 to 41[10]. The number of deputies of the Prime Minister of the State Council was reduced from 13 to 2, while both deputies were among the supporters of a different path of economic reform. Yao Yilin was close to Chen Yun, who advocated that the planned economy be the main component of the country's economy, and market regulation should complement the planned[11]. Wan Li was close to Deng Xiaoping [12], who patronized those supporters of the reforms in the CPC leadership who advocated expanding the role of the market in China's economic development.

The main direction of the reform of public administration was a gradual departure from the model of public administration integrated with the planned economy, and the search for a new model - public administration in the context of an economic policy that combines planned principles with market ones. On May 4, 1982, the NPC SC adopted another Decree entitled “On the project for reorganization in the system of ministries and committees of the State Council”[13]. In August 1982, a group of bodies of direct (direct) subordination to the State Council underwent reform. The NPC Standing Committee on August 23 at its 24th meeting, having

[9]Usov V.N. Deng Xiaoping and his time. - Moscow: SteelService, 2009.P. 698.

[10]People's Republic of China in 1982, Moscow: Nauka Publishing House. The main edition of oriental literature, 1987. P. 45.

[11]Usov V.N. Spec. Works., P. 699.

[12]Usov V.N. Spec. Works., P. 699.

[13]Renmin ribao 05.05.1982.

considered the corresponding draft, decided to cut to 15 departments directly subordinate to the State Council. By the same decision, the NPC SC removed from the direct subordination of the State Council and included 8 departments in the structure of the relevant ministries[14].

The work carried out during 1982 prepared the provisions of the new Constitution of the PRC, adopted on December 4, 1982 at the 5th session of the NPC of the fifth convocation. The provisions determined the status and structure of the Council of State. At the same session of the NPC, December 10, 1982, the provisions of the Law on the Organization of the State Council of the PRC were adopted. The law defined the basic model of the PRC public administration system, which subsequently changed, as it gained experience in public administration in a rapidly changing, under the influence of internal and external factors, socio-economic conditions.

The reform of the economy posed the question to the authorities about whether it is possible to carry out economic reform with an unchanged political system. The CPC leadership agreed that political reform was necessary. The disagreement lay in determining the depth and nature of the political transformation. In many respects both the depth and the nature of the political transformations were influenced by the economic transformations in the city, which markedly differed from the transformations in the countryside. By the time the XIII Congress of the CPC was convened in October 1987, the situation was not very favorable for deciding on political reform. At a meeting with Deng Xiaoping on April 28, 1987, Zhao Ziyang, who by then had been appointed executive Secretary General of the CPC Central Committee, Instead of resigning and actively promoting the issue of political reform Hu Yaobang, expressed concern that in the context of the ongoing campaign against bourgeois liberalization, it would be difficult to hold a congress that would support reforms[15].

Nevertheless, the preparation of proposals for political reform, which began in the framework of the State Council in 1986, was continued. In the Report presented at the XIII Congress of the CPC (25.10.1987 – 01.11.1987), by the Secretary General of the CPC Central Committee, Zhao Ziyang, section 5 was devoted to the restructuring of the political system. The section contained a detailed presentation of the results of a serious scientific and practical study of the content of political innovations, which on behalf of the Central Committee of the CPC were declared necessary for the further promotion of socialist modernization. The directing document in the restructuring of the political system was the speech by Deng Xiaoping in August 1980 at an expanded meeting of the Political Bureau of the CPC

[14]Renmin ribao 05.05.1982.

[15]The history of China from ancient times to the beginning of the XXI century: In 10 vol. Vol. 9. - Moscow: Nauka, 2016. P.382. Author of the section A.V. Vinogradov.

Central Committee. Under a favorable political regime, the Report said, "there are important defects in a specific leadership system and organizational forms and working methods." These defects are expressed: in the excessive centralization of power, the dominance of bureaucracy, "far from complete eradication of feudalism"[16].

The report proposed a model for reforming the political system, which included 7 areas: delineating the functions of party and government bodies, lowering rights down, restructuring the government apparatus, restructuring the personnel system, introducing a system of public consultation and dialogue, improving the institutions of socialist political democracy.

The model of political reform proposed by the CPC leadership at the XIII Congress in 1987 in nature and depth corresponded to those approaches that were used in the economic reform of the village. One can agree with their definition “directed neoliberalism,” given by researcher Huang Yasheng.[17].

The proposals for the restructuring of the political system, voiced and discussed at the XIII Congress of the CPC, formed the basis for the draft reform of the structure of the State Council, adopted in March 1988 at the 1st session of the 7th convocation of the NPC. The document, which opened the second administrative reform, provided, inter alia, a change of functions, transfer of rights to lower bodies, streamlining of the structure, reduction of the staff of government bodies, reduction of the competence of government bodies to intervene in the management of enterprises, strengthening the function of macroregulation and macrocontrol, carrying out work to change the irrational structural organization and inefficient administration. The events of June 1989 influenced the implementation of these measures. Nevertheless, it was in the sphere of public administration that there have been advances that might not have been possible without the decisions on the reform of the political system adopted by the XIII Congress of the CPC.

[16]Documents of the XIII All-China Congress of the Chinese Communist Party (October 25 - November 1, 1987). Beijing: Publishing House of Literature in Foreign Languages, 1988. P. 45-46.

[17]Huang Yasheng. Spec. Works., P. 62.

利用骨传导材料研究慢性实验性骨髓炎的骨矿化水平

STUDY OF THE LEVEL OF BONE MINERALIZATION IN CHRONIC EXPERIMENTAL OSTEOMYELITIS WITH THE USE OF OSTEOCONDUCTIVE MATERIALS

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抽象。 文章介绍了在复合材料处理中使用羟基磷灰石和氢氧化钙作为骨传导成分的实验中骨矿化综合研究的结果。 对84只Vistar系白鼠进行了研究。 为了研究骨组织的结构和功能变化，进行了X射线研究，以及使用分子成像系统确定骨组织的矿物质密度。 所得结果表明使用羟基磷灰石和氢氧化钙作为骨髓炎复杂治疗的骨传导成分的有效性。

关键词：慢性骨髓炎，骨传导性物质，骨密度。

Abstract*. Article presents the results of a comprehensive study of bone mineralization in an experiment on the use of hydroxyapatite and calcium hydroxide as an osteoconductive component in the treatment of composite materials. Studies were conducted on 84 white rats of the Vistar line. To study the structural and functional changes in bone tissue, X-ray studies were conducted, as well as the determination of the mineral density of bone tissue using a molecular imaging system. The results obtained indicate the effectiveness of the use of hydroxyapatite and calcium hydroxide as osteoconductive components of the complex treatment of osteomyelitis.*

Keywords*: chronic osteomyelitis, osteoconductive materials, bone mineral density.*

Despite the frequent debate in the field of traumatology regarding the management of patients with purulent infection of the long bones, the topic of treatment of chronic osteomyelitis remains one of the priority tasks of traumatology for many generations [1,8]. According to statistics, today there is no decrease in the number of patients with this pathology, the frequency of exacerbations of the chronic

process increases in certain regions to 60% [12,13,18,11]. For post-traumatic osteomyelitis, this is due to the high frequency of road traffic accidents, numerous severe industrial injuries [10,8], and late and poor-quality primary surgical treatment of bone wounds [1,17]. Inappropriate growth of indications for surgical treatment for complex fractures with massive soft tissue injury, violation of the period and method of performing interventions, erroneous selection of surgical aids and metal structures are the main etiological factor in postoperative osteomyelitis [7,19]. Thorough sanitation of the outbreak is the leading link, which currently has a special role [3,5,12,9]. Substitution of the bone cavity, the selection of material to create an osteogenic environment, is the second, no less important part of the operation [2,3,6,12,9,14].

The aim of the work was to evaluate and compare the regenerative processes of bone tissue when using long tubular bone-osteoconductive materials in the treatment of experimental chronic post-traumatic osteomyelitis.

Materials and methods

The experiment was performed on 84 white Vistar rats. Chronic post-traumatic osteomyelitis was modeled on the femur. During the experiments, the drug "Zolitil-100" was used as anesthesia at a dose of 8 mc/kg. All manipulations were performed under aseptic conditions. Laboratory animals, on a shaved hair section of the outer surface of the lower tertiary thigh, undergone a linear incision of the skin, subcutaneous fat 1.5 cm. The muscles were pushed apart in a blunt manner, exposing the metaepiphyseal area of the femur. Using the original micromotor device, a cavity with a diameter of 3.5 mm was created. After that, turunda moistened with a 20% ethoxysclerol solution was introduced into the cavity. One suggestive suture with a silk thread of size 1.0 was applied to the skin. After 7 minutes, a postoperative scar was dissected, access to the cavity was obtained, the turun was removed, a culture of Staphylococcus aureus in 2% agar (150-200 thousand microbodies) was introduced. Bone hole was filled with cement-phosphate, the wound was sutured tightly. A clear clinical picture of osteomyelitis with the presence of fistulas, purulent discharge, manifested itself by the 31st day after the introduction of Staphilococcus aureus.

In the experiment, the animals were divided into control and experimental groups. There are 28 animals in each group, 7 for each stage of the study. The first experimental group included animals in which hydroxyapatite was used as a composite material, and in the second experimental group, calcium hydroxide was used. In the course of the experiment, finely dispersed hydroxyapatite powder “Hydroxyapol GAP-85” by "Polistom", Russia and a powder based on calcium hydroxide Calcetin from "TechnoDent", Russia, were used. In the control group, the condition of animals without treatment was assessed. After the development of the clinical picture of osteomyelitis, treatment was started in the experimental

groups. In each experimental group, the animals were excised with a fistula and a necrotic tissue site, and thorough surgical sanitation of the lesion was performed until the appearance of "blood dew". The surgical wound was washed with 0.9% sodium chloride solution, the cavity was dried with a sterile napkin. Then osteoconductive materials were introduced into the bone cavity - in the first experimental group, hydroxyappatite was used, in the second, calcium hydroxide. The bone cavity was completely filled with composite material with the addition of physiological saline.

The processes of vascularization, migration, and differentiation of osteoblasts in the focus of destruction form coarse-fibered bone tissue. Composite, or osteoconductive, materials also create an osteogenic environment, which is necessary for the formation of bone tissue [16,4,14].

On the 7th, 14th, 28th and 60th days, X-ray studies and a study of the bone mineral density were carried out. A feature of the work was the radiography using the In-Vivo MS FX Pro molecular imaging system manufactured by Bruker (USA), which allows one to obtain some parameters of bones in vivo. This technology can significantly save material and natural resources.

Results and discussion

On the 7th day from the start of treatment, in all the experimental groups on the roentgenogram, the bone was thickened due to periosteal layers, destruction foci with uneven sclerotic walls, zones of osteoporosis are visible. Sequestries are visualized in the control group.

In the automatic analysis of the bone structure by the imaging system, one of the reliably confirmed indicators was bone mineral density (BMD). In intact animals, this indicator was 0.5531 ± 0.0023 g/cm². In animals of the control group, BMD ranged from 0.3413 ± 0.0043 g/cm², which indicates the phenomenon of osteoporosis. When performing osteodensitometry in the experimental groups, the following results were obtained: I experimental group 0.3754 ± 0.0023 g/cm², II experimental - 0.3799 ± 0.0043 g/cm², which also means the washing out of minerals from the bone, however, the data are insignificant, but reliably higher than in the control group.

An X-ray examination on the 14th day in the control group reveals significant thickening of the bones, foci of destruction, the growth of sequestration to 3 mm in diameter to the lateral and medial contours. Indicators of bone mineral density in the control group remain within the same limits as on day 7 –0.3313 ± 0.0043 g/cm². In the experimental groups, osteoconductive materials have an increasingly visible effect. The X-ray diffraction pattern in the experimental groups is similar and shows a decrease in the destruction zone, a decrease in the background of osteoporosis, and sequestration in small quantities and sizes. BMD: I experimental group 0.4143 ± 0.001 g/cm², II experimental group - 0.4256 ± 0.0012 g/cm². These

results indicate the process of bone mineralization, which allows us to speak not about osteoporosis, but about osteopenia.

On day 28, osteoporosis predominates on radiographs in the control group, foci of destruction and sequestration remain. The mineral density is decreased insignificantly –0.3187 ± 0.0052 g/cm², which suggests the depletion of the body's reserves and recognize the stage of complete decompensation. In the experimental groups, the x-ray picture is still similar. Significant reduction of foci of destruction, foci of osteosclerosis compared with 14 days. Densitometry showed the following results: I experimental group 0.4532 ± 0.0013 g/cm², II experimental - 0.4733 ± 0.003 g/cm². The results of osteodensitometry in the Ca hydroxide using group show the best mineralization rates at 28 days.

In animals of the control group on the 60th day of the study, the bone was thinned and sclerotized on radiographs. The bone becomes less compact, its edges become loose, periosteal layers are visible. Destruction is preserved, sequestration has decreased in size (up to 2 mm). BMD remains at the previous values - 0.3227 ± 0.0042 g/cm². In the X-ray photographs of the animals of the experimental groups, a thickening of the bone due to periosteal stratification is still preserved, a narrowing of the medullary canal occurs (the phenomenon of osteosclerosis). The foci of osteoporosis and osteosclerosis alternate, which indicates the process of reconstruction of the bone structure. In the II experimental group, foci of osteosclerosis predominate. In the experimental group, the mineral density is not significantly changed. Experimental group I- 0.4645 ± 0.0013 g/cm², II experimental - 0.4800 ± 0.0016 g/cm². Minor improvements according to densitometry data indicate the processes of vascularization, migration and differentiation of osteoblasts.

Conclusion

During the course of the experiment, it can be concluded that the intraoperative use of hydroxyapatite and Ca hydroxide as an osteoconductive component of treatment contributes to the accelerated mineralization of bone tissue, which leads to accelerated formation and differentiation of osteoblasts. It also helps to trigger a cascade reaction leading to increased bone metabolism. On this side, composite materials can also be considered as osteoinductive materials, which are the matrix for the forming bone. However, the imperfect osteoinductive properties of the preparations provide new fields for experiments. Assessing the results of these experiments, it should be mentioned that the osteoconductive materials used in the experiment exerted not only the above processes, but also a local antiseptic, anti-inflammatory effect due to their alkaline reaction.

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儿童长期饥饿后成年人颈动脉粥样硬化斑块的形态学特征
MORPHOLOGICAL FEATURES OF ATHEROSCLEROTIC PLAQUE OF THE CAROTID ARTERIES IN ADULTS WHO SURVIVED LONG PERIODS OF STARVATION IN CHILDHOOD

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抽象。 这项研究显示，在法兰西斯（1941–1944）封锁的列宁格勒童年长期饥饿中存活的成年人数量有统计学意义的显着增加，并且由于血栓或其组合导致颈动脉直径缩小。 动脉粥样硬化斑块和血栓。 被围困城市长期存在的极端生活条件是影响年轻居民身体的极其不利因素。 这些因素决定了我们所研究的已经成熟的人群中不仅颈动脉硬化的发展以及其他非传染性疾病的后续不利性质。

关键词：动脉粥样硬化，动脉粥样硬化斑块，颈动脉，动脉粥样硬化斑块形态，儿童和青少年长期饥饿，饥饿的长期影响，列宁格勒的封锁

Abstract. *The study revealed a statistically significant increase in the number of adults who survived long periods of starvation in their childhood in Leningrad blockaded by fascists (1941-1944) and had a narrowing of the diameter of the carotid artery due to a thrombus or a combination of atherosclerotic plaque and thrombus. The long-existing extreme living conditions in the besieged city were extremely unfavorable factors affecting the body of young residents. These factors determined the subsequent unfavorable nature of the development of not only carotid arteriosclerosis, but also other non-infectious diseases in the group of already matured people we examined.*

Keywords: *atherosclerosis, atherosclerotic plaque, carotid arteries, morphology of atherosclerotic plaque, prolonged starvation of children and adolescents, long-term effects of starvation, blockade of Leningrad*

As is known, atherosclerotic lesions of the internal carotid artery, common carotid artery, aorta, and coronary arteries play a leading role in the development of ischemic brain lesions. Currently, two types of ischemic stroke are distinguished: thrombotic, which occurs due to primary thrombotic occlusion of the cerebral vessels and embolic, which occurs due to embolism from a distant source. Primary thrombotic occlusion often develops in a vessel whose lumen is narrowed due to atherosclerotic lesions. The most common cause of embolization of cerebral vessels is coronarogenic emboli that occur in a patient with prosthetic valves, acute myocardial infarction, infectious endocarditis, atrial myxoma, atrial fibrillation from atherosclerotic plaques located on the aortic arch or in the main arteries, carrying blood to the brain. Atherosclerotic lesions of the carotid arteries are more often a source of intracranial artery embolism, but may also be the cause of their primary thrombotic occlusion [1].

The aim of our study was to determine the morphological features of atherosclerotic plaque of the carotid arteries in adults who survived long periods of starvation during childhood during the military blockade of Leningrad in 1941-1944. We studied intraoperative biopsy specimens of atherosclerotic plaques, taken during eversion carotid endarterectomy in 1999–2001 in 17 men and 7 women living at that time permanently in St. Petersburg. Surgical intervention was carried out in the clinic of the city vascular center, functioning at the Pavlov First Saint Petersburg State Medical University (Russian Federation). In the statistical processing, 36 intraoperative biopsy samples were used, which were taken from 24 elderly people born in 1927–1943 and who received surgical aid in 1999–2001 in the city vascular center. The main group included 12 people aged 61 to 73 years who survived the blockade of Leningrad in childhood. The average age of the patients in the group was 65.7 ± 1.1 years; the male/female ratio was 1.0: 1.2. The comparison group consisted of 12 elderly people aged 62 to 71 years, the average age was 64.3 ± 1.1, the male/female ratio was 1.0: 5.5. The material for histological examination was 36 biopsy specimens of atherosclerotic plaques of the internal carotid and common carotid arteries obtained intraoperatively: in the main group there were 15 biopsy specimens and in the comparison group 21. The morphological nature of the atherosclerotic lesion was taken into account in the review histological analysis: its composition was noted, i.e. the presence of liposclerosis with the deposition of crystals of cholesterol and calcification, the nature of the deposition of calcifications, lipomatosis; the state of the surface of the atherosclerotic plaque, the causes of narrowing of the vessel, the presence of a blood clot, the limitation of its formation were studied; the infiltrate surrounding the plaque, its composition and the presence of hemorrhages with an assessment of their presence period were taken into account. When assessing the degree of narrowing of the lumen of the vessel, a morphometric analysis was used using a 50-point Weibel ocular network.

The reliability of the results was determined by the Student criterion for the difference in average values and the T criterion (differences in relative indicators) [2].

A histological and statistical study showed that patients of the two observation groups showed no statistically significant differences (T <2) in the degree of narrowing of the carotid arteries (Fig. 1).

Atherosclerotic plaques were the main cause of stenosis of the carotid arteries both in the main group and in the comparison group (Fig. 2): 64.3 ± 12.4% in the main group and 92.9 ± 9.6% in the comparison group, while in patients who survived long periods of fasting in childhood, narrowing of the lumen of the carotid arteries was statistically significantly more often (T> 2) caused by a thrombus or a combination of a thrombus and atherosclerotic plaque (35.7 ± 12.4% versus 7.1 ± 5.6% in the comparison group).

In patients of two observation groups, the atherosclerotic plaque had a similar microscopic structure (Fig. 3), i.e. the same number of lipoprotein complexes, lipoprotein complexes and crystals of cholesterol, lipoprotein complexes and calcium was observed, for example, lipoprotein complexes were detected in 18.8 ± 10.1% of patients of the main group and 4.5 ± 4.5% in the comparison group, which did not have statistically significant differences (T <2). On the surface of the atherosclerotic plaque (Fig. 4), both atheromatosis and calcium deposits were equally often detected; however, in people of older age groups who survived long periods of fasting in childhood, there was a pronounced tendency (T = 1.6) to increase the number of plaques with a defect or thrombus on the surface (46.7 ± 12.9% versus 23.8 ± 9.3% of the comparison group).

Thus, our study revealed a statistically significant (T> 2) increase in the number of people in the main group with carotid stenosis caused by a blood clot or a combination of atherosclerotic plaque and blood clot.

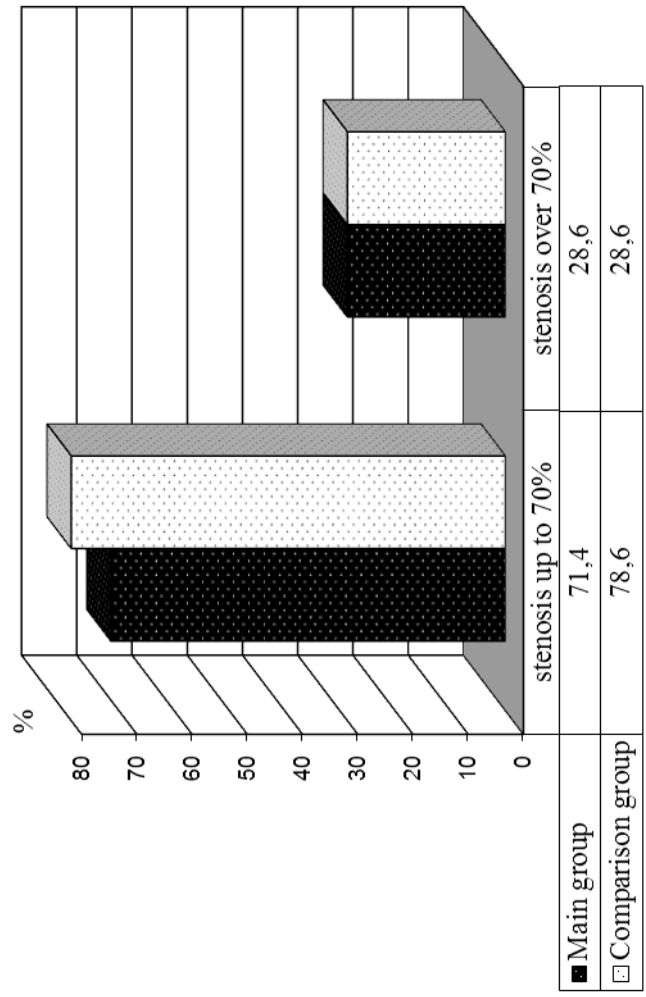


Figure 1. *The degree of narrowing of the carotid arteries in adults who survived long periods of starvation in childhood (the main group) during the fascist blockade of Leningrad (1941-1944)*

Figure 2. *Causes of narrowing of the lumen of the carotid arteries in adults who survived long periods of starvation in childhood (the main group) during the fascist blockade of Leningrad (1941-1944)*

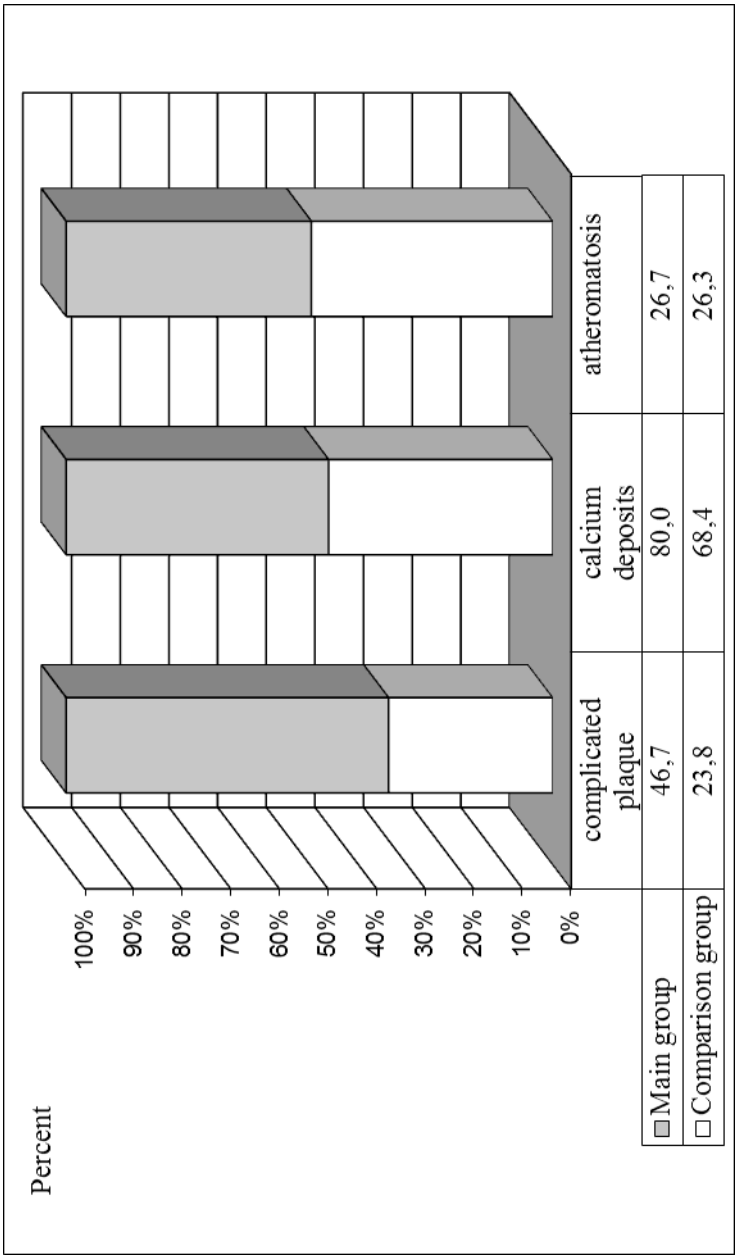
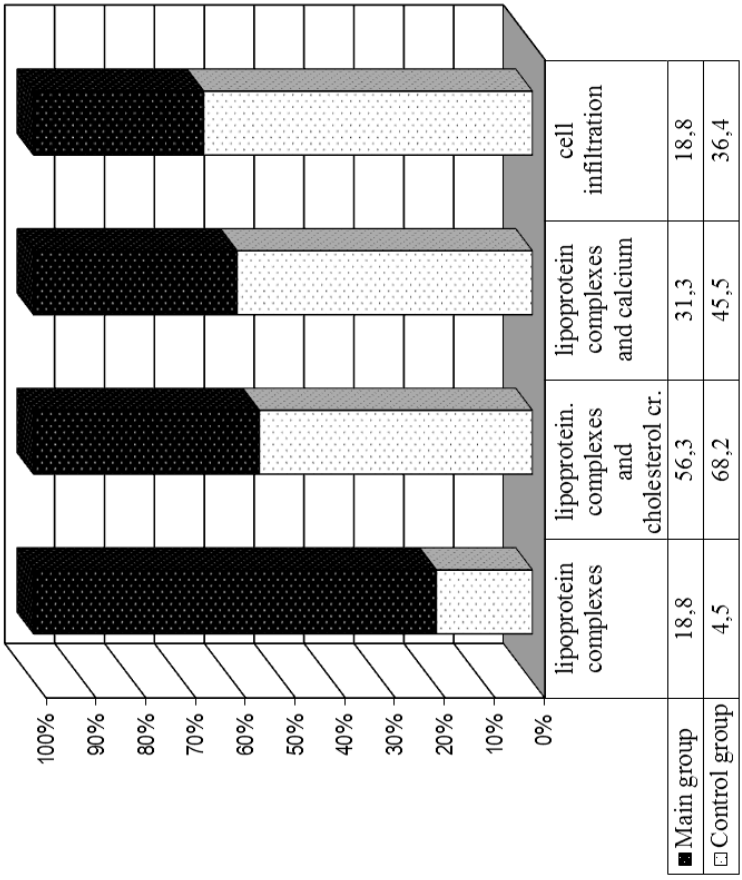


Figure 4. *Surface condition of atherosclerotic plaque in adults who survived long periods of starvation in childhood (the main group) during the fascist blockade of Leningrad (1941-1944)*



	lipoprotein complexes	lipoprotein. complexes and cholesterol cr.	lipoprotein complexes and calcium	cell infiltration
■Main group	18,8	56,3	31,3	18,8
□Control group	4,5	68,2	45,5	36,4

Figure 3. *Microscopic structure of atherosclerotic plaque in adults who survived long periods of starvation in childhood (the main group) during the fascist blockade of Leningrad (1941-1944)*

We suggest that the morphological characteristics of atherosclerotic lesions of the carotid arteries in adults who survived long periods of fasting in children in Leningrad blockaded by fascists (1941-1944) can be explained by the idea of two variants of the clinical course of atherosclerosis [3]. Morphologists called the first option non-stenotic, diffuse, dilated atherosclerosis with a slow increase in the number of plaques that occur diffusely and do not lead to vascular stenosis. Collateral blood circulation compensates for continuously decreasing tissue perfusion, therefore no foci of ischemia occur. These plaques have no tendency to rupture of the fibrous membrane, therefore, there are no conditions for the appearance of a blood clot on its surface - this option for the progression of atherosclerotic lesions of the arteries usually does not lead to the development of acute myocardial infarction and cerebral stroke and does not accumulates in carotid arteries. The second variant of the development of atherosclerosis is called focal stenotic disease of the vessel, which is characterized by the appearance of local, rapidly growing plaques that protrude into the lumen of the vessel and have ulcerations on its surface, as well as thrombotic masses, often leading to the development of acute cardiovascular events, including ischemic a stroke. It is the second model of the progression of atherosclerosis that early affects the carotid arteries. In most cases, small atherosclerotic plaques are unstable [4], which narrow the vessel lumen by less than 50%, often without causing clinical manifestations and contribute to the sudden development of acute cardiovascular events. Large stable plaques may not cause ischemia if collateral arteries develop well in the tissue.

It is likely that extreme living conditions in blockaded Leningrad [5,6, 7,8,] such as psychoemotional stress, prolonged starvation and malnutrition, the surrogate nature of food, etc. were extremely unfavorable factors affecting the body of children and adolescents in the besieged fascists of Leningrad [5, 9,10], which largely determined the early formation and severe course of many noncommunicable diseases [5,11, 12, 13, 14, 15, 16 , 17], including an unfavorable variant of the development of the atherosclerotic process in large arteries [5, 18, 19, 20,21].

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免疫刺激剂在肉鸡替代抗菌药物中的应用效率
EFFICIENCY OF APPLICATION OF IMMUNOSTIMULANTS FOR BROILER CHICKENS WHEN REPLACING ANTIBACTERIAL DRUGS

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抽象。 不受控制地使用抗菌药物导致了对它们具有抗性的微生物形式的广泛传播。 与几乎所有使用的抗生素相比，观察到大多数细菌对一种或另一种程度的抗性，这导致其使用效果显着降低，尤其是在医学中。 因此，不使用抗生素培育农场动物是现代科学的一个迫切领域。

我们是第一个研究getmick和cyclferon对肉鸡的影响的人。 发现这些药物完全排除了来自肉鸡预防性治疗方案的抗菌剂，增加了鸟的生长并增加了天然抗性。建议使用完全排斥抗生素的hetmic和cycloferon肉鸡。

关键词：getmick cycloferon，抗菌药物，天然抗性，肉鸡

Abstract. *Uncontrolled use of antibacterial drugs has led to the widespread dissemination of forms of microorganisms resistant to them. The resistance of most bacteria to one degree or another is observed in relation to almost all antibiotics used, which led to a significant decrease in the effectiveness of their use, especially in medicine. Therefore, the cultivation of farm animals without the use of antibiotics is an urgent area of modern science.*

We were the first to study the effects of getmick and cyclferon on broiler chickens. It was found that these drugs, with the complete exclusion of antibacterial agents from the prophylactic treatment regimen of broiler chickens, increase the growth of the bird and increase the natural resistance. Recommendations are given for the use of hetmic and cycloferon broiler chickens with a complete rejection of antibiotics.

Keywords: *getmick cycloferon, antibacterial drugs, natural resistance, broiler chickens*

1. Relevance

The need to combat pathogenic microorganisms in animal husbandry without the use of antibacterial drugs is the main task of all developing countries of the world. This problem is dictated by the fact that antibiotic resistance leads to difficulty, and in some cases the impossibility of treating a number of infectious diseases of humans and animals [3].

Already, 33% of antibacterial drugs are ineffective, and pathogens are resistant to the latest developments that have not yet been clinically used.

Over time, bacteria develop resistance to drugs used to combat them. As sustainability develops, the effectiveness of drugs gradually decreases and, as a result, is completely lost. Resistance to antibiotics is a consequence of their use, and the irrational use of antibiotics accelerates its occurrence [1]. The excessive role of antimicrobial agents, as well as their use in insufficient doses, plays a negative role.

Resistant microorganisms carried by farm animals can be transmitted to humans through contaminated food, direct contact with animals or through the environment, such as contaminated water. Agricultural workers can contribute to the fight against antimicrobial resistance by improving the protection of farm animal health, ensuring proper hygiene, and adhering to agricultural norms and rules [4].

Therefore, in order to improve the safety and productivity of animals, it is necessary to constantly monitor the resistance of their body, use antibacterial drugs more carefully and completely eliminate unnecessary or ineffective ones.

A weakened immune system and a low level of nonspecific resistance under the influence of various adverse factors are not able to withstand viruses, bacteria and even fungi with high pathogenicity. Therefore, at present, along with improving the technology of feeding and keeping animals, an urgent task is to increase the nonspecific resistance and specific immunity of animals using immunocorrectors with a wide spectrum of action [6], [2].

As further observations and studies have shown, one of these factors, in particular, the immunodeficiency state of the animal organism, can be successfully corrected by the scientifically-based prescription of immunostimulants and used to increase the body's defenses and, therefore, to increase the effectiveness of chemotherapy [7].

The widespread use of non-specific agents in veterinary medicine to increase the general and specific resistance of the body, correct immunity, prevent and treat patients will reduce the incidence and initially increase the productivity of animals [5].

Thus, the search for effective and inexpensive immunostimulants, the use of which will reduce the use of antibacterial drugs is an urgent task facing the veterinary service [8].

Our developments are aimed at replacing antibacterial drugs in the diets of farm animals with other substances that are completely harmless to the human body.

The purpose of the experiment: To study the effect of the hematics immunostimulant on broiler chickens in order to offer this drug as an alternative to antibacterial in the diets of poultry and compare its effect with cycloferon.

To achieve the goal, the following **tasks** were set**:**

- exclude antibacterial drugs from broiler chickens ration;
- study the effects of hetmics and cycloferon on the safety and productivity of birds;
- determine the effect of drugs on the natural resistance of chickens

2. Material and methods of the research.

Production experiments were carried out in the conditions of the Poultry Laboratory of the Scientific Research Center "Agrotechnopark" Federal State Budgetary Educational Establishment of Higher Education " Belgorod State Agricultural Univerisity named after V. Gorin. "

The formation of groups was carried out on the counterparts basis.

To conduct the experiment on the counterparts basis, 6 groups of broilers of age of one day, 30 animals each, were formed. The first group is the control, the rest are test groups.

Chickens of 3 and 4 experimental groups were processed with water cycloferon, chickens of 5 and 6 experimental groups were fed getmick.

On the birds of the second, fourth and sixth experimental groups, antibacterial drugs were not used

Cycloferon is a clear yellow liquid, contains meglumine acridone acetate in terms of acridonoacetic acid 125.0 mg, obtained according to the following formula: acridonoacetic acid 125.0 mg, N-methylglucamine (meglumine) 96.3 mg. Excipient: water for injection up to 1.0 ml.

Getmick – is a polysaccharide of microbial origin. The main active ingredients are galactomannan and fatty acids. Getmick is a high molecular weight hydrocolloid and, therefore, when dissolved, a highly viscous gel is formed, the viscosity of which depends on temperature and concentration.

lysozyme Serum activity was determined by the Dorofeychuk nephelometric method, phagocytic activity was determined by counting phagocytic pseudoeosinophils of 100 cells, and serum bactericidal activity was determined by I.M. Karput.

The digital material obtained in all experiments was subjected to statistical processing on a personal computer according to the generally accepted methods of variation statistics with the calculation of the Student argument (td). The difference between the compared values was considered significant at $p \leq 0,05$.

3. Research results

To conduct research on the basis of counterparts , 6 groups of broiler chickens of age of one day were formed, 30 goals each.

The first group is the control; the second, third, fourth, fifth and sixth are experimental. Chickens in the control, third and fifth experimental groups received a diet according to the scheme adopted on the farm using all antibacterial drugs (starting from 2 days of age, cypromag was added to the water at the rate of 5 ml per 10 l for 5 days and this drug was used from a 20 day old age with water for 5 days).

Antibacterial drugs were not used on the chickens of the second, fourth and sixth experimental groups.

For chickens of 5 and 6 of the experimental groups, starting from 8 days of age, getmick was added to the water at the rate of 0.4 g / kg body weight over 10 days. Chickens of 3 and 4 of the experimental groups during the same period were treated with water cycloferon at a dose of 0.003 mg per 1 kg of body weight.

The experimental scheme is presented in table. 1.

Bird observation was carried out throughout the growing period..

Chickens were weighed on 8, 18, 28 and 38 days of rearing.

Table 1. - *Scheme of experiment*

Groups	**Number of heads**	**Used drugs**	**Dose**
1 – control	30	The basic diet (BD)	-
2 – experimental	30	**BD (without antibacterial drugs**)	-
3 – experimental	30	BD + cycloferon	0,003 mg per 1 kg
4 – experimental	30	**BD ((without antibacterial drugs)** + cycloferon	0,003 mg per 1 kg
5 – experimental	30	BD + getmick	0,4 g per kg
6 – experimental	30	**BD (without antibacterial drugs)** + getmick	0,4 g per kg

As a result of the studies, an increase the average daily growth of birds of all experimental groups was found (table. 2).

Table 2 - *Test results of cycloferon and getmick treatment on broiler chickens*

Indicators	Groups					
	1- control BD	2- experimental ***BD without antibacterial drugs***	3- experimental BD + cycloferon	4- experimental ***BD without antibacterial drugs + cycloferon***	5- experimental BD + getmick	6- experimental ***BD without antibacterial drugs + getmick***
Number of *heads* at the beginning of the experiment	30	30	30	30	30	30
at the end of the experiment	28	27	30	30	28	29
Preservation, %	93,3	90,0	100,0	100,0	93,3	96,6
The average daily gain, *heads*	60,1	56,6	65,8	63,8	65,5	63,7
+/- to control, %	-	-5,8	+9,5	+6,2	+8,9	+5,9

It should be noted that the highest safety of the bird was in the third and fourth experimental groups (100%) where cycloferon was used and in 5 and 6 experimental groups where hetmick (microbial polysaccharide) was added to water.

In the same groups there were the highest average daily gains: 6.2 and 5.9% higher than the control after the use of cycloferon and getmick with the complete exclusion of antibiotics. And by 9.5 and 8.9% - after using the same drugs, but antibiotics were present in the main diet.

As for the second experimental group, the complete exclusion of antibacterial drugs from the diet led to a decrease in the average daily growth of chickens (5.8% below the control indicators). In the same group was the lowest preservation (90.0%).

When studying natural resistance (Table 3), an increase in the phagocytic activity of pseudo-eosinophils from the use of all the drugs studied was established.

So, after the use of cycloferon in the 3rd experimental group, there was a significant increase in the bactericidal activity of blood serum and the phagocytic activity of pseudo-eosinophils by 20.2 and 17.6%, respectively, compared with the control. In the 4th experimental group, with the complete exclusion of antibiotics from the diet, these indices of natural resistance also increased by 21.5 and 16.6%.

Table 3 - *Indicators of the natural resistance of broiler chickens, n=20 (M±m)*

Groups	Indicators		
	Bactericidal activity, %	**Phagocytic activity, %**	**Lysozyme activity, %**
At the beginning of the experimental period			
1 – control	30,46±1,65	38,24±1,40	10,69±1,46
2- experimental	31,26±1,77	37,84±1,69	10,44±1,76
3- experimental	31,34±1,66	39,18±1,67	10,14±1,72
4- experimental	30,24±1,79	36,43±1,47	10,76±10,39
5- experimental	30,47±1,64	38,72±1,61	10,58±1,83
6- experimental	30,54±1,82	37,75±1,77	10,68±1,56
At the end of the experimental period			
1 – control **BD**	32,24±1,73	37,56±1,65	11,77±1,15
2- experimental ***BD without antibacterial drugs***	30,57±1,61	36,88±1,75	10,98±1,12
3- experimental **BD + cycloferon**	38,75±1,69*	44,18±1,85*	12,15±1,23
4- experimental ***BD without antibacterial drugs + cycloferon***	39,16±1,67*	43,89±1,52*	13,15±0,57
5- experimental **BD + getmick**	37,13±1,84	45,23±1,66*	12,84±1,19
6- experimental ***BD without antibacterial drugs + getmick***	37,22±1,89	43,92±1,68*	13,26±1,16

*p<0,05;

After the use of getmick, an increase in only the phagocytic activity of pseudo-eosinophils was noted: in the 5th experimental group by 20.4%, in the 6th experimental group with the complete exclusion of antibiotics - by 16.9% compared with the control.

Conclusion

Thus, studies have shown that cycloferon and getmick increase the body's natural resistance and, as a result, increase the average daily growth and preservation of broiler chickens. Moreover, the complete exclusion of antibiotics from the diet of the bird does not have a negative effect on the body.

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区块链技术在运输系统规划和管理中的应用
USE OF BLOCKCHAIN TECHNOLOGY IN PLANNING AND MANAGEMENT OF TRANSPORT SYSTEMS

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抽象。 在ITS中使用区块链的可能方案之一可能是获得无阻碍旅行的服务。该服务旨在创建一个分散的车道实时共享网络。

关键词：区块链技术，智能交通系统，公路运输管理。

Abstract. *One of the possible scenarios for using blockchain in ITS may be the service of obtaining unhindered travel. This service aims to create a decentralized real-time sharing network of lanes.*

Keywords: *blockchain technology, intelligent transport systems, road transport management.*

Blockchain technology in the planning and management of transport systems has great potential for use in the creation of self-sufficient and decentralized intelligent transport systems (ITS). Nevertheless, it is necessary to consider several key issues so that the use of blockchain technology reaches its full potential.

Let us define the fundamental research questions as the main opportunities and potential ideas.

1) Decentralized Autonomous Transport Systems.

Decentralized autonomous transport systems include the main components of the blockchain. P2P networks, based on the consensus of distributed coordination and economic benefits, are a natural way to model a complex transport system. Each computing node (for example, IoT devices, vehicles, or other objects with computing power) can be considered as a stand-alone agent in this system [1].

A large number of such nodes can be connected to a common network and communicate with each other through various types of blockchain technology-based decentralized applications (Dapps), as a result of which it is possible to create a decentralized autonomous organization (DAOs) that is subordinate to specific requirements and tasks. Further, when forming the macro level, we will come to the creation of a decentralized autonomous system and even a community of systems (DAS) [2].

In this direction, it is necessary to delve into the microlevel of individual behavior and interaction between autonomous agents of the system, as well as the systemic macrolevel of modeling, self-organization, self-development and self-adaptation of systems.

2) Development of a crowdsourcing incentive mechanism.

The competition of distributed consensus in systems based on blockchain technology can already be considered as a crowdsourcing task for a large number of nodes that contribute their computing power to verify blockchain data [3]. These nodes are single agents, therefore, the incentives and mechanisms of crowdsourcing should ensure that the individual behavior of the node in its quest to maximize income is consistent with the system-wide goal of providing guarantees for the protection and reliability of the system. The applied blockchain technology can be used to aggregate all possible computing resources in the ITS to solve previously unsolvable problems, for example, more accurate real-time traffic management and control.

3) Software that defines trust to its systems.

Trust based on a chain of blocks in the system plays an important role in creating a decentralized ITS, which in turn will allow this technology to be used to solve many problems, such as P2P trade, payment and communication [4]. This type of trust is guaranteed by the code and verification of most participants in the process. Technology has the potential to significantly reduce structurally complex systems, and in turn will lead to a reduction in social problems. This will allow currency and assets to move freely between legal entities and individuals. For example, based on P2P trust, used cars can be resold and registered directly through the blockchain applications instead of centralized authorities or platforms.

In this direction, the issues that await further research are a fundamental justification for building trust and trust management.

4) Intelligent Contracts Based on Intelligent Transport.

A smart contract serves as an “activator” of the blockchain, endowing static data using a variety of algorithms (for example, machine learning, big data analysis, etc.) and high-level logic programs to build the ITS software ecosystem and improve the intelligence of its applications [5]. A self-fulfilling smart contract significantly reduces social complexity by reducing the importance of the human factor, and can act as software agents on behalf of their creator or even themselves. Therefore, there

is an urgent need to study the development and implementation of specific smart contracts, as well as the management and control of ITSs based on them.

5) Data security and privacy protection.

Although the blockchain has shown high reliability and security, the encryption structure should be further strengthened in an ITS with a large number of devices in order to protect it against attacks.

A number of researchers [2] proposed the idea of PTMS (Parallel Transportation Management and Control System), which optimizes a real transport system through parallel interactions with its corresponding artificial or virtual counterparts. Blockchain is one of the secure and reliable architectures for PTMS, and thus, blockchain can be seen as an important step towards PTMS. One of the possible uses of blockchain technologies in PTMS is shown in Fig. 1.

Blockchain-based PTMS will include all objects in the physical space, including IoT devices, vehicles and assets, can be easily digitized through the "blockchain of things" and registered on the blockchain online. Big data transfer in cyberspace can also be integrated into the blockchain. In addition, it is possible to create one or several artificial transport systems in the code space of smart contracts using the Ethereum platform, which offers programmable scripts to support complex modeling and calculations [6].

Based on these jointly developing real and artificial transport systems, we can design and conduct multidirectional computational experiments to evaluate and verify specific behavior, mechanisms and strategies in ITS (for example, to assess traffic conditions). These experiments can be designed as "What-If" type of script output and simulation, based on the predefined rules "If-Then". The optimal solution will be developed in a large number of computational experiments and will return to real transport systems. This process is repeated endlessly, leading the actual transport system to the final approximation of its optimal artificial counterparts [7].

One of the possible scenarios for using blockchain in ITS may be the service of obtaining unhindered travel. Let's call it the Quick Road System (QRS). This service aims to create a decentralized real-time sharing network of lanes. If the driver is in a hurry or wants to get priority in using the high-speed lane, then having established a special status, he, by exchanging incentives through the blockchain with other owners of private cars, shares his place on the lane with other vehicles moving along the same route.

A special application installed on the driver's smartphone or integrated into the car's software can be registered as one of the QRS computing nodes called "Road miners". Real-time data is checked and stored in a P2P community-supported network through which all lane-sharing and payment sharing behavior is coordinated and executed. Road miners are connected to a P2P network without any central authority.

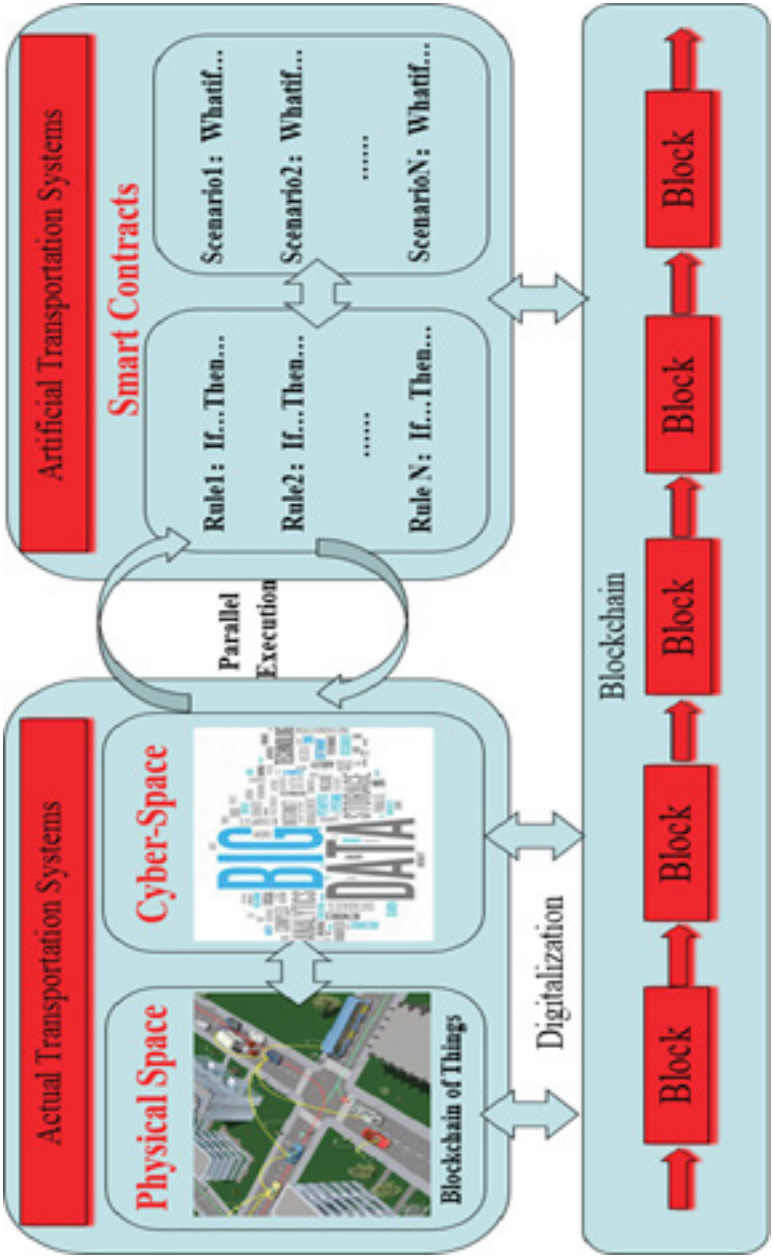

Figure 1 *- Parallel transport management [2]*

As a consensus algorithm, we can offer an innovative consensus algorithm called “motion proof”, which encourages road miners to ride with the QRS application running on their smartphones or on-board computers. In this way, road miners can contribute to the community by sharing their traffic data along the way and helping QRS build a local social network of road lanes. As a reward, QRS automatically generates new tokens called “QRS” for road miners, and these tokens can be used to pay for trips and other transportation services. The more they travel in a slow lane, the more QRS tokens they earn. Accordingly, those drivers who use fast lanes will be forced to pay for the use of the fast lane from their own funds, or from previously accumulated QRS tokens (Fig. 2).

In the process of creating QRS, we will create various algorithms. These algorithms can be used to make specific decisions without human intervention, for example, to determine the possibility of using QRS in a specific geographical region or to activate a service in a region where the number of active users exceeds the "critical mass", and so on. QRS will be a decentralized, self-governing system (DAO) and, together with other services, with a similar business model, will represent the future trend of social transport and will change the sharing economy [9].

Another application of blockchain can be imagined as a distributed transportation service. Inside a distributed network, its own crypto coins are circulated. The network will be built on top of the Bitcoin blockchain, and coins are mined through a new concept - proof of movement.

Anyone can join the transport network. To become a miner, you just need to download the application and turn on GPS on your phone: mining will start automatically when you move at a speed of more than 20 km / h. Coins can also be acquired by participating in the development of program code or application design, or simply by attracting friends.

Thus, early supporters can lay the foundation for a future network until enough participants are gathered to launch the entire system, in which drivers will be paid for with cryptocurrencies issued through the coin mechanism, for example, through Mastercoin, Counterparty protocols [10].

Combining these two breakthrough concepts - distributed traffic and cryptocurrencies - is only a matter of time. We use cryptocurrency technologies to gain a critical mass of users necessary for the smooth operation of a distributed transportation network, and also as the basis for creating a truly distributed solution in the field of transportation [11].

The funds raised from coin purchases will go to further development and improvement of the system. Purchased coins can later be used to buy trips when the network begins to operate.

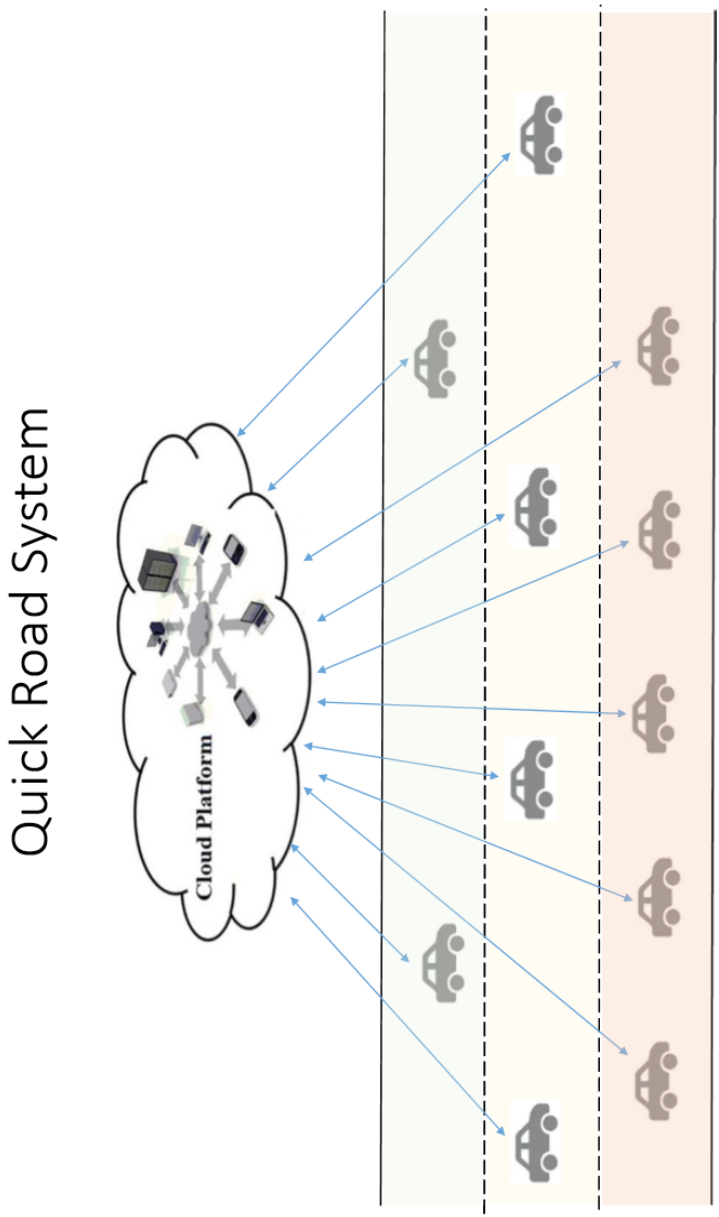

***Figure 2** - Unobstructed access service*

People are becoming to be very keenly aware of the need to solve the transportation problem. Distributed transportation services are a step in the right direction. But still one can completely trust only truly distributed systems, because Uber and others like it are actually based on the old business formula. In contrast, blockchain systems are completely open, decentralized, owned by society, where in essence, anyone can become part of it.

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物流过程在多式联运公路货物运输中的应用
APPLICATION OF LOGISTICS PROCESSES IN DELIVERY OF GOODS BY ROAD IN MULTIMODAL TRANSPORT

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抽象。 对终端系统的建设和运行采用后勤方法将加速物流，运输的发展，并将确保在国际标准一级提供运输和物流服务。
关键词：物流，公路运输，终端系统，效率。

Abstract. *The introduction of the logistic approach to the construction and operation of terminal systems will accelerate the material flows, the development of transportation, and will ensure the provision of transport and logistics services at the level of international standards.*
Keywords: *Logistics, road transport, terminal systems, efficiency.*

The logistic approach to road transport offers a reassessment of the scope of circulation, determining that at present all kinds of reserves in production are depleted, and it is possible to replenish them through improving the scope of circulation. This approach requires a radical update of transportation process and cargo handlin gtechnology, rolling stock and organizational restructuring, change in the control system.

Thing that gives us all that, is logistics, i.e. it allows to plan and control the process of delivery of consolidated goods at various levels of the transport services market: in-house, city, district and regional. And therefore, transport logistics can be considered as a direction in the activities of any business entity. The use of a logistic approach in the practice of transport enterprises makes it possible to understand that when one transport flow is organized, a network of associated logistic flows is formed: information, financial, material, personnel. All of them must ensure the achievement of the strategic goal of the business entity and designate tactical steps to address it.

It is transport that is one of the most important elements of the logistics system in solving the problems of cargo delivery at the level of functioning of enterprises, cities, regions, districts and states. At the same time, transport itself can be considered as a complex logistics system with its own functioning tasks, and in this case we are talking about transport logistics at various levels.

The main problem of organizing transport services is to provide the appropriate modern infrastructure: transportation equipment, loading and unloading, storage, information transfer systems, etc. The main service of road transport is the transportation of consolidated goods, but the list of services must be supplemented by marketing, information, commercial services, etc. The development of the transport and logistics system should be focused on the increase in the number and length of highways, on forecasts of changes in the structure of cargo transportation, on the change in the specific weight of various types of vehicles and methods of transportation of goods. The emphasis of transport policy should be aimed at high-quality modernization of the entire transport system, which will implement the basic principles of transport logistics [3].

Improving the quality and competitiveness of transport services depends on the use of a logistic approach in organizing schemes for moving freight flows. The use of consolidation of freight transportation and routing principles allows to reduce tariffs for the delivery of goods, as well as provide additional services without changing the tariff level. There is a relationship between the development of the transport and logistics system and the spatial distribution of economic activity in the regions. A reliable, dynamically developing transport and logistics system is a tool that allows to correct economic inconsistencies in the development of regions or large industrial centers, where road transport is a key element in the distribution system [4].

Modern research in the field of transport logistics in most cases is focused on international transportation of bulk cargo. Logistic technologies for the transportation of goods by road have a high degree of knowledge of the conceptual areas of improvement. The adaptability and flexibility of the principles of logistics in these types of transportation is due to the fact that participants in the transportation process deal with stable, voluminous cargo flows. At the same time, there are low indicators of time costs for the preparatory work for the transportation of a separate consignment of cargo compared with the time of transportation of the cargo itself, which is significantly higher than the total cost of the entire set of applied services aimed at ensuring high-quality cargo transportation [2]. Therefore, in our opinion, the optimization of such a space-time system is a complex multicriteria task.

To deliver consolidated cargoes in compliance with the "Just-in-Time" technology and at minimal cost, a unified technological process should be developed and implemented that would be based on the “three pillars” - production, transport,

and consumer. A single technological process - is a set of technological measures, within the framework of which all elements of the transport and logistics system interact based on a systematic approach. [6].

The strategic goal of the functioning and development of the transport and logistics system of a transport enterprise is the economic growth of the enterprise through transport and technology, with the aim of improving the quality of life of the country's population. The task of developing the transport and logistics system can be formulated as long-term socio-economic priorities, namely: improving the regulation of transport and logistics processes through the transition from price regulation of the market to free tariffs; creation of optimal conditions providing free access for consumers of transport and logistics services to transport infrastructure; reduction of economic and administrative barriers in the competition of transport operators through public tenders of transport operators and the involvement of more private operators; ensure a smooth transition to the forms of state regulation to support small and medium-sized businesses in the transport sector of the economy; development of effective measures to protect the economic interests of hired carriers in the non-transport sector market; development of measures to replace quantitative quotas with qualitative ones in transport.

A comparison of the qualitative characteristics of various approaches to the organization and management of the functioning of the transport and logistics system should be based on selected and reasonable logistics and transport criteria and indicators. To develop logistics technologies in transport, a systematic approach is needed that is used as a set of interconnected logistics subsystems united by a common goal, namely, achieving a synergistic effect.

The process of moving goods using road transport is part of the process of social reproduction, as participates in production as an element of a technological process or as an independent process that contributes to the implementation of basic technological operations [1]. When we consider road transport as part of the supply chain, it becomes necessary to describe it in terms of new logistics aspects. If we consider the analysis of the operational efficiency of individual types of transport, then the transportation of goods between the cargo departure and destination points is of interest. But from the perspective of the organization of freight transportation, it is necessary to analyze the single process of multimodal transport from the shipper to the consignee. To take into account the interests of customers, it is necessary to consider not only transportation by trunk modes of transport, but also all additional related services - processing, storage, packaging and unpacking, as well as the processes of formation of information and service flows accompanying the material flow associated with these services. This approach contributes to the optimal selection by the consumer of the necessary transport services [5].

Logistic delivery of goods by road for multimodal transport allows to reevaluate and revise the scope of circulation, recognize if the production reserves have already reached their minimum limit, and it is time to improve the scope of circulation. This approach requires a radical approach from the carrier: updating the technology of the transportation process, the use of new technologies in cargo handling, the acquisition of new, modern, environmentally friendly rolling stock, organizational restructuring, improving human resources, and changing of management systems.

The development of the transport and logistics system should be focused on the growth in the number and length of highways, on forecasts of changes in the volume and structure of cargo transportation, on the change in the specific weight of various types of vehicles and methods of cargo transportation. The emphasis of transport policy should be aimed at high-quality modernization of the entire transport system, which will implement the basic principles of transport logistics [3].

Improving the quality and competitiveness of trucking services depends on the use of a logistic approach in organizing schemes for moving freight flows. The use of consolidation of freight transportation and routing principles allows to reduce tariffs for the delivery of goods, as well as provide additional services without changing the tariff as a whole. There is a relationship between the development of the transport and logistics system and the spatial distribution of economic activity in the regions. A reliable, dynamically developing transport and logistics system is a tool that allows to correct economic inconsistencies in the development of regions or large industrial centers, where road transport is a key element in the distribution system [4].

Logistic technologies for the transportation of goods by road have a high degree of knowledge of the conceptual areas of improvement. The adaptability and flexibility of the principles of logistics in these types of transportation is due to the fact that participants in the transportation process deal with stable, voluminous cargo flows. At the same time, there are low indicators of time costs for the preparatory work for the transportation of a single consignment of cargo compared with the time of transportation of the cargo itself, which is significantly higher than the total time spent on the entire set of applied services aimed at ensuring high-quality cargo transportation.

The strategic goal of the functioning and development of the transport and logistics system of the transport enterprise is the economic growth of the enterprise through transport and technology itself, with the aim of improving the quality of life of the country's population.

Strengthening market mechanisms with the interconnection of state regulation will help to circumvent undesirable consequences in the logistics of the transportation complex, and especially the transportation and communication components of freight transportation. In modern transport policy, it is necessary to focus on the modernization of the transport system, in which the principles of transport logistics will be implemented.

The task of developing the transport and logistics system can be formulated as long-term socio-economic priorities, namely: improving the regulation of transport and logistics processes through the transition from price regulation of the market to free tariffs; creation of optimal conditions providing free access for consumers of transport and logistics services to transport infrastructure; reduction of economic and administrative barriers in the competition of transport operators through public tenders of transport operators and the involvement of more private operators; ensure a smooth transition to the forms of state regulation to support small and medium-sized businesses in the transport sector of the economy; development of effective measures to protect the economic interests of hired carriers in the non-transport sector market; development of measures to replace quantitative quotas with qualitative in transport.

To ensure increased efficiency in the freight forwarders market, a constant increase in freight turnover is necessary. A necessary condition for the formation of a single information space and the development of an information system for automating production and business operations in the transportation complex is the development and implementation of restructuring strategies in the direction of creating integrated transport and logistics companies [5].

The logistic concept, combined with the integration idea, makes it possible to form motor transport systems in the market on the basis of a strategic alliance of enterprises thanks to a logical financial hierarchical vertical structure. These systems acquire new attractive qualities for customers, financial stability and reliability. They are able to provide cost-effectiveness of automation of management of production and commercial processes.

Summarizing all the above, we conclude that transport in modern market conditions plays an important role in the promotion of goods in the logistics system and largely determines the competitiveness and final cost of the goods. A comparison of the qualitative characteristics of various approaches to the organization and management of the functioning of the transport and logistics system should be based on selected and reasonable logistics and transport criteria and indicators. To develop logistics technologies in transport, a systematic approach is needed that is used as a set of interconnected logistics subsystems united by a common goal, namely, achieving a synergistic effect.

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宇宙高分辨率图像的锐度校正现代化
SHARPNESS CORRECTION MODERNIZATIONS ON COSMIC HIGH RESOLUTION IMAGES

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抽象。 通过使用面向问题的计算机算法来替代通过缓慢增长的广义函数的模型在频谱表示的合成中出现的奇点的处理来考虑宇宙图像的处理，该计算机算法在去卷积期间支持操作的完整性以增加清晰度。

关键词：空间图像，空间频谱，点散射函数，反褶积，Lebesgue积分，零测度载波广义函数，面向问题的计算机算法。

Abstract. *Processing of cosmic images is considered with the replacement of singularities arising in the synthesis of spectral representations by models of generalized functions of slow growth, using problem-oriented computer arithmetic that supports the completeness of operations during deconvolution to increase sharpness.*

Keywords*: space image, spatial frequency spectrum, point scattering function, deconvolution, Lebesgue integral, generalized function with zero measure carrier, problem-oriented computer arithmetic.*

Introduction

For high-resolution images from a spacecraft (SC) in the Earth Remote Sensing Path (ERS), the Bates and Mac Donnel model [1] is popular with an analytical record in the form of Fredholm equations that transform a hypothetical, i.e. the desired image in the observed, i.e. formed on the SC. From the spatial frequency spectra (SFS) of these images (the desired image can be assumed with subsequent necessary enumeration), the frequency-contrast characteristic (FCC) of the ERS area is restored by a simple ratio of the described SFS [2,3]. As the first iteration of the initial hypothetical image in the Fredholm equation, we use the generated image with a slight improvement in sharpness caused by processing it by a generalized gradient operator with a non-integer and rather low (no higher than 0.1) order of differential operators [4]. In addition, it is possible to construct the field of image movement speeds (IMS) on the focal plane of the fixing equipment for the subsequent correction of the occurring smears in the image and increase the resolution on the image to the possible level [5,6].

Further processing of the desired image in this case corresponds to matching the image corrections with the FCC, which is optimized for the required quasi-rectangular transmission window by the SFS path [4] and gives improved results in sharpening and, accordingly, in the spatial resolution provided by the image with leveling of the effects of excessive contrast, which is visually accepted for sharpening.

An increase in the effectiveness of these methods requires a decrease in the degree of regularization of singularities that arise (especially when calculating SFS ratios), since regularization in the deconvolution of high-resolution images leads to work with images "not quite those" that you need to work with [7]. In addition, it is necessary to weaken the problem of the incompleteness of the involved basic operations of algebras, including algebras in operator spaces. The projections of these objects into a machine representation, i.e. in problem-oriented computer arithmetic (POCA), it is necessary to focus on ensuring the speed and visibility in the time of calculations, which leads to the need to develop multidimensional tabular transformations oriented to algorithms of the Fourier transform class, to compute convolutions, linear filterings implemented in algebra with the operations "add" and "multiply" less efficiently than based on operations such as, for example, eight- , four- or two-point Fourier, Hadamard, Walsh transform, representable quite easily in tables and organized by a single-cycle selection from multidimensional tables.

By declaring images as elements of a Hilbert linear space and relying on the Murray lemma on the boundedness of a polynomial constructed on a bounded deconvolution operator, it is possible to construct integral deconvolution operators in an iterative form [8]. At the same time, one of the options for replenishing POCA was the introduction of a generalized gradient operator of non-integer order [4] for the first iteration of sharpness correction in the observed image, whose operation errors are leveled when optimizing the FCC sensing path in accordance with the objective requirements for the FCC of the ERS path.

Purpose of the study

Investigation of the possibility of increasing the sharpness of the post-factum high-resolution satellite image while maintaining the measurement properties of the image i.e. suppression of the present PSF in accordance with the construction of an optimized spatial-frequency characteristic of the ERS path corresponding to the presented image (modulation transfer function), with the modernization of deconvolution operators for the case of singular values in the FCC.

Materials and research methods used

Materials: free high-resolution space satellite images from SC Resource-DK (territory of Spain, fragment of Rota city), with SC OrbView-3 (fragment Houston_24466_0_8bit of a panchromatic normalized image) and the development results reflected in the monograph [4].

Research methods

The basis of all research in the work is the modeling of sharpness correction for high-resolution space images based on the modernization of theoretical-type mathematical approaches.

In [1,3], deconvolution (the solution of Fredholm integral equations) is constructed using modified Wiener filters, i.e. spectral representations of the deconvolution operator (SRDO). By minimizing the discrepancies of the inverse optimized frequency-contrast characteristic of the sensing path $(FCC)^{-1}$ and SRDO at the stages of the iterative correction process, we can determine a sequence of frequency-dependent parameters of the perturbation SRDO converging to the minimum norm, reducing the "residual" PSF to the pixel aperture using the operator perturbation technology in Hilbert spaces. Optimization of FCC is carried out by minimizing the functionalities formulated on the requirements:

- the absence of a tendency to decline and growth of the FCC applicate up to the approach to higher spectral modes within the given limits; maximum smoothness of FCC;
- FCC's steepest decline in the highest spectral mode of the path;
- majorization of the envelope FCC envelope $SRDO^{-1}$ even with a disturbing additive;
- inscribing the envelope of the spectral representation of the lineament or boundary observed in the image into the FCC envelope;
- not exceeding the value of the order of the gradient operator of the threshold at which global contrasting or contouring is resident.

However, it is necessary to consider and construct processing with singular values in an optimized FCC. They arise quite often, since in the denominator of the expression for the synthesis of FCC SFS, the initially corrected image has a sufficient number of zeros. The regularization methods used in the practice of analogous operations with spectra always lead to a solution close to the "truth", which does not always fall into the range of deviations from the "truth", lying in the spatial frequency region beyond the limits of the corresponding capabilities of the transmission window of the probing path [9].

In this paper, the mentioned singularities are represented by generalized singular Schwarz slow growth functions (with support of measure zero) [10]. Moreover, the Riemann integrals in all expressions are transformed into Lebesgue integrals during analytic integration (with preliminary functionalization of the integrable array), and when numerically integrating, the singularities are represented by models of generalized functions singular on measure zero, i.e. the maximum possible narrow parallelepiped in the upper and lower Darboux sums for the integral.

In the final iterative Van-Zitter relation, the integral in the inverse Fourier transform of the expression is the Lebesgue integral.

At the same time, a computing cluster that implements computational processes based on "classical" arithmetic works orders of magnitude more efficiently if the double operation of multiplication is replaced in the arithmetic system, say, with the bilinear table operations listed above. The return of the virtual computer to the traditional arithmetic system is not only implemented elementarily, but also provides a much more efficient implementation of the same multiplication operation. An example of this is the theorem on the substitution by fast Fourier transforms (FFT) of classical flow algorithms that can be represented by the Riesz-Fréchet theorem [11] by a convolution integral with a decrease in complexity, for example, of a one-dimensional algorithm from a quantity n^2 (n – is the bit depth and/or dimension of the operands) to order $3n\log_2 n$.

Multicomponent operations and multi-input algorithms in the described problems were presented in the form of cascades of two-place operations and two-input algorithms, respectively. Moreover, for lists of operations and algorithms that provide a mathematical representation of the tasks of stream processing of images, the forms of their tabular presentation have been developed [12].

Results and discussion

Sharpening while maintaining the measurement properties of the image i.e. suppressing the present PSF requires initially suppressing the component of the PSF by compensating the influence of perturbations of the orbital parameters on the image. Calculation of IMS fields is a highly complex measuring and computing task [6]. In [5], synthetic and computationally simple formulas for calculating the IMS path component for combating PSF are compared with the programmed IMS in the form of an expression for V for an elliptical orbit

$$V = \frac{f \cdot \sqrt{\mu \cdot (\frac{2}{r} - \frac{1}{a})}}{h}, \quad (1)$$

for a circular orbit in the form

$$V = \frac{f \cdot \sqrt{\frac{\mu}{r}}}{h}, \quad (2)$$

where α – is the semimajor axis of the orbit; r – is the radius vector corresponding to the position of SC in orbit; μ – is the gravitational parameter of the planet, h – is the height of the orbit above the surface of the planet, f– s the focal length of the on-board optoelectronic equipment.

The expressions for the other components of IMS are much more complicated, but the logic of their calculation is similar and these expressions are not given. The accuracy characteristics of the digital model for estimates of h, i.e. digital elevation model (DEM) in this case significantly affect the level of suppression of PSF. Figure 1 shows a fragment of an image from SC Resource-DK (territory of Spain), characterized by 1.4-1.6 times improved image sharpness from the original pattern.

Fig. 1. *Image fragment from SC Resource-DK*

A noticeable in the center of the upper part of the fragment and anomalous PSF is the result of coordinate "non-reduction" of the channels either due to abnormal pitch, yaw and roll of SC or incorrect DEM on the spacecraft leg.

When combining the channels, the control points were determined on the generated images in the form of a grid of positioned image points, which corrected the calculated IMS values from frame to frame by the measured IMS values using the coordinate method. The positioning of control points in the work with the aim of the maximum possible reduction of its error is realized in the form of a regularized delta function, which is formed as a radar response of a filter that collects and sums at one point all the amplitudes of the signal spectrum on the principle of harmonics delay implementation depending on their frequency [13].

All harmonics of the SFS image reduced to a single phase value for the selected positioning point at the "rising" edge of the generated pulse are added in phase, determining the minimum slope of the front for this SFS from zero value of the pulse amplitude to the maximum value and vice versa.

The inverse filtering ratio for the hypothetical case of determining the full spectral portrait *F (ΦPT)* can be used to restore image sharpness [14]

$$F(S_H) = F(S_R) / F(\Phi PT_0) = F(S_R)(F(\Phi PT_0))^{-1}, \qquad (3)$$

Here *F* – two-dimensional Fourier transform (i.e. SFS), $(F)^{-1}$– division of the unit into samples of the complex SFS, the spectra and FCC are always bounded by the upper mode ω_e, the modes are given by $(\omega_x,\omega_y)=(\omega_i,\omega_j)$ – coordinates in the two-dimensional SFS image *S(x,y)),* S_R – observed and post factum formed image, S_H – reconstructed image..

Determined from reference points of PSF with a high degree of probability, it is necessary to replenish the spectral portrait by the optimized frequency-contrast characteristic $FCC_o(\omega_i,\omega_j)$[2]. Then $F(\Phi PT_0)$ is replaced by$H(\omega_i,\omega_j)$, i.e. PSF

spectrum with incomplete coverage of the frequency range of the problem. The numerator and denominator in (3) are multiplied by $H^*(\omega_i,\omega_j)$ (* – is the symbol of complex conjugation) and adding the regularization parameter $\rho(\omega_i^2+\omega_j^2)^{1/2}$ additively to the denominator "moderately" suppressing the upper SFS image modes, we obtain The modified Wiener-Tikhonov filter used widely in sharpening correction with the spectrum of the nucleus of the deconvolution operator $H_м^{-1}$ [4]

$$F(S_H) = H^*(\omega_i,\omega_j)F(S_R)/(\left|H(\omega_i,\omega_j)\right|^2 + \rho(\omega_i^2+\omega_j^2)^{1/2} = H_M^{-1}F(S_R), \quad (4)$$

The frequency-dependent addition of ERS $v(\omega_i,\omega_j)$ replenishes $H(\omega_i,\omega_j)$ in accordance with the optimized $FCC_o(\omega_i,\omega_j)$ of path, as close as possible without generating artifacts like resident contrast in the image when selecting the level primary image correction by a generalized gradient operator. The expression for the Wiener-Tikhonov filter corrected for the optimal $FCC_o(\omega_i,\omega_j)$ then has the form of

$$F(S_H) = F(S_R)(H^*(\omega_i,\omega_j)/(\left|H(\omega_i,\omega_j)\right|^2 + \rho(\omega_i^2+\omega_j^2)^{1/2}) + v(\omega_i,\omega_j)) = F(S_R)(H_M^{-1}+v), \quad (5)$$

For *in accordance with [14], we obtain an iterative representation of th integral Van Zitter deconvolution operator in a generalized and compact form*:

$$S^{(0)}{}_H = S_R;$$

$$S^{(n)}{}_H = S_R + F^{-1}(1-Y)^{**}S^{(n-1)}{}_H; \quad (6)$$

here the symbol ** denotes a two-dimensional convolution operation, and $Y = H_{\lambda M} = H_M/(1+\lambda vH_M)$

However, it is necessary to consider and construct processing with singular values in an optimized FCC. They arise quite often, since in the denominator of the expression for the synthesis of FCC SFS, the initially corrected image has a sufficient number of zeros. The regularization methods used in the practice of analogous operations with spectra — "leveling" zeros with parameters tending to zero (Tikhonov regularization) always lead to a solution close to the "truth" [7]. In the paper, the mentioned singularities are represented by generalized singular functions of slow Schwarz growth (with the support of measure zero) [10]. Moreover, the Riemann integrals in all expressions are transformed into Lebesgue integrals during analytic integration (with preliminary functionalization of the integrable array), and when numerically integrating, the singularities are represented by models of generalized functions singular on measure zero, i.e. the maximum possible narrow parallelepiped in the upper and lower Darboux sums for the integral.

Figure 2 shows the original image (a fragment of the Houston_24466_0_8bit panchromatic normalized image from the OrbView-3 satellite with its conversion to the * .bmp format, coordinated with the software support of the model) and its spatial-frequency spectrum (SFS).

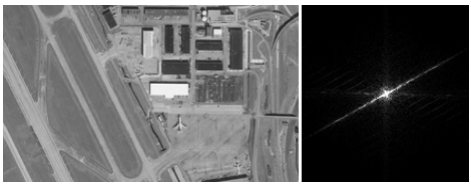

Fig. 2. *The original image and its SFS*

Figure 3 shows the image reconstructed using the approaches described above with inspired super-resolution with its SFS when performing PSF suppression on inspired images with lower resolution.

Fig. 3. *Recovered super-resolution image with its SFS when performing PSF suppression on inspired images*

A noticeable increase in the radius of SFS (Foucault resolution) is 1.9–2 times. Inspecting images with enlarged pixel apertures with corresponding row and column delays allows us to unambiguously identify and level out the contrast of the image that appears at the last iteration of deconvolution and return to the original image using superresolution technology [15] (similar to the technology used on the SPOT class satellite).

Conclusion

A method has been developed for correcting the results of the functioning of the iterative integral operator of deconvolution of the initial space image with the replacement of the singularities arising in the synthesis of spectral representations by models of generalized functions of slow growth. The organization of problem-oriented computer arithmetic for solving problems of drastically reducing computational complexity and related processes in paths with replenishing the operation space is shown.

Thanks

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碳纳米材料在水泥混凝土技术中的应用效率
EFFICIENCY OF USE OF CARBON NANOMATERIALS IN CEMENT CONCRETE TECHNOLOGY

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抽象。 研究了碳纳米材料添加剂对水泥水化过程中形态的影响，水泥石硬化强度和动力学，水泥标准化性能以及重混凝土试验数据的研究结果。
关键词：碳纳米材料；水泥石；相结构变化；强度；标准化属性；重混凝土。

Abstract. *The results of studies on the effect of additives of carbon nanomaterials on the morphology of neoplasms during cement hydration, the strength and kinetics of hardening of cement stone, standardized properties of cement, as well as some data on testing of heavy concrete are presented.*

Keywords: *carbon nanomaterial; cement stone; phase-structural changes; strength; standardized properties; heavy concrete.*

Introduction

In modern conditions, knowledge, skill and ability to control the processes of structure formation upon receipt of various (including building) materials at the level of elementary particle sizes from which this material is “built” (created) is becoming increasingly important A targeted effect on the formation of a nanostructure, for example, a hardening cement stone, can provide a more homogeneous and dense mutual "packing" of crystalline hydrate neoplasms - reaction products of clinker cement minerals with water [1], characterized by nanoscale (~ 8…25 x 10^{-9} m). On this basis, it becomes possible not only to control the kinetics of transition (transformation) of a viscoplastic concrete mixture into a solid-phase state - cement concrete, but also to provide a higher level of its density and strength, which is the basis for increasing the bearing capacity, durability and operational reliability of building structures made using it.

1. The structure of nanomaterials - is the basis of efficiency.

In the process of developing technologies for producing carbon nanomaterials (CNMs), a multiplicity of types of structures and sizes that are formed under various conditions of nanostructures obtained by various methods using various materials and subjected to different modification methods [2-7, etc.] was revealed.

In Belarus, a unique method has been developed for producing CNMs in high-voltage discharge plasma [7] and the corresponding equipment has been created for implementing the technology for producing CNMs [8,9], and since 2006, systematic studies have begun in BNTU on the efficient use of carbon nanomaterials in the construction industry.

From the standpoint of the effective influence of CNMs on the processes of structure formation, hardening and on the strength of cement (respectively, cement concrete as a basic building material), the highest potential energy of ultrafine CNMs, as well as their ability to form, under certain conditions, the thinnest fibers of significant (up to tens micron) length, are of particular importance. In this embodiment, the efficiency of introducing CNM substance into cement and cement compositions as a whole is based on lowering the energy threshold for the onset of formation of neoplasm crystalline hydrates as a result of the interaction of clinker cement minerals with mixing water. That is, in this case, a high level of surface energy of CNM ultrafine particles is used, as well as vertices (endings), fractures of tubular CNM, which can serve as "quasicenters" of crystallization, accelerating the formation of crystalline hydrates and providing an increase in the growth rate of cement stone strength.

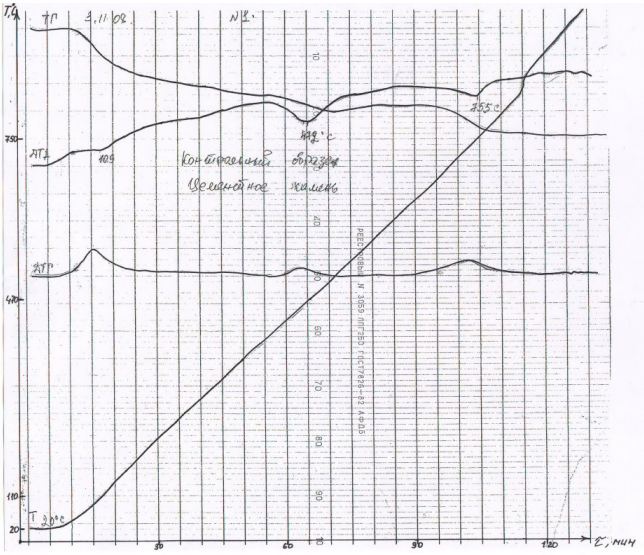
In a slightly different aspect, the effectiveness of fibrous tubular CNMs is manifested. Their feature is a considerable length (in the literature, examples of the formation of tubes up to 30 μm long are given) with small cross-sectional sizes, which may be less than 1 nm in diameter. Such a fibrous material, characterized by significant tensile strength, can have a huge impact on the strength characteristics of cement stone and concrete. The small transverse dimensions of the nanofibers with a length significantly exceeding the sizes of crystalline hydrates themselves — the products of hydration of clinker cement minerals corresponding to ~ 8.0 ... 25.0 nm, provide the necessary prerequisites for "jamming" the fibers in the interplanar spaces of adjacent surfaces of many hydrocrystals, which ensures the reinforcing effect of nano- and microstructures of hardened cement stone neoplasms volume.

2. Phase-structural changes and strength of cement stone.

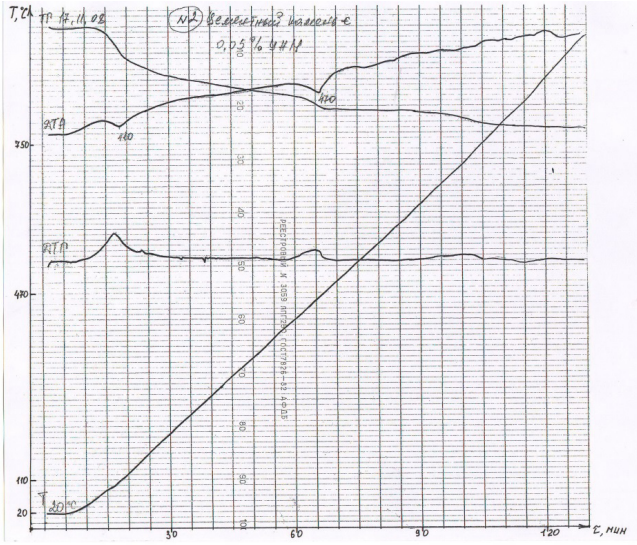
The introduction of the potentially active CNM substance into cement can cause changes both in the development of reactions of its interaction with water, and in the products of hydration formed in this process. In order to verify this assumption, a comprehensive study of hardened cement stone samples was performed by thermal decomposition (derivatographic analysis), X-ray analysis, and the amount of water chemically bound by cement. In addition, the strength characteristics of cement stone were determined.

2.1. Derivatographic analysis results.

Derivatographic studies of cement stone with a strength of 70-90 MPa and more than 100 MPa were carried out without and with the introduction of CNM. Derivatograms of cement stone of different strength do not differ from each other [10], which indicates the commonality of hydrolysis-hydration processes and the resulting products of cement hydration in both cases. However, in the presence of CNM (Figure 1), differences are observed on the derivatograms in the temperature range from 600 ^{0}C to 1000 ^{0}C.



a)



b)

Fig. 1. *Derivatograms of cement stone that hardened for 28 days: a) - control, without CNM; b) - containing 0.05% of CNM.*

In the compared samples with CNM there is a "wavy" character of the DTA graph, which indicates the presence of both endothermic and exothermic effects in the temperature range from 600 0C to 1000 0C. If the temperature rises above a critical value, the residual carbon particles contained in CNM and those "introduced" into the cement stone, and with a further increase in temperature, the structured substance of CNM can oxidize (burn out), which reflects exothermic manifestations on the derivatogram in the temperature zone of more than 600…650 ^{0}C.

2.2. X-ray analysis results.

The phase composition of the control cement stone (not containing CNM), and the stone containing CNM, samples with a strength of 110 ... 130 MPa, were almost identical to the phase composition of samples with a strength of 70 ... 80 MPa. The results of this study are given in the publication [10]. The analysis of the obtained X-ray diffraction patterns shows, firstly, that as a result of the development of the process of the interaction of cement with water by the age of 28 days (compared to earlier periods), the intensity of clinker mineral reflections naturally decreased, and to a greater extent - for samples with CNM. And secondly, it was found that in cement stone samples supplemented with CNM, crystalline neoplasms are represented by the same crystalline hydrates as in samples without CNM. In general, the characteristic diffraction reflections of the control cement stone and stone containing CNM do not differ from each other, which indicates

the absence of additionally formed compounds under the influence of CNM. At the same time, an assessment of the amount of water chemically bound by cement and the degree of hydration on counterparts samples showed that in cement stone samples with 0.05% CNM from MC they increased by (6.5 ... 7.0)%. This is evidence of the deep development of hydration reactions in cement and a larger (quantitative) formation of crystalline hydrate neoplasms.

2.3. Cement stone strength.

Figure 2 shows the trend in the relative strength of cement stone (age 28 days; HBT hardening) depending on the dosage of one of the investigated CNM substances. Despite the significant (and in some cases mutually exclusive (these data are not given in the article)) variation in strength (compressive) values of cement stone samples modified by one or another version of CNM (relative to the strength of "pure" cement stone, taken as 100%) it is possible to trace certain patterns of the influence of CNM on its strength.

In particular, for a number of CNM varieties, their dosage corresponding to 0.05% by weight of cement has the greatest influence on the strength of cement stone. An analysis of the data on the effect of the studied CNM varieties at this optimal dosage on the strength of cement stone revealed a type of CNM characterized by a stable positive effect.

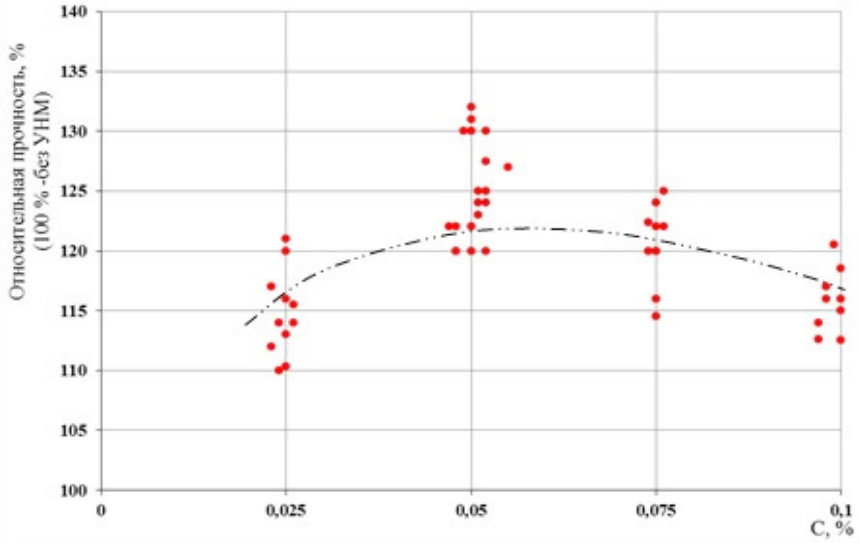


Fig. 2. *The trend in the relative strength of cement stone with CNM depending on the dosage,% of the mass of cement*

As a result of research work at the stage of obtaining CNM [7–9] and their use in cement concrete [10], it was found that solid-phase CNMs containing ultrafine, fibrous (single-layer) and multilayer tubular components in their material are most effective. These varieties of CNM provided a stable increase in the strength of cement stone under various conditions (water; normal humidity; after steaming and with maturing (up to 28 days) after steaming) of the hardening of the samples.

Estimating the role of carbon nanomaterial in the formation and establishment of the structure of cement stone, it can be assumed that CNM particles, characterized by nanoscale and extremely high energy potential, form a "physical" substrate in the form of a "quasi-embryo" of clinker cement mineral hydrates, which reduces the level of work spent on their formation from an aqueous "mortar" in a hardening cement stone. This creates the necessary conditions for the accelerated formation of both crystalline hydrates per se and the spatial structure formed by them in the volume of the solvation shell of cement particles. As a result, a structure is formed with a large number of "neoplasms" per unit volume, which is accompanied by an increase in its density (the number and area of contacts between crystalline hydrates), and, consequently, the strength of cement stone.

2.4. Properties of cement and concrete.

As a result of numerous experiments, it was found that the introduction of CNM substances in dosages from 0.001% to 0.1% of its mass practically does not change the normal density (water demand) of cement and the uniformity of changes in its volume. The experimental results indicate a tendency to reduce (up to (10 ... 12)%) the setting time of the cement paste with some CNM substances.

After the tests of cement stone and the establishment of optimal types and dosage of CNM, experiments were carried out, the purpose of which was to establish the laws of the influence of carbon nanomaterials on the physico-mechanical and operational properties of heavy (and high-strength concrete), such as compressive strength, tensile bending, axial stretching (when cracking), water absorption and water resistance (by breathability), resistance in solutions of salts of NaCl and Na_2SO_4, etc. Concrete compositions were selected, characterized by different strengths (60 ... 150 MPa), cement consumption (480 ... 650 kg per $11m^3$), various types of coarse and fine aggregates, water-cement ratio (W/C ~ 0.22 ... 0.35) and various fillers (silica fume, stone flour, granite screenings).

It was established that the introduction of carbon nanomaterial into concrete at a dosage of ~ 0.05% by weight of cement provides a significant improvement in the quality characteristics of structural heavy concrete (fine-grained and coarse aggregate) of different levels of compressive strength: from 40 ... 60 MPa to 120 ... 150 MPa including strength, elastic deforming and operational characteristics and properties of concrete.

It was experimentally confirmed that under the influence of CNM, the strength characteristics of fine-grained heavy (cement-sand) concrete at 28 days of age increase: up to ~ 14% compressive strength, up to ~ 16% bending strength, up to ~ 24% axial tensile and shear strength (determined on the basis of splitting tests), and also the water absorption of concrete by mass decreased by ~ 10%. At the same time, a greater (1.5 times) increase in the strength of concrete (both fine-grained and concrete with coarse aggregate) for axial tension, for example, in comparison with its growth in bending, confirms the validity of the initial hypothesis about nano-, microreinforcement of cement stone structure in concrete, single and multi-layer tubular carbon nanomaterial, which is the basis of this phenomenon.

The experimentally established increase in the growth rate and strength level of cement stone and concrete with coarse aggregate under the influence of CNM on the first day of normal hardening up to 40% and 30%, respectively, while maintaining the effect of increasing strength in 28 days, up to (20 ... 25)% for cement stone and up to (15 ... 20)% for concrete, and at a later date (90 days) up to (10 ... 15)% for concrete, confirm the conclusion about the acceleration and deepening of the hydrolysis-hydration process of the interaction of cement with water in the presence of CNM. This confirms (in the transition to concrete) the initial hypothesis regarding the energy impact of ultrafine particles of CNM, which contributes to the accelerated formation and increase in the number of new crystalline hydrate phases in hardening cement stone, which ensures an increase in its density and strength, and on this basis - strength of concrete in general.

Based on the previously obtained data of the derivatographic analysis of cement stone samples with CNM, with a change in the “behavior” of cement hydration products in their presence at a temperature of ≥ 650 ° C, it could be assumed that the presence of CNM in concrete will increase its stability under fire exposure.

That is what was established by direct tests on the fire resistance of concrete in products (plates with dimensions 3300x3000x150 mm), the positive role of carbon nanomaterial under fire exposure, for 90 minutes under a load of 1000 kN (100 t): there were no stability losses and they withstood the tests as a whole (“limit states ”(in the terminology of the test data) was not found.

Conclusions.

The results of comprehensive experimental and theoretical studies have shown that the effect of carbon nanomaterials on the processes of cement-water interaction, hardening, structure formation and strength properties of cement concrete is physical in nature and does not change the morphology of crystalline hydrated neoplasms of hardened cement.

An experimental assessment of the effect of nanosubstances on the physicotechnical properties of cement showed that the studied varieties of CNM (at a dosage of from 0.001% to 0.1%, and some samples up to 0.5% by weight of cement) do not have a practical effect on normal density (water demand) cement and uniformity of change in its volume. At the same time, the setting time is reduced (up to 10%) for CNM -1 and increased (up to 15)%) for CNM obtained from organic raw materials using the original technology (different from the technology for producing CNM -1).

The conclusion is experimentally substantiated by the results of studies of the kinetics of hardening of cement stone with many varieties of domestic CNM, that it the most effective, from the standpoint of the growth rate of its strength (both in normal humidity conditions and during heating), is a multicomponent substance labeled "CNM -1" . The optimal dosage of this substance is ~ 0.05% by weight of cement.

The X-ray phase analysis showed that there are no changes in the morphology of neoplasms (in the products of the interaction of clinker cement minerals with mixing water) formed in the presence of CNM substance, which fixes the fact that there is no chemical interaction between them and confirms the physical nature of the influence of CNM, reflected in the growth of cement stone strength. Based on this, it can be concluded that the “mechanism” of CNM action is, firstly, in the energy effect accelerating the formation of crystalline hydrates (confirmed by the growth rate of cement stone strength, especially in the initial period (up to 24 hours)), which contributes to their growth quantity and density of cement stone. Secondly, in the nano- and microreinforcing of cement stone (single and multilayer nanotubes), which provide an increase in its axial tensile strength and, as a consequence, compressive and tensile strength in bending (which was confirmed later on when testing fine-grained concrete).

This conclusion was experimentally confirmed by an increase of ~ 7.0% in the amount of chemically bound water (degree of cement hydration), as well as an increase in the density and elastic properties determined by the change in the ultrasound speed of cement stone samples with CNM (increase of ~ 8.0%). In addition, this conclusion is also confirmed by the data of x-ray phase and derivatographic analyzes on the increased number of crystalline hydrate neoplasms traditional for Portland cement in the presence of 0.05% of CNM -1.

The results of mechanical tests of concrete for compression, tensile, bending, and axial tension (by cracking samples) showed that in the latter case, the increase in concrete strength is more significant, which confirms the theoretical premise of nano- and micro-reinforcement of the crystal hydrate structure of cement stone in concrete due to "incorporation ”of fibrous CNMs in it, contributing to the tensile forces resistance arising in cracked samples.

It has been established that the introduction of the number os CNMs contributes to a steady increase in the density of concrete, a decrease in its water absorption, which forms the basis for an increase in its impermeability, resistance to the corrosive effects of salts (chlorides and sulfates), and determines an increase in the operational reliability and durability of building structures. A general assessment of the properties of concrete with CNM confirms its prospects for use in heavy concrete monolithic load-bearing structures, concrete roads, airfield coatings, as well as in the manufacture of products in precast factories.

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用于废弃采石场土壤修复的生物活性胶囊的研制
DEVELOPMENT OF BIOACTIVE CAPSULES FOR SOIL RESTORATION IN SPENT QUARRIES

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抽象。 该文章的作者开发了可生物降解包装的生物活性胶囊，能够有效地恢复人为干扰的土地。 作为最经济有效的填海方法，作者建议使用他们开发的多功能胶囊来恢复碳酸盐岩尘土表面的土壤覆盖，并快速形成废弃采石场的斜坡。

关键词：生物活性胶囊土壤形成剂，复垦，废弃采石场，土壤覆盖物修复的生物学方法

Abstract*. The authors of the article have developed bioactive capsules in biodegradable packaging, capable of effectively restoring man-made disturbed lands. As the most economical and effective method of reclamation, the authors propose to use the multifunctional capsules they developed to restore the soil cover on the dusty surface of carbonate rocks and to quickly form sod the slopes of spent quarries.*

Keywords*: bioactive capsules soil-forming agents, reclamation, spent quarries, biological method of soil cover restoration*

The problem of the formation of technologically disturbed lands as a result of human industrial activity becomes more urgent every year. Such lands appear in places of extraction of minerals, building materials, in spent quarries, oil and gas fields. Significant damage to the environment is caused by quarries for the extraction of non-metallic materials. Their total area is about 180 thousand hectares.

This problem is especially relevant for the territory of the Samarskaya Luka National Park, due to the merciless and depleting use of resources of a unique natural complex and the negative impact of dust from quarries on the environment and humans. The Zhiguli mountains are severely disturbed by the mining of limestone, used for construction needs, primarily for the production of cement.

The use of terraced upland mining of minerals leads to the complete destruction of soil and vegetation. In addition, in the impact zone of spent quarries, there is a deterioration in public health indicators: a decrease in life expectancy, an increase in the incidence (especially of the respiratory organs in children), and congenital pathologies. As a result of the negative impact of dust on the human body, respiratory organs are affected, the cardiovascular system is disrupted, and the risk of cancer is increased [6].

To solve this problem, effective and reasonable measures for the restoration of disturbed lands are necessary. Land restoration at the present stage is considered as a set of measures to restore the productivity and reconstruction of landscapes disturbed by industry (Motorina L.V., Zaitsev G.A., Izhevskaya T.T., Markin S.A., Pashkov D.N., Reva M.L. And others.). Conducting restoration work contributes to a more rapid integration of disturbed lands into the natural environment.

The analysis of the problem showed that the existing methods of reclamation of dusty quarries are not effective enough. Of the measures for the restoration of the quarries of Samarskaya Luka, as a rule, only the method of applying loose humus material to the rocky substrate was used. This led to the formation of replantozems. The disadvantage of this method is the rapid loss of the fertile soil layer, partial reclamation of quarry areas without covering the slopes of the quarry. The surface growth of replantozems was slow, there was a flushing of soil fine earth from the terrace to the terrace, the loss of the productive layer of the soil, and a decrease in the efficiency of remediation work [4].

Therefore, the development and implementation of new effective methods for the restoration of spent quarries is the optimal solution to a complex problem.

Among such methods, the use of capsular reclamants deserves special attention. This method makes it possible to use capsules with a mixture of bioactive substances and seeds of resistant crops for the restoration of land disturbed by mining operations. With the right technology for introducing the capsular reclamant into restored or newly formed soils, the effect of obtaining the full complex of fertilizers and growth stimulating substances necessary for plants is achieved by them. At the same time, sorbents accumulate and remove contaminants. The soils are enriched with humus and become fertile after 2-4 years of their restoration [4,5].

The capsule recultants developed by us contain biosorption mixtures and seeds of perennial native herbs, moisture-retaining sorbents, mineral additives, EM preparations, etc. They contribute to focal humus formation at the site of application, which subsequently completely restores and transforms “empty” rocks into fertile soils and contributes to the rapid seeding of dusty slopes.

As a result of experimental studies, bioactive capsules of various compositions were obtained with seed mixtures and mineral additives, including glauconite, which have a beneficial effect on the development of sod, the creation of grass cover resistant to wind erosion, and regulate plant nutrition and water-salt regime of the soil. The herbs used for reclamation must be quickly acclimatized, have resistance to adverse microclimate conditions and negative physical and chemical properties of the soil, have a well-developed root system, and be capable of symbiosis with microorganisms. When preparing seeds for capsule reclamation, it is necessary to use the seeds of local vegetation to the maximum. The introduction of an EM preparation and other biological products into the capsule mixture increases the content of mobile forms of nitrogen, phosphorus and potassium during the growing season. The introduction of "Baikal EM 1" increases the biological activity of soils by 83-94%. Especially growing are the number of bacteria and actinomycetes [2, 3, 4,5].

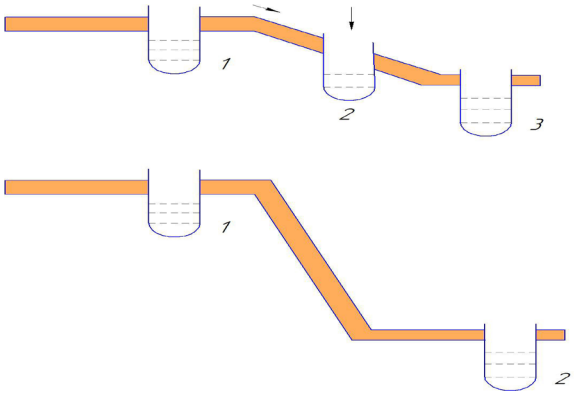

Figure 1 - *Scheme of capsule insertion*

During the experiments, bioactive capsules of various compositions and methods of their application were developed and analyzed (Fig. 1). Activation of the capsule led not only to the rapid germination of seeds in low humidity, but also to acceleration of the sod formation process.

For the production of reclamant capsules, a technological module has been developed, including a chopper, a dispenser, a mixture preparation unit and a packaging unit. As a raw material, it is economically feasible to use various types of plant waste, biocompost obtained from MSW, etc. The technological module can be used to prepare capsules on the spot.

When conducting studies of the effectiveness of different capsules of reclamants, technological methods of reclamation, the shape, size, formulation and dosage of components for their use in dumps of quarries were worked out. The types of capsules developed by us are multifunctional and contribute to humus formation and rapid sodding [3,4,5].

The technological scheme of reclamation for specific conditions includes the following preparatory work: study of reclaimed areas; development of a suitable mixture for capsular reclamation; the choice of form, composition, volume of the capsule; development of technology and recommendations for the preparation of capsules of reclamants in the required volumes; reclamation design; obtaining the required volume of reclamant.

The use of soil-forming capsules has a number of advantages: profitability - the capsule is most convenient and optimal for the reclamation of large and inclined areas, reduces the cost of reclamation; Efficiency - allows to restore the soil cover of reclaimed dumps during one growing season, create grass and shrub cover on virtually any land and rock, significantly reduce irrigation water consumption, increase the survival rate of seedlings of the used reclamant.

Preliminary calculations showed that the total value of the prevented damage resulting from the use of bioactive capsules in combination with biogenic dust removal of the surfaces of technogenic massifs with an area of 17 hectares, respectively, amounted to about 180 thousand rub. for the Zhigulevsky quarry.

Thus, as a result of the analysis of existing technologies for the restoration of spent quarries, we have developed and experimentally substantiated methods for using capsular reclamation to restore the nutrient layer on the carbonate rocks of the spent quarries of Samarskaya Luka. Experimental studies of the effect of the composition of the capsule mixture on the effectiveness of soil restoration have been carried out. A set of optimal methods and means for the reclamation of the quarries of Samara Luke using bioactive capsular soil-forming agents has been developed.

The research results became the basis for the development of a set of measures for the reclamation of quarries. The creation of soil cover on bare dusty rocks will allow the subsequent stages of reclamation to be carried out - the design of landscape complexes close to natural and indigenous.

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视觉分析仪作为飞机飞行危险因素的疲劳
FATIGUE OF THE VISUAL ANALYZER AS A DANGEROUS FACTOR OF THE AIRCRAFT FLIGHT

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注解。 分析了人员的视觉能力对飞行员和航空调度员的专业活动中的技术因素的依赖性。 揭示了导致航空专家操作可靠性资源减少的条件，制定了控制其心理生理状态的建议。 限制视觉分析仪的功能被认为是危险的飞行因素。

关键词：飞机驾驶员，空中交通管制经理，视觉分析仪，疲劳，敏锐度，飞行威胁因子，安全管理系统（SMS）。

Annotation*. The dependence of visual capabilities of a person on technogenic factors in the professional activity of a pilot and an aviation dispatcher is analyzed. The conditions leading to reduction of operational reliability resources of aviation specialists are revealed, recommendations on control of their psychophysiological state are formulated. Limiting the functioning of the visual analyzer is considered as a dangerous flight factor.*

Keywords*: he pilot of the aircraft, air traffic control Manager, visual analyzer, fatigue, acuity, threat factor of the flight, safety management system (SMS).*

Aviation systems cannot be completely free from hazards and associated risks. The problem of the "human factor" in aviation remains relevant.

The purpose of the work is to analyze the influence of physiological and psycho-physiological qualities of a person on professional qualities, depending on the influence of physical factors.

The object of the research was the activity of the pilot of the aircraft and the air traffic control controller.

The subject was psychophysiological factors affecting the man-machine-environment system, namely: “man (pilot) - machine (aircraft) - machine (technological equipment of an air traffic controller) - man (air traffic control specialist)”.

In July 2011, ICAO presented the “Operator's Guideline for the Implementation of a Fatigue Risk Management System” (“Fatigue Risk Management Systems) of pilots during the flight [1].

The activity of the pilot in flight is associated with continuous monitoring of aircraft instruments and navigation aids with the help of a visual analyzer. The natural mobility of the eyes while a long time is limited, since the dashboard is at a short distance. At the same time, the visual capabilities of a person depend on man-made factors in flight.

The analyzed situations were long flights of transport aircraft. It is established that the workload on the visual analyzer pilots in night flights significantly increased compared with day flights. The intersection of several time zones also led to an overstrain of the visual apparatus and a decrease in the speed of visual perception. Strong turbulence, low pressure, low humidity in the cockpit, homogeneous activity also influenced the visual capabilities of the pilot. The minimum levels of illumination at the level of the dashboard was 2 lux. It is noted that the above factors led to a decrease in visual acuity due to a significant strain of the visual system of the eye, which required a period of relaxation after the flights. However, it should be noted that irreversible phenomena in the work of the visual analyzer were not observed.

However, a change in visual acuity in long night-time flights with a reduced level of illumination at the workplace should be considered as a psycho-physiological hazard that, if visually landing, can lead to accidents. Especially if the landing is carried out in difficult meteorological conditions (rainfall, inversion in the atmosphere, etc.) Changes in the optical properties of the atmosphere lead to the deviation of light rays from the straight-line propagation, which should be considered by aviation specialists.

In May 1991 at the airport Pulkovo (St. Petersburg), the crash of the Tu-154B-1. According to the commission that investigated the incident, one of the reasons was the visual illusion of a higher position of the aircraft relative to the imaginary line of the glide path, caused by the refraction of light rays due to the presence of a band of heavy rainfall. As a result, the pilots took a maneuver to increase the rate of descent, which led to a rough landing of the aircraft to the runway end, exceeding the calculated value of strength under vertical overload. This led to the destruction of the structure [2].

With poor visibility there is the likelihood of visual illusions. At the San Francisco airport on the night of July 8, 2017, the dispatchers managed to prevent the largest air crash in civil aviation history. Air Canada's Airbus 320 aircraft mistakenly began to descend onto a taxiway, where there were four aircraft with passengers waiting for their turn to take off, instead of the runway. The pilot found the pilot's error when the plane touched the runway. He was instructed to gain altitude. The pilot followed the instructions of the dispatcher, went to the second circle and landed in the right place [3].

On December 18, 1977, the crew of the Sud Aviation SE-210 Caravelle 10R aircraft of the Swiss airline, during an approach during a night-time landing over the sea, lost its runway lights, but continued to decline. The evaporation of water led to a local increase in air density, which led to a change in the refractive index of the air and an illusion of the spatial position of the sun above the glide path. After the third turn, the plane came into contact with the sea, causing the landing gear and flaps to come off. Killed 35 passengers and 1 crew member [2].

Analysis of the documents on the investigation of aviation accidents and accidents confirmed that mixing the image in the presence of even thin inversion layers, thin and transparent when observed from the earth, but opaque in the horizontal or inclined direction can be 10-15 m. The situations that the pilots describe low value of the distance to the ground in the visual assessment, the wrong position of the aircraft relative to the runway when leaving a thin layer of inversion fog, clouds, rain. Such situations have repeatedly led to aviation accidents.

The other side of the interaction with the pilot are air traffic control experts. They should be aware of the decrease in visual acuity of pilots after long night flights and provide the most complete support when landing the aircraft.

Adverse factors for the professional activity of a dispatcher that negatively affect vision are: reduced level of illumination, leading to eye strain and rapid fatigue; excessively high illumination causes fatigue; the wrong direction of light contributes to the appearance of sharp shadows or strong glare.

The similar situation became the accompanying cause on February 6, 1970, when the Il-18B crashed while landing at Samarkand airport. During the investigation of the actions of the Office of Internal Affairs, it was found that the approach controller incorrectly conveyed information to the crew about the distance of the aircraft from the airfield in high ambient light conditions at the workplace (the approach controller combined the functions of the launch controller) [2].

Observation of the work of aviation controllers allows us to conclude that the functionality of the visual analyzer is limited due to the monotony of actions for continuous monitoring of incoming signals can lead to a decrease in concentration after 30-40 minutes of a continuous process.

The practical significance of the work lies in the fact that the analysis made it possible to identify the conditions leading to a decrease in the operational reliability resources of aviation specialists and to formulate recommendations for monitoring the conditions of their activities and monitoring their psycho-physiological state.

Currently, in accordance with ICAO Annex No. 19, a safety management system (SMS) is being implemented, which aims to identify potential security threats and take corrective measures to reduce risks. Fatigue aviation specialists (pilots and controllers) is one of the dangerous factors of flight, which should be considered when organizing air traffic.

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氢反应器中暗氢（中子样颗粒）的合成
THE SYNTHESIS OF DARK HYDROGEN (NEUTRON-LIKE PARTICLES) IN A HYDROGEN REACTOR

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抽象。 理论上预测并实验证实存在一种特殊形式的氢原子Ĥ2，其特征尺寸比普通氢小三个数量级。 这种形式的氢原子被称为“暗氢”。 通过实验记录在合成“暗氢”result2的结果中发射的能量为258keV的X射线。

预测涉及“暗氢”chemical2的化学反应的物理性质，特征和典型能量。 预测“暗氢”participation2在链式反应中的参与，其中单个行为释放约8Kev的总能量，包括4Kev作为X射线。

关键词：放电，氢，暗氢，磁相互作用，链式反应。

Abstract. *Theoretically predicted and experimentally confirmed the existence of a special form of the hydrogen atom $\hat{H}_2$ with a characteristic size of three orders of magnitude smaller than ordinary hydrogen. This form of hydrogen atom is called "dark hydrogen". The X-rays of energy 258 keV emitted in a result of synthesis of "dark hydrogen" $\hat{H}_2$ were experimentally recorded.*

The physical properties, features and typical energy of chemical reactions involving "dark hydrogen" $\hat{H}_2$ are predicted. The participation of "dark hydrogen" $\hat{H}_2$ in a chain reaction with the release of total energy of about 8 Kev in a single act, including 4 Kev as a X-rays, is predicted.

Key words: *electric discharge, hydrogen, dark hydrogen, magnetic interaction, chain reaction.*

Introduction

The term "dark hydrogen" was introduced in the paper [1] presented at the 25 Russian conference "Cold transmutation of nuclei of chemical elements and ball lightning" in Adler (Sochi) on October 1-5, 2018. During the experimental studies in the INLIS laboratory during 2014-2018, nickel - hydrogen reactor with external electric heating by low-frequency (50 Hz) electric current, we obtained the following results:

- no noticeable evidence (excess of neutron flux and hard gamma radiation over background values) of nuclear processes was found,

- in the vicinity of the reactor registered electromagnetic signals in the radio band 0.8 – 30 MHz,

- signals in the x – ray range of 0.5-15 Kev and 258 Kev were recorded in the vicinity of the reactor,

- readings of thermocouples located on the reactor and near the reactor (10-20 cm) vary significantly depending on the presence of a permanent magnet in the vicinity of the reactor,

- measurement of thermal parameters of the reactor in a calorimeter with convective water-air heat removal from the reactor occasionally led to the manifestation of heat release, with a power exceeding the active power of the external electric drive, calculated on the basis of the Joule –Lenz law,

- calorimeter readings on the power of the heat taken depend on the use of a layer of conductive material in the outer housing of the calorimeter,

- the detector with the use of permanent magnets located on the rockers of the torsional scales shows the presence of the moment of forces in the vicinity of the reactor,

- on the copy paper placed in the vicinity of the reactor, punched holes of macroscopic size are found,

These experimental results and theoretical studies of the processes have led to the conclusion that in a nickel-hydrogen reactor in extremely small quantities, a substance is generated that has a high penetrating power, has a mechanical moment of motion and has magnetic properties. The energy of a single act of formation of this substance is huge, but in modern types of nickel-hydrogen reactors the reaction rate of formation of this substance is small and the processes of its synthesis do not give a significant contribution to the total power of heat release. We called this hypothetical substance "dark hydrogen".

We suggested that "dark hydrogen" is synthesized not only in a nickel-hydrogen generator, but also in an electric discharge in a hydrogen-containing medium. This assumption is also based on the results of [2], in which x-ray quanta of 300-400 keV are registered at a discharge of 10 kV in low-pressure hydrogen. This paper presents theoretical considerations of the physical and chemical properties of "dark hydrogen". An experiment is described, the results of which allow us to draw a conclusion about the reality of "dark hydrogen".

The International System of units is used in the paper.

1. Barut Ion.

Before proceeding to the consideration of "dark hydrogen", which is a neutral particle, it is useful to get acquainted with the theoretical idea of a positive "Barut ion". To explain the increased heat generation in hydrogen reactors, numerous

attempts were made to use the possibilities of compaction of atomic matter due to electromagnetic processes rather than nuclear ones. One can point to such ideas as muon catalysis, hydrino, etc. But even in these new ideas of the structure of matter, the main message of the Rutherford - Bohr atomic model is not revised. We mean the position that the atom should be a fixed heavy nucleus, and light particles electrons are mobile and located in orbits near the nucleus.

In June 1989, just two months after Fleischman and Pons ' speech at the University of Utah, the theorist A. Barut presented his work [3]. In this work, a revolutionary assumption is made that when two protons and an electron interact, the motion of a light particle (electron) can be suppressed, and the kinetic contribution to the Hamiltonian is given by heavy particles (protons). In this case, protons do not necessarily have to be located in the Central zone. In [3] in the approximation of Born – Oppenheimer quantum-mechanical calculation is given of a positively charged ion, which consists for example of two protons, located in orbits about the Central stationary particles, and central electron plays the role of nuclear. The ground state energy of such an ion is V_{B0} = - 28.1 keV. A. Barut called this ion "new tightly bound-states of H_2+". We think it is more correct to call this substance " Barut ion ".

The work [3] was performed in quantum mechanical terms, so A. Barut did not estimate the characteristic size of the "Barut ion". This size is essential for further reasoning. It is shown in [3] that the main contribution to the Hamiltonian is the Coulomb interaction of two protons with a Central electron. Given this, it is easy to obtain an estimate for the characteristic size R_{B0} of "Barut ion»

$$R_{B0} = 2*e^2/4\pi\varepsilon_0 V_{B0} = 10^{-13}\text{м} \quad (1)$$

The symbol $\hat{H}_2$+ is proposed to denote "Barut ion" in [3]. As expected, the characteristic size of the "Barut ion" $\hat{H}_2$+ is three orders of magnitude smaller than the Bohr radius. In [3] it is not specified during what process of interaction of particles "Barut ion"is formed. It can be assumed that the formation of "Barut ion" can go through the exothermic reaction.

$$p^+ + H\ 3\ \hat{H}_2^+ + 2*28{,}1\ \text{кэВ} \quad (2)$$

2. The structure of the atom "dark hydrogen" $\hat{H}_2$ and its physical properties.

In [3] A. Barut did not make an obvious step to the construction of a neutral atom, using the excellent idea he proposed about the location of heavy particles on the periphery of this atom. Perhaps the fact is that the quantum mechanical calculation of such an atom is complicated by many circumstances. Here are some of them:

- contribution to Hamiltonian gives not only Coulomb but magnetic orbital interaction of protons and electrons, which complicates calculations and makes the problem non-spherically symmetric,

- Schrödinger equation for the calculation of this atom cant' be used and it is necessary to use a relativistic analog, which makes the task even more difficult.

A neutral atom with two protons on the periphery of the atom, and two electrons in its center, we will call further "dark hydrogen". To denote the atom of "dark hydrogen" we will use the symbol $\hat{H}2$. In this paper, we do not pretend to an accurate quantum mechanical calculation of such an atom, but we will make estimates that we think will allow us to understand the basic physical and chemical properties of this substance.

Our estimates of the parameters of such a structure will be based on the following provisions:

- the dark hydrogen atom consists of two orbital structures: an outer orbit containing two movable protons; an inner orbit containing two movable electrons, which we will call an electron pair. In the atom there is no fixed nucleus and all the particles of the atom are mobile,
- the parameters of the outer orbit of two protons are determined by the energy of the Coulomb interaction of protons and with the electron pair,
- the parameters of the internal orbit of electrons are determined mainly by the energy of the orbital (magnetic) interaction of electrons with each other in the electron pair. The energy of interaction of electrons in an electron pair denote It,
- electrons in an electron pair are relativistic ones and we will use SRT formulas to estimate their mass.

The arrangement of two protons and an electron pair in the dark hydrogen atom $\hat{H}_2$ is shown in Fig.1. Although for quantum mechanics the concept of distance between particles isn't conditional, we nevertheless estimate some dimensions of "dark hydrogen", which in our opinion is useful for simple calculations of energy characteristics in the formation of "dark hydrogen" and its interaction with other atoms.

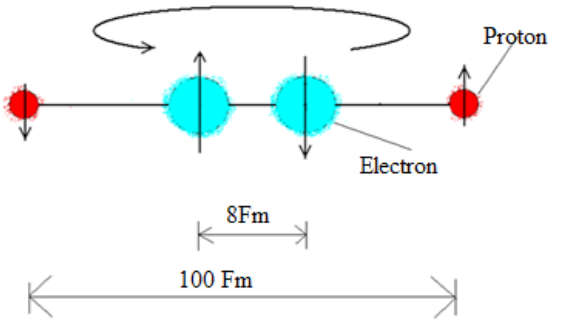

Fig.1 *Scheme of the atom "dark hydrogen"* $\hat{H}_2$.

To estimate the radius at which the protons are located in the "dark hydrogen" $\hat{H}_2$, we use the Barut solution [3] for the energy of the ground state of the Barut ion. It is evident that in contrast to the "Barut ion" in "dark hydrogen" $\hat{H}_2$, due to the fact that in the central zone there is an electron pair, the module of the electrostatic potential of protons in the field of central electrons will be twice as large and will be

$$V_{\hat{H}2} = - 2* 28,1 = - 56,2 \text{ кэВ} \quad (3)$$

Then we may estimate the radius of the proton orbit on the ground state of $\hat{H}_2$

$$R_{\hat{H}2} = -2*e^2/4\pi\varepsilon_0 V_{\hat{H}2} = 50*10^{-15}\text{м} \quad (4)$$

To calculate the parameters of the orbit of the electron pair, we use the value of the x-ray quantum 258.5 keV emitted during the formation of "dark hydrogen" $\hat{H}_2$ obtained from the experiment (the experiment is described below)

$$H_{ee} = 2*2,58 *10^5 \text{ эВ} = 2\mu_0 \mu_1 \mu_1 /4\pi r^3$$
$$m = m_{e0}/(1-u^2/c^2)^{0,5}$$
$$\mu_1 = \hbar e /2m \quad (5)$$

where m and me0 are the mass of the electron in the electron pair and the rest mass of the electron, r is the radius of the electron orbit in the electron pair, It is the energy of the orbital interaction of electrons in the electron pair , l , μ0, c is the Dirac constant , the magnetic permeability of vacuum and the speed of light, μ1 is the orbital magnetic moment of the electron in the electron pair. In (6) it is fundamental to use the relativistic relation for the electron mass. It is also important in our approach that in (6) we assume that the energy of the orbital interaction of electrons in a pair is known from the experiment. Solving the system (6) with respect to m and r we obtain

$$m = 50\ m_{e0}$$
$$r = 4*10^{-15}\text{м} \quad (6)$$

Based on the ratio (4-7) of the physical properties of the atom $\hat{H}_2$ we can say the following:

- $\hat{H}_2$ is a neutral particle with a mass slightly greater than 2 a.u. Electron pair playing the role of the nucleus consists of heavy relativistic electrons and has a mass of 100 m_{e0}, which slightly increases the mass of "dark hydrogen»,

- characteristic outer diameter 10-13m,

- on the outer orbit having a radius $R_{\hat{H}2}$ = 0,5*10-13m there are 2 mobile non-relativistic protons,

- the diameter of the orbit of relativistic electrons of the electron pair 8*10-15m,

- the density of the atom $\hat{H}_2$ is nine orders of magnitude greater than the density of an atom of ordinary hydrogen H_2. It can be assumed that $\hat{H}_2$ under the influence of gravity should fall to the center of the Earth and accumulate there. Perhaps in the central regions of the Earth "dark hydrogen" $\hat{H}_2$ can be converted into ordinary hydrogen H_2 and further diffuse to the surface of the Earth, ie possible cycle of hydrogen and "dark hydrogen" in the earth's crust,

- the total energy of $\hat{H}_2$ formation from free protons and electrons is 2*2*258+2*56 = 1144 keV,

- the orbital magnetic moment of the atom $\hat{H}_2$ is determined by the electron pair and is 25 times smaller than the Bohr magneton $\mu_{\hat{H}2} = 2* \mu_B /50 = 3,7*10\text{-}25$ j/T. Separate atom $\hat{H}_2$ exhibits paramagnetic properties,

- we can say that the atom $\hat{H}_2$ is a neutron-like particle having only an order of magnitude larger than the neutron, almost twice the mass and two orders of magnitude greater magnetic moment in comparison with neutron.

- it can be assumed that "dark hydrogen" $\hat{H}_2$ is formed from the Barut ion $\hat{H}_2^+$ in a result of the reaction, in which two quanta of 256 Kev are emitted

$$\hat{H}_2^+ + e^- \; 3\,\hat{H}_2 + 2*258 \text{ кэВ} \qquad (7)$$

It should be noted that in the model of "dark hydrogen" described here $\hat{H}_2$ does not violate the uncertainty ratio, since electrons in the electron pair have the ability to be in such a small area of space $8*10^{-15}$m in a result of a huge momentum when moving at speeds close to the speed of light.

3. Experiment to confirm the model of "dark hydrogen".

We conducted an experiment to register x-ray radiation in hundreds of keV, which should be emitted during the synthesis of $\hat{H}_2$. As a source of "dark hydrogen" $\hat{H}_2$, an electric discharge with a voltage of 20 kV in a dense heterogeneous water - air medium was used. The basis for this experiment are the data of the article Kurchatov [2]. In [2], in particular, it is said"... the Energies of x-ray quanta appearing in pulsed electrical processes in hydrogen and deuterium reach 300-400 keV. ...the voltage applied to the discharge tube is only 10 Kev." It seems to us that the experiments of Kurchatov serve as a weighty confirmation of the above theoretical model.

Nevertheless, we decided to carry out our own experiments on the registration of hard x-rays. The results of [2] gave a hint that "dark hydrogen" is synthesized not only in metal-hydrogen reactors, but also in electric discharge in hydrogen containing medium. Fig. 2 shows the scheme of the experiment. The electrode gap with a voltage of 20 kV is placed in a jet of "cold steam" supplied from the household humidifier by the air flow. "Cold steam" in the humidifier is created by high-frequency mechanical vibrations of a ceramic ferroelectric immersed in a vessel with water. The temperature of the "cold steam" is slightly below room temperature. Above the discharge gap is a PEM -29 with NaI crystal, which serves as a sensor of x-ray quanta. The signal from the PEM is fed to the oscilloscope and then to the computer screen. The discharge gap and PEM are placed in a lead box with a volume of 15*15*15 cm3, assembled from 5 cm thick lead blocks.

It should be noted that in contrast to [2], we used a discharge at atmospheric pressure in heterogeneous water-air medium with drops of condensed water. The fact that the PEM and the discharge gap are placed in a lead box allowed to reduce the background signal by more than 10 times and , thus, to increase the ratio of the useful signal to the background by an order of magnitude.

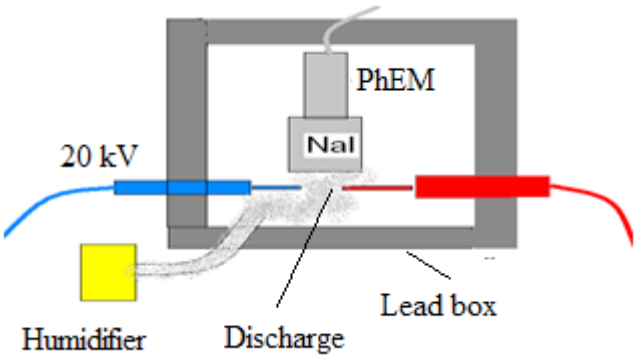

Fig.2. *Scheme of experiment on registration of high-energy x-ray radiation at discharge in heterogeneous water-air environment*

Fig.3 shows the result of the experiment. On the abscissa axis in Fig.3 shows the channel number on the oscilloscope. Calibrated using Americium 241 allows us to calibrate channel numbers and energy. The ordinate axis shows the number of x-ray pulses received for special channel during 55 seconds. At Peak energy 258,6 Kev were counted 53 signals. Fig.3 shows the measurement error for the normal distribution, which is 8 times smaller than the recorded signal. This allows us to consider the data reliable. Fig.3 small side peaks of gamma rays are visible. This data is also very significant. In order not to overload the article, we will not analyze them.

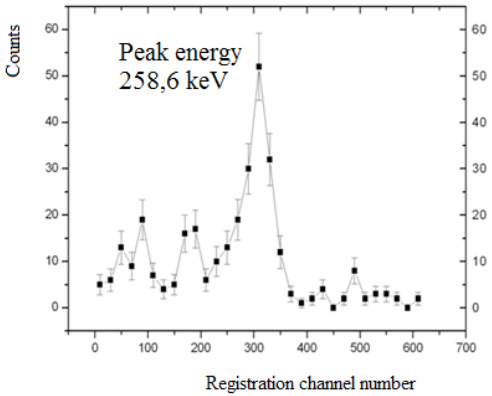

Fig. 3. *The peak of x-ray radiation is 258.6 keVev at a discharge voltage of 20 kV in a heterogeneous water - air medium with drops of condensed water at atmospheric pressure*

In case of discharge in the air without "cold steam" hard x-ray signals are not recorded. The reproducibility of the experiment is not very high. It was possible to obtain such data in only two launches. The reason is that the electronics can not withstand the very intense conditions of the experiment and constantly fails. In particular, not only the PEM, but also located outside the lead box, the generator of "cold steam" is turned off a few seconds after the start of the discharge. Without the supply of "cold steam" from the humidifier, the PEM operates steadily, despite the presence of a high-voltage discharge in the immediate vicinity of the PEM. Perhaps the reason for the failure of electronics is the spread of "dark hydrogen" from the discharge zone and its ingress into the components of electronic devices.

4. Magnetic-chemical properties of the “dark hydrogen” atom $\hat{H}_2$.

A very important feature of a single atom $\hat{H}_2$ is that it has a characteristic size three orders of magnitude smaller than the diameter of a conventional atom and has a magnetic moment. This leads to that the atom of "dark hydrogen" $\hat{H}_2$ can approach the source of the magnetic field, for example, to another atom much closer than a normal atom, on the distance of magnetic interaction. For typical sizes of atoms of usual substance 10^{-10}m magnetic energy is three orders of magnitude less than electrostatic energy which generates usual chemical bond. The situation changes significantly when the particle interaction distance is 10^{-13}m. At such distances, the magnetic forces are many times greater than the Coulomb electrostatic forces. The energy of the magnetic-chemical interaction of "dark hydrogen" $\hat{H}_2$ with the usual substance is about 8 Kev, which is three to four orders of magnitude greater than the typical energy of a conventional chemical reaction. This interaction can be called a "magnetic-chemical" reaction.

"Magneto – chemical" type of reaction allows to explain the formation of traces on the surfaces and in the volume of ordinary substances surrounding the source of "dark hydrogen" $\hat{H}_2$. We can assume the following mechanism of formation of traces. Atom $\hat{H}_2$ moving from the source, synthesizing $\hat{H}_2$, for example from the zone of electrical discharge in water vapor, strikes the nucleus of an atom of substance X, surrounding the discharge zone, and sticks to the nucleus due to the magnetic forces. Substance $\hat{H}_2X$ is formed in a result. In this case, the energy is released in the form of an x-ray quantum with an energy of 4 keV and 4 keV of the energy is released in the form of rotational energy $\hat{H}_2X$ of such an atom. This process is similar to a chain reaction, because the atom $\hat{H}_2X$ will have a small size and magnetic moment and can enter into a new "magnetic-chemical" reaction with the surrounding substance.

For Fig. 4 with an increase of 400 times, traces of interaction of "dark hydrogen" with the aluminum coating of the surface of the CD disk with a long (about 30 minutes) high-voltage discharge in the "cold vapor" coming from the humidifier are shown. Craters on the surface of the CD disk form complex structures, which is depended on the magnetic properties of "dark hydrogen".

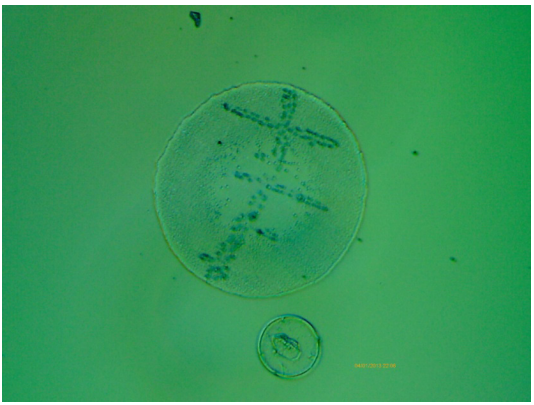

Fig. 4 *Traces of the interaction of "dark hydrogen" Ĥ2 with the surface of the CD disk located next to the discharge in the jet of "cold steam"*

The atoms of "dark hydrogen" Ĥ2 are very small and easily penetrate through ordinary matter. They bear a threat to a person conducting an experiment with electric discharges in a hydrogen-containing medium, because a chain reaction involving $\hat{H}_2$ will go with the release of energy and the destruction of ordinary matter in the human body.

Thus, the task of protection against " dark hydrogen" $\hat{H}_2$ penetrating through the ordinary substance and methods of stopping the chain reaction with the participation of $\hat{H}_2$ are a prerequisite for the safety of personnel in the synthesis of "dark hydrogen". Apparently for protection from $\hat{H}_2$ can be use its magnetic properties. The system of permanent magnets and electromagnets can act as a storage $\hat{H}_2$ and serve as a protective screen.

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冷非核聚变和无燃料微波（脉冲）功率
COLD NON-NUCLEAR FUSION AND FUEL-FREE MICROWAVE (PULSE) POWER

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抽象。 从以太动力学的角度来看，这个问题提出了一个全新的答案：在所谓的今天的低能核反应（LENR）中，多余的热量来自何处。 为了解释加热效应，对磁控管（MW）的微波电磁辐射给出了新的解释 - 这些是强大的电磁脉冲（PEMP）。 从协同学的角度提出了一种用于核素转换（冷核嬗变）的机制。 EmDrive电磁电机与无燃料发电机相结合，为其供电。 提出术语“冷核聚变（CNF）”以指示来自基本粒子的化学元素的自组装。 给出了CNF类型的分类。 展示了地球物理学与历史和考古学中“古接触”假设的联系。

关键词：LENR，微波能量，笛卡尔以太，电磁谐振器，巨石，稀土金属，采矿。

Abstract. From the standpoint of ether dynamics, a fundamentally new answer to the question is proposed: where does the excess heat come from during the so-called today low-energy nuclear reactions (LENR). To explain the heating effect, a new interpretation is given to microwave electromagnetic radiation from a magnetron (MW) - these are powerful electromagnetic pulses (PEMP). A mechanism is proposed for the transformation of nuclides (cold nuclear transmutation) from the point of view of synergetics. The EmDrive electromagnetic motor is developed combined with a fuel-free generator to power it. The term "cold nuclear fusion (CNF)" is proposed to designate the self-assembly of chemical elements from elementary particles. The classification of types of CNF is given. The connection of geophysics with the hypothesis of "paleocontact" in history and archeology is shown.

Keywords: LENR, microwave energy, Descartes ether, electromagnetic resonators, megaliths, rare earth metals, mining.

Issue Status. An interdisciplinary approach allowed the authors to establish a connection - to combine, at first glance, incompatible, scientific disciplines: physics, mining (rock mechanics), history and archeology.

For more than 30 years, physicists have been arguing: is there cold nuclear fusion (CNF) or not. On the one hand, according to physical theory, CNF cannot occur at low temperatures, since it is necessary to overcome the Coulomb barrier. In this case, hard ionizing radiation should be observed, but it is not. On the other hand, the evolution of excess heat during electrolysis has been experimentally proved (the Fleischmann-Pons effect). And also, if metal hydrides are heated, then at a certain temperature they begin to produce excess heat. That is, in both cases during mechanical action on the hydride (thermal stress due to heterogeneity is also a mechanical effect). When comparing “fuel” and “ash”, mass spectral analysis shows a change in the isotopic composition and the appearance of new chemical elements. From the point of view of physics, this is evidence of nuclear reactions, which cannot occur from the point of view of the physics. This article should put an end to this debate.

For more than 100 years in mining, the problem of dynamic and gas-dynamic phenomena (rock blows and sudden emissions of coal, rock and gas) has not been resolved when developing a gas-tight rock mass at great depths. Practical experiment shows that two or more pressure gauge wells drilled in close proximity to the same coal seam never show the same gas pressure. Theoretically, “connected” vessels are practically not connected. Consequently, the coal seam is impervious to gas, and even more so to liquid. At the same time, gas and water are released into the mine workings (miners walk in boots).

Official history and archeology mistakenly date pyramids, dolmens, menhirs, seids and other stone buildings on Earth, for example, fortresses, castles, palaces, temples, etc. time when they were rebuild. The fact that they were not designed for people and not built by people, is indicated by the weight of megaliths and traces of machine processing not available for modern civilization, as well as windows in the ground, doors in windows, lack of heating, lack of waterproofing of the foundation, and other inconsistencies. In this case, in mostly, the schematics (project documentation) are absent. Therefore, it is not known who built them, and most importantly, for what purpose. According to alternative researchers, the Earth is a former alien mine. Rare-earth and dispersed chemical elements, mainly metals (REM), are therefore called rare-earth because they are practically no longer on our planet (all were extracted by aliens). They are not really needed by modern civilization (microelectronics and permanent magnets), but in the future we will not do without refractory alloys. REM extraction in space is impossible without new energy and means of transportation based on it.

A single mechanism of cold non-nuclear fusion and ball lightning. This year marks 30 years after the conference of Martin Fleischman and Stanley Pons, at which they first announced CNF. During this time, Shestopalov A.V. formed the notion that CNF can be different [1].

1st type. The Fleischmann-Pons effect (conventional non-plasma electrolysis), Andrea Rossi's E-Cat and cold nuclear transmutation (CTN) at nanosecond high-power electromagnetic pulses (PEMP), possibly even when irradiated with a laser, when the deactivation rate increases. All this is a "cave" region of energies that has not been previously investigated. It is known that chemists have electron-volt units, physicists have mega-, gig-electron-volts, and nobody has a kilo. In order not to excite Orthodox physicists, you need to come up with the correct name for the phenomenon. The most acceptable term today, according to the Russian Foundation for Basic Research, is "low threshold (cold) transformation of nuclides". The previously used term "cold nuclear transmutation" (CTN) fits into this framework.

According to Shestopalov A.V. the CTN mechanism, hereinafter, can be explained by the collective behavior of nucleons (non-destructive recombination mechanism of the "folds on a carpet" type). To do this, you need to mentally imagine that the nuclei of atoms do not consist of nucleons, but of the nuclei of other atoms. It is precisely on the boundaries of the "nuclei of other atoms" that a low-energy transformation (separation or attachment without breaking the old bond) with kilo-electron-volt energies occurs. The "impact" of an electromagnetic (EM) wave falls not on the Coulomb barrier, but on the boundary between the "nuclei of other atoms", for example, helium nuclei (alpha particles). Such a model of the nucleus makes it possible to involve resonance phenomena (photosynthesis by V.A. Atsyukovsky), which are not considered in this article because of the volume limitation.

We consider only metal-hydrogen non-nuclear (recombination) "reactions". As applied to hydrogenated carbon (hydride), such reactions were previously called in geomechanics "non-destructive transport", "wave of properties", "ultra-fast decomposition reactions in solids under pressure". Based on this principle, Andrea Rossi used the "cold" and "hot" E-Cat Low and E-Cat Hot catalysts (Fig. 1). The chemical composition of E-Cat Hot fuel was solved by AG Parkhomov. in 2014 and, unlike secretive A.Rossi, he told everyone and published everything, after which in 2015 there was a boom of rip-offs all over the world.

Fig. 1. *Evolution of A. Rossi from nickel-hydrogen reactors to ball lightning*

2nd type. This is a "transmutation" in biological systems, for example: microbes turn radioactive strontium into stable barium, chicken from silicon produces calcium for the shell of its eggs, etc. (first disassembly then assembly), which are not considered here due to the limited volume of the article. For those interested, there are publications by A. Kornilova and Vysotsky V.I., as well as earlier other authors.

3rd type (only in the works of Shestopalov). This is not the restructuring of one set of chemical elements and isotopes into another set. This is self-assembly of atoms and molecules from elementary particles, as if from scratch. This happens as crystals grow or A. Y. Kushelev collects protein molecules (only assembly without disassembly). It is not considered in detail here, since this is still a hypothesis, and an attempt to prove it, using carbon methane as an example, has been published more than 100 times [1].

4th type. These, according to Shestopalov A.V., are a plasma electrolysis and accidents at type 1 reactors: the appearance (spontaneous generation) of pulses of electromagnetic (EM) radiation, traditionally called "super high frequency" (MW), but in fact pulses with a steep wave front. According to Zatelepin V.N. and Baranova D.S. in a metal-hydrogen reactor, excess heat is obtained from the outlet due to unaccounted for high-frequency pulses of electricity caused by a self-oscillating process [2]. According to Shestopalov A.V., the oscilloscope registers pulses of consumed electric power not from the network, but from the ether. The spontaneous generation of EM pulses in the reactor can be achieved by the experimenter by slow heating and maintained by electronic automation in a quasi-stationary mode for a long time. But if an inverse positive connection appears in the system, then an exacerbation regime will come - resonant ignition (formation) of ball lightning, which melts (burns) the walls of the reactor vessel. Metal-hydrogen cold non-nuclear fusion turned out to be ball lightning. Ball lightning is a self-sustaining MW discharge consisting of PEMP. Frequency, wavelength and, especially temperature, have no physical meaning for a pulse. It is PEMP that carry out the cold transmutation of the nuclei of some chemical elements into others, due to the gradient (steepness of the front) of the flow of mechanical energy ("impact").

5th type. This is ball lightning as a broadband self-sustaining MW discharge (uncontrolled analogue of the Kushelev resonator): E-Cat QX and E-Cat SK industrial design Andrea Rossi (see Fig. 1), plasma electrolysis Kanareva F.M., Energoniva Vachaeva- Ivanova, experiments Godina S.M. Several modes of ball lightning are possible: 1) "metallurgical" mode of A.Vachaev (operating time of metal powders); 2) "energy" mode A.Vachaev with self-recording (220-380V 50Hz without converter); 3) A.Rossi mode (E-Cat SK) if disconnected from the outlet, the BL will go out. After heating the metal hydride to a critical temperature,

spontaneous PEMPs begin to be generated. The first in the world, self-generation of electromagnetic radiation was discovered by Zatelepin V.N. and Baranov D.S. back in 2017. They do not seem to realize that interacting with the ether, they locally excite “bounce” in the “Maxwell gears” and light up ball lightning (BL) in hydride. In this case, “fuel” must be supplied to the BL plasmoid and the “ash” removed, for example, in the "Energoniva" installation there was running water [3]. At the same time, excess electricity was removed by the inductor, thereby protecting the reactor from melting.

6th type. These are dielectric resonators of Kusheleva A.Yu. Moreover, if the resonator is made of ruby balls, then excess electromagnetic energy is highlighted, thereby protecting the resonator from destruction. It is known that one cubic meter of the structure of the nanoworld (ether) contains 96 orders of magnitude more energy than a cubic meter of nuclear fuel. There are other estimates, but in any case, it is monstrous energy that can be taken from the structure of the nanoworld using an electromagnetic resonator of a special shape and a high-quality factor (theoretically, the quality factor should be more than 150,000). It was experimentally confirmed [4] that the entire class of ritual objects (tridents of the ancient gods, swastika, various kinds of crowns, etc.) are actually resonators unknown to official science. Their quality factor is limited only by the accuracy of the manufacture of the frame and the quality of the materials, and, therefore, is theoretically unlimited. These resonators can be made of both metal and non-conductor. The most effective are dielectric resonators (special classes of polyhedra, in particular the diamond form, etc.).

The hypothesis that the Christian cross can serve as a microwave engine (EmDrive), capable of moving without a jet stream in air and space, has been experimentally confirmed [5]. The mechanism for creating traction is the same as that of fish. The conduction current in the conductor or the bias current in the dielectric acts on the ether in the same way as a fish acts on water (repelled from the environment).

Ruby, basalt, quartzite (both natural and artificial), as well as brick, etc., are dielectrics. Ideally, a material with a specific refractive index and dielectric loss (thermal). With the help of such material (whole or composed of elements) it is possible to organize (direct, focus) electromagnetic waves. Two key conditions must be met in an energy source: 1) sound resonance; 2) a superposition of electromagnetic fields. Resonance allows you to get strong electromagnetic fields. In the 2011 experiment in Dubna, an electric field was obtained at which YAG (yttrium-aluminum garnet) or ruby, i.e. about 107 V/m. Thus, in the 2011 experiment (and in subsequent experiments (Saratov-2017, Moscow-2019)), one condition was met - a strong EM field was obtained in a high-Q resonator.

Now it remains to add a second condition - a superposition of fields. To do this, you need to excite not a single ruby ball, but a group consisting of 3-5 identical ruby balls. In the interval between the balls, a superposition of strong electromagnetic fields will be created (Fig. 2).

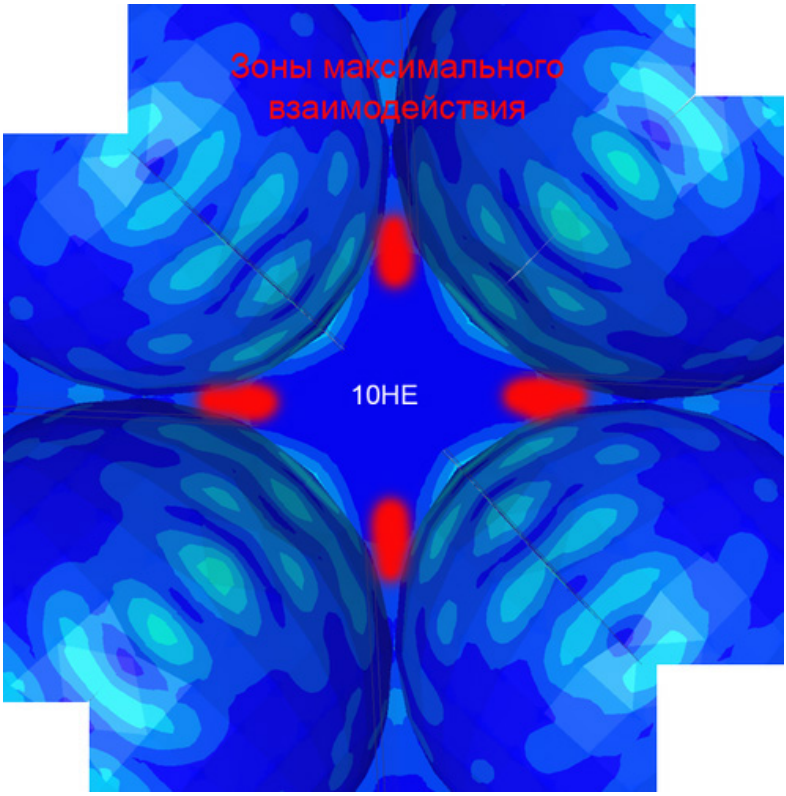

Fig. 2. *The result of the simulation in the program HFSS*

The Nanomir Laboratory does not have permanent funding, and conducts research on donations from patrons and sponsor money. At the moment, there are no neither one nor the other, so it is not yet knownwhen the superposition of strong electromagnetic fields will be created.

Antediluvian stone buildings on Earth prove the hypothesis described above that we live in an ocean of electrical energy. The most mysterious buildings are megaliths, the size of stone blocks exceeds the capabilities of modern lifting equipment. The most famous megaliths - the pyramids in Egypt, the city of Machu Picchu in Peru, the Baalbek temple complex in

Lebanon, the Wailing Wall in Israel - we studied on the Internet. We managed to visit dolmens on the Black Sea coast of the Caucasus, a half-monolith in the village of Prigorodny near Tuapse, and a monolith in the village of Volkonka near Lazarevsky, although at different times. Fabrice Davide, a scientist from France, took part in the study of Pshad dolmens near the village of Krinitsa near Gelendzhik. In France, there are about the same number of dolmens as in the Caucasus, and we exchange results of analyzes of spring water and information with him.

To explore the antediluvian stone buildings there is no need to travel far or fly. In every big city you can find houses with pits (windows halfway into the earth) and other objects for studying alien magnetrons. Who and why built temples and train stations that are not like temples and train stations? When designing and building, they forgot to make stairs to the bell tower, stove heating, thermal vestibules, isolation of walls from groundwater, etc.? People don't build like that, they could find ready-made buildings and adapt them for their needs. Why are there so many churches in one place or a huge temple-skyscraper in the steppe where almost no one lives? And all because the temples were not built for peoples prayers!

All the ancient stone buildings on the earth are brick. People could not build so many brick factories, and most importantly roads, not to mention delivery vehicles. Most likely, the "brick" buildings named above were made by alien robots (3D printers) and burned with an MW-field. They built magnetrons in the form of cities with streets and houses. Therefore, "colonial" architecture is the standard for the whole world, incl. for countries that have never been a colony. Artists ruinists (15-18 century) painted their paintings from nature, i.e. then, when people had not yet had time to rebuild the magnetrons into houses and palaces.

Aliens built "houses" (magnetrons) to evaporate spring water for the extraction of rare-earth metals. Fortress towers could be water-pressure earlier, and fortress walls were aqueducts. In addition to the ground part, evaporation complexes always also have underground ones - tunnels for discharging water into rivers. All megacities are located on tectonic faults (places where spring water flowed out). Therefore, under almost every "city" there are catacombs, and in the basements of old houses there are "brick" ceilings, and even some Moscow metro stations have brick arches. Earthen ramparts sometimes connected "cities" (magnetrons), which reduced the cost and speed of the construction of the first railways for people who found these ramparts. It seems that people chose a building from the found magnetrons for the future station, and then they pulled a track to it. Most stations are similar to each other and all initially did not have warm vestibules. The list of illogicalities of stone buildings can be continued, but listing is no longer possible within of this article.

Antediluvian stone buildings on Earth indirectly prove that ether is the source of electric energy for ball lightning, and PEMPs carry out cold non-nuclear fusion (LENR). Aliens as well as humans should have been preoccupied with mining. All the last wars on Earth were due to oil, now they are due to gas, the next ones will be due to rare earth metals (REM), which are practically absent on Earth (all were extracted by aliens).

Conclusions

1. There is no cold fusion. There is transmutation (a change in the chemical and isotopic composition), but without heat. There is excess heat in the metal-hydrogen reactors, but not from the outlet (from the network), but from the ether. The synergistic transmutation mechanism (recombination type of movement of the folds on the carpet): the collective behavior of nucleons under the action of a flow of mechanical energy (thermal stresses when heated).

2. Cold nuclear fusion should be understood as self-assembly of elementary particles from ether, atoms from elementary particles, molecules from atoms and further to supramolecules. This is possible only at a stress concentrator, which is an ether sink. For example, at the tip of a growing crack, microdefect, dislocation, etc. The mechanism is similar to crystal growth and self-assembly of proteins.

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犹太自治区土壤地理
（在Priamurye中部地区，俄罗斯远东地区）
GEOGRAPHY OF SOILS OF JEWISH AUTONOMOUS REGION (IN THE LIMITS OF THE MIDDLE PRIAMURYE TERRITORY, RUSSIAN FAR EAST)

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摘要。 本文描述了犹太自治区境内基本土壤类型在依赖景观 – 生态条件方面的分布。 提出了土壤类型规模500 000的基本地图。 山区和平原（农业）领土的多样性得到反映。

关键词：土壤类型，土壤图。 犹太自治区

Summary. *The paper describes the distribution of basic soil types at the territory of the Jewish Autonomous Region on dependence landscape-ecological conditions. The base map of soils types scale 500 000 is presented. The diversity of soils of mountainous and plains (agricultural) territories are reflected.*

Keywords: *types of soils, map of soils. Jewish Autonomous Region*

Introduction

The Jewish Autonomous Region (JAR) is located on the Eastern edge of the Eurasian continent in the center of the southern part of the Russian Far East. The extreme points of JAR are located between 47° and 49° north latitude and 130° and 135° east longitude. The area of the region is bounded in the south by the Amur River and at the same time the state border with China; in the northwest with the Maly Khingan Mountains; and in the north by the mountains of the Bureinsky Ridge. The extreme eastern part is located in the confluence of the Amur and Tunguska rivers. The total area of JAR is 36.3 thousand km^2.

The soil diversity in this region is determined by the combination of mountain and lowland terrains, different climatic conditions, a complicated water regime, and vegetation cover specifics. All of these factors noticeably change from south to north and from west to east. The climate is temperate continental with monsoon features. The average monthly temperature in January is 22-24º below zero and in July is 20-22º above zero. The average annual precipitation varies in different parts of the region from 600 to 800 mm. The moisture regime shows a pronounced seasonality. About 90 % of the precipitation falls in summer. The north-western half of JAR is composed of low and medium mountains (300-1250 m) of the Khingano-Bureisakay mountain system. The rest of the area is the western edge of the Middle Amur (Amuro-Sungariiskaya) Lowland with the highest altitudes of 40-100 m. Soil-forming rocks in the mountains are eluvial-deluvial deposits of weathering products of primary rocks (granites, andesites, andesite-basalts, quartz porphyry, quartzites, etc.). On the Amur floodplain terraces soils are formed on the Quaternary deposits of alluvial and lacustrine-alluvial genesis, and in flood-plains – on the modern alluvium. Vegetation of JAR mountain parts belongs to the northern subzone of the zone of mixed coniferous-deciduous forests. Reed grass, sedge-reed meadows, low grass-moss and transitional sedge bogs are common in the lowlands.

The soil cover of the region, especially the inaccessible mountain systems of the Maly Khingan ridge and the southern spurs of the Bureinsky ridge, remains poorly studied. Waterlogged heavy loamy-clay soils of the plain part of the region (Central Amur Lowland) are also insufficiently studied, which creates difficulties for their effective drainage and agricultural use. Of the works of past years, the most important for understanding the genesis and geography of soils in the middle Amur region were the generalizing works of Yu.A. Liverovsky [3], G.I. Ivanova [2].

The purpose of this work is to provide an overview of the soils of the JAR, one of the important areas of the territory of new development and cross-border interaction in the Far East.

Materials and Methods

Primary data on the JAR soil cover were obtained from the soil map, designed by the V.V. Dokuchaev Soil Institute (scale 1:2 500 000) [4] and during our field studies in JAR carried out in different years. Few data on JAR soils, published in regional reports were also used [2, 3,]. On a landscape basis, we compiled a map of the JAR soils at a scale of 1: 500 000. The map is based on a systematic list of soil types corresponding to 16 cartographic units. The nomenclature names of the main soil types of the region were used in accordance with [4]. In a number of cases, materials of the register of soil resources of Russia were used to adjust the names of soil types [5]. Local names of soils were matched with the names of the Reference soil group of the World Reference Base for Soil Resources [6].

Results and Discussion

The JAR Soil Map (Figure) shows that in the mountainous areas (zone of broadleaf forests) most common are **brown mountain-forest soils (brownzems) weakly-unsaturated**. They occupy the slopes of the ridges 300-500 m high above sea level and are formed on loose, gravelly loam eluvial-deluvial deposits under the oak and broadleaf forests. The soil profile is of bright brown colors. The structure of the profile is AY-BM-C. These soils are diagnosed by the upper horizon rich in humus type "mull" (to 10-12 %), and the brown-colored horizon BM. They have a neutral or slightly acidic reaction. The forest leaf litter is of great soil-forming importance, serving the material for the humus production, the habitat of diverse fauna and flora, the protection from water erosion, and the link between soils and vegetation in the general circuit of substances. According to the WRB soil classification [6] brownzems weakly-unsaturated correspond to the reference soil group Cambisols (cambisols eutric).

The JAR Soil Map presents **brownzems acid** as a distinct type. They take a big area in the north and are found under the coniferous forests at altitudes from 300-500 to 700 m. They are diagnosed by the acid reaction (pH<5.0) and the low base saturation (<50 %). These soils are typical to forest ecosystems with some oligotrophic features. In the WRB classification they are close to Cambisols eutric.

Brown mountain-forest podzolized soils form small independent ranges in the central and western parts of the mountainous territory, and also occur in combination with typical weak unsaturated burozems. Formed under broad-leaved and coniferous-deciduous forests on the eluvium of well-weathered rocks (granitoids, andesite-basalts, sandstones). The structure of the AYe-BM-C profile. Diagnosed by the presence of brightened fine earth in the lower part of the humus horizon. They correspond to the Distric cambisols.

On the gentle slopes under broad-leaved grassy forests, **sludge-brown earth soils** are formed on the eluvium-diluvium of sedimentary rocks rich in bases. The structure has AU-Bm-C profile. They are characterized by a powerful humus horizon (up to 20 cm or more) and a high degree of base saturation. WRBs are classified as Distric cambisols.

Among mountain forest brownzems in conditions of poor drainage or additional surface moisture **brownzems gleyic and/or gley** are formed. In some areas they have a dominant value. They are diagnosed by the presence of a gleyed horizon (G) in the profile. The structure of the profile is AY-BMG-C In the WRB classification they correspond to Cambisols dystric or Geysols dystric.

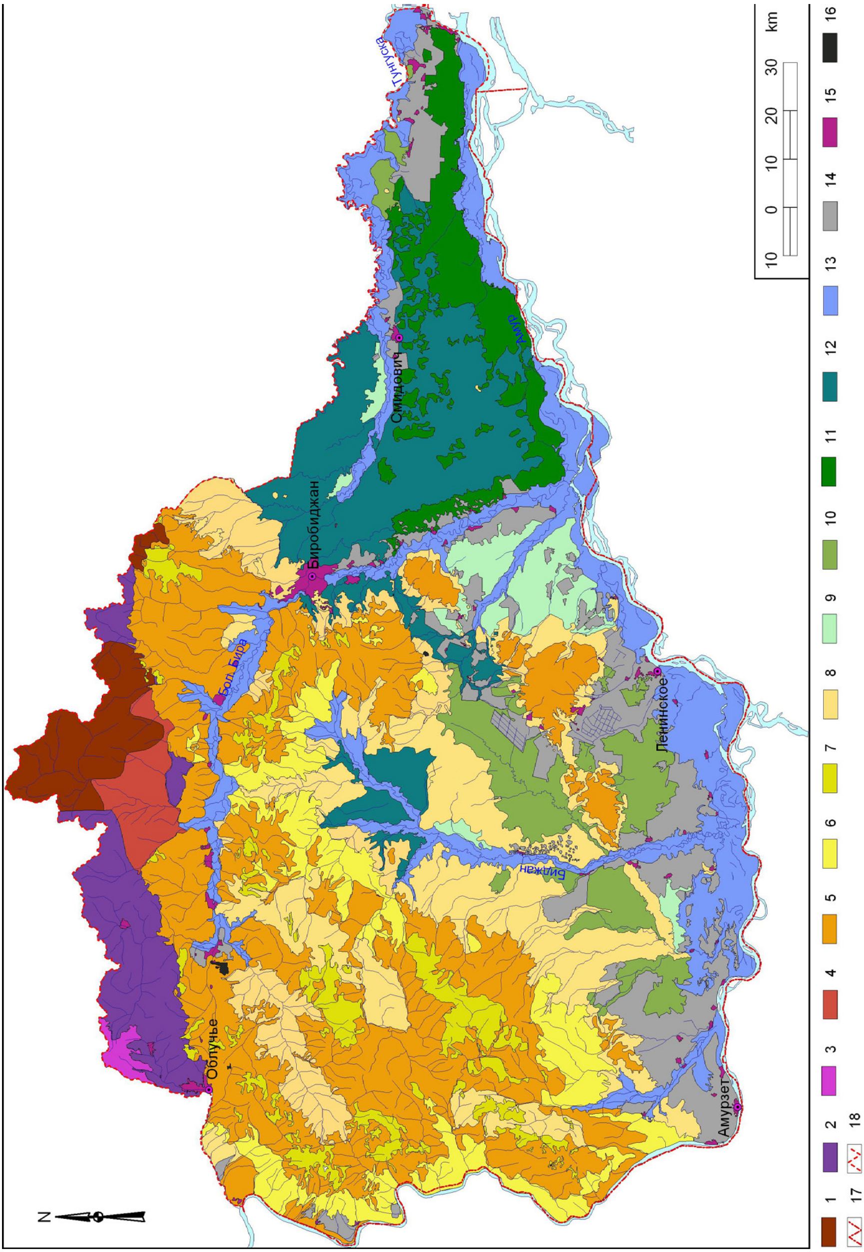
Биробиджан
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Figure. *The map of the basic soils types (groups) of the Jewish Autonomous Region (original scale 1:500 000):*

Soils of mountains

Taiga zone: 1 – podburs dry-peaty;
2 – taigics brownzems illuvial-humic;
3 – taigics brownzems raw-humic;
4 – taigics brownzems raw-humic gley.

Zone of coniferous-deciduous forests:
5 – brownzems weakly-unsaturated (tipical);
6 – brownzems weakly-unsaturated podzolized;
7 – sod-brownzems;
8 – brownzems gleyic and gley.

Soils of foothills and lowlands

Half gidromorfic soils:
9 – forest differentiated (forest podbels);

Gidromorfic soils:
10 – meadow differentiated (including meadow podbels and meadow gley soils);
11 – meadow boggy soils;
12 – peat-boggy high and transitional moor;
13 – alluvials (complex of floodplain meadow, forest and boggy soils);

Agricultural and meliorated lands:
14 – agrozems (meadow podbels and meadow gley soils);

Antropogenic soils:
15 – urbanozems;
16 – technozems.
17 – state boundary;
18 – agministrative boundary.

Zone of taiga forests in the north of JAR presents mountain-taiga soils**.** On the slopes of up to 600-700 m above sea level, under the light larch forests **brownzems raw-humic** are formed. For a long time these soils were called brown taiga soils [3]. In JAR they form small independent areas or are found among other groups of brownzems. Compared to other soil groups they differ in a shallow, very stony profile of fulvous-brown color with spots of gleying; the presence on the surface of the moss cover in combination with a slightly decomposed forest leaf litter like moor or moder. The structure of the profile is O-BMg-C. In spring and summer icy permafrost remains in the profile for quite a long time (on the northern slopes). Brownzems raw-humic have a very low resistance to water erosion. According to the WRB soil classification brownzems raw-humic correspond to the Cambisols group (cambisols dystric).

In all areas of its distribution brownzems raw-humic are coupled with **brownzems illuvial-humic**. In the JAR north in the Maly Khingan Mountains brownzems illuvial- humic form a large independent area, where they are formed under the grass-moos moor larch forests with spruce and abies on the well-drained slopes. They are diagnosed by the second maximum of humus in the middle of the profile (Bh horizon), and often by iron compounds (Bhf horizon). The structure of the profile is O-BMh-C or O-BMhf-C. These soils as brownzems raw-humic belong to Cambisols dystric.

Podburs dry-peaty have a special place in this soil group. They are formed in the far north of JAR in the Bureisky Ridge offsets at the altitudes of 900-100 m, which is the upper part of the larch forests belt and the mountain pine belt. According to the classification of Russian soils [1] the structure of their profile is TJ-Bhf-C. The podbur profile is shallow, brown in color, without the humus horizon AY. Podburs are diagnosed by the presence of a ferric illuvial-humus horizon. Like all taiga soils, they have an acid reaction and the extremely slow forest litter decomposition due to the heat deficit. Organic substances accumulate on the surface in the form of dry peat. WRB classification of podburs dry-peaty corresponded to the Podzols group (podzols histic).

In the transition zone from mountains to lowlands soils acquire a different character. On the gentle slopes of the foothills at an altitude of 90(100)-200 m **forest podbels** are widely spread in the broadleaf-oak forests. In the regional classification they are called brown bleached soils [2]. The classification position of these soils has long been controversial. Now they are diagnosed by the presence of the texture-differentiated profile AU-ELnn,g-ELBTg-BT1g-BT2g-BCg-C. The forest podbel specific feature is that under the humus horizon there is a greyish-whitish (bleached) horizon with numerous Fe-Mn concretions. The forest podbels are Typic Planosols (planosols eutric).

Soils of the Middle-Amur Lowland inherited the heavy loamy-clay composition from the lacustrine and alluvial deposits, thus they are poorly permeable both for the atmospheric precipitation and groundwaters. Therefore gleying processes develop in these soils. In the flat watersheds **meadow gley soils** (AU-G-CG) are common. Their humus horizons are interweaved with grass roots, and underplayed with a gley horizon of a bluish-ochreous colour and a viscous consistency. Soils belong to the Typic Gleysols group (gleysols eutric).

In areas with a little descending surface **meadow podbels** are formed. The profile structure is AO-AUg-AUELnn,G-ELnn,G-ELBTG-BTG-BCG-CG. In the upper horizon the humus content is high (up to 15 %), the bleached horizon is of a brownish-straw color (10 YR 5/4), and the profile middle has a crumbly "caviar" structure. According to the Russian national soil classification [1] these soils are included into the section of texture-differentiated soils, the type of dark-humic gleyic podbels. According to the WRB they correspond to the Planosols group. Detailed classification is mollic Planosols (pedomorphic, redoxic, with illite dominant).

In the lowland marshy meadows (lowland and transitional) **peaty-gley and peat-gley soils** are widely spread, and under the larch mari upland **peat-bog soils** are common. The profile structure is T-G-CG, where the horizon T is 20-30 cm thick in peaty-gley soils and 30-50 cm thick in peat-gley soils. The peat layer in peat-bog soils is typically over 50 cm but rarely reaches 1 m. In the world classification such soils are ranked as Histosols (terric and fibric).

In the floodplain of the Amur River and other major rivers alluvial soils vary, including **primitive layered, well-developed sod, meadow and brown forest soils** developed on alluvial sediments. According to the WRB classification all these soils belong to the Fluvisols group (mainly to fluvisols umbric and histic)

Sod and brown forest alluvial soils (on the sand bars) with a well-developed humus horizon (up to 12 cm) are considered the best for farming. However, they occupy a small area in the overall structure of the JAR land fund. At the same time, the widespread meadow gley soils, meadow and partly forest podbels have a high potential fertility, however they require reclamation. Amelioration of these soils through drainage-collecting systems will greatly improve their water-air regime and the vegetation conditions for various crops. The agricultural efficiency of reclaimed also depends on the systematic cultivation of soils (increasing the plough layer thickness, the application of lime, mineral and organic fertilizers).

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清理贝加尔湖地区的技术废物
LIQUIDATION OF TECHNOGENIC WASTES OF THE BAIKAL REGION

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抽象。 贝加尔湖地区的大部分技术性废物是木质素污泥沉积物和燃烧产生的灰烬。 在监测BPPM OJSC的领土时，发现重金属的MPC超过2-7倍，苯并（a）芘超过3倍。 在选择消除废物的技术时，应减少其体积并确定进一步用作次要原料的技术。

关键词：木质素污泥，木质素污泥灰（ZHL），贝加尔纸浆和造纸厂OJSC（BPPM），利用，技术原料，吸附性能，饱和度，滑移，污泥收集卡，沉淀。

***Abstract**. The bulk of technogenic wastes of the Baikal region are sediments of lignin sludge and ash from its burning. When monitoring the territory of the BPPM OJSC, it was found that the MPC for heavy metals is exceeded by 2-7 times, benz (a) pyrene by 3 times. When choosing a technology for the elimination of waste should reduce their volume and determine the technology for further use as secondary raw materials.*

***Keywords**: lignin sludge, lignin sludge ash (ZHL), Baikal Pulp and Paper Mill OJSC (BPPM), utilization, technogenic raw materials, sorption properties, saturation, slip, sludge collector cards, sedimentation.*

The solution of environmental problems at a modern level should be implemented both in the activities of special state bodies and the whole society with the goal of environmental education and upbringing of the country's public, rational use of natural resources, elimination of environmental pollution, including the elimination of industrial waste. Modern nature management should develop in the direction of the integrated use of resource-saving technologies, allowing not only to maximize the full potential inherent in the resource, but also to minimize the environmental load on the environment, as well as eliminate the accumulated damage. To date, a huge amount of various wastes has already been accumulated, which must be considered as technogenic raw materials. The other side of the issue is the increasing negative impact of these wastes on the environment. Therefore,

their processing should be considered, both from an economic and environmental point of view. Especially relevant, this problem is in the Baikal region. Currently, the Agency for Strategic Initiatives (ASI), together with the Lake Baikal Foundation for Applied Ecological Research and Development Support Fund, have begun to create guidelines for waste management in specially protected natural areas (SPNA). The document will contain algorithms for handling MSW, while the issue of utilizing industrial waste from the shore of Lake Baikal remains open.

The territory occupied by OJSC Baikal Pulp and Paper Mill, OJSC Selenginsky Central Control Commission and slurry accumulator cards of these plants is classified as destroyed and artificially recreated, and the coastal zone, which is directly affected by the maps, belongs to territories that cannot be restored naturally.

Colloidal sludge-lignin sludge of BPPM OJSC, with a volume of about 8 million m3, is stored in maps with multilayer waterproofing from natural and synthetic materials that prevent drainage, with a seismic resistance of 9 points.

Maps are located on two sites in relative proximity to the city of Baikalsk, the villages of Solzan and Babha. On Solzansky site with an area of about 105 hectares are maps number 1-10. On the Babkhinskaya site with an area of about 33 hectares, cards No. 12-14 are located. There is also an intermediate map No. 11 on the industrial site of BPPM OJSC. The accumulation of large amounts of sludge-lignin waste leads to the possibility of man-made accidents and natural disasters caused by earthquakes, since these enterprises are located in a zone of high seismic activity.

Another reason for the violation of the integrity of sludge collector cards can be floods. So, due to extreme rains in July 2019, a flood began in the Irkutsk Region in the southern part of Lake Baikal, which caused flooding, and the Solzan River overflowed the banks.

According to the data of [1, 2], when breaking through dams of sludge collectors of the BPPM OJSC, up to 250,000 tons of organics can instantly get into Lake Baikal, i.e. such an amount of pollution that during normal operation of the plant would have entered the lake in 700 years. At the bottom of the lake, a large zone of hydrogen sulfide infection may occur, which will cause massive death of aquatic organisms and the ecological disaster of the lake as a whole.

In our opinion, one of the topical directions for the utilization of sludge-lignin is the production of sorbents intended for physicochemical wastewater treatment. A study of a number of authors [3] found that sludge-lignin ash (ZHL) contains the following components: α-SiO_2 - 21.8; γ-$A1_2O_3$ - 44.83 in dispersed form; $Na_2O*A1_2\ O_3*\ 6SiO_2$ - 6.85; Fe_2O_3 - 5.2; $3A1_2O_3$ * $2SiO_2$ - 18.32; $CaSO_4$ - 1.6; TiO_2, K_2O, etc. — 1.4, C — 4.5–5% (formed as a result of the combustion of hydrocarbon feed added during sludge combustion), and, unlike crude waste, is capable of exhibiting sorption properties.

One of the determining technological indicators of the sorbent is its density and particle size in (table. 1). The bulk density of the mineral part of the ash of BCPM OJSC was 1.67 kg/m^3. The density of the light fraction, which is soot from trace elements, table. 2, and carbon compounds is 0.8 kg/m^3.

Table 1 - *Indicators of sedimentation analysis of particles of ZHL JSC BPPM*

Fraction number	Settlement time, min	Particle Radius, mm	Percentage,%
1	0,12	0,059-0,085	22,6
2	0,25	0,051-0,059	12,3
3	0,33	0,046-0,051	16,6
4	0,42	0,034-0,046	19,6
5	0,75	0,027-0,034	21,6
6	1,2	0,020-0,027	7,3

The extreme particle sizes of ZHL vary from 0.020 to 0.085 mm, and the sizes of the main fractions - 21.6% from 0.027 to 0.034 mm and 22.6% from 0.059 to 0.085 mm.

Based on the given component composition, we assume that ash has unique sorption properties and can be used as a sorbent to extract a wide range of contaminants from wastewater. The results of experimental studies on model solutions are given in (table 2).

Table 2 - *Indicators of the adsorption process*

Sorbent	Quality indicators of cleaning, sorbates							
	Lignosulfate waters, 350 ° HKSh		Hg, 0,01 mg / l		Ca, 2650 mg / l		Oil products100 mg / l	
	Breakth-rough time, hour	Full saturation time, hour	Break-through time, hour	The time of complete saturation of the solid phase, hour	Sorption time, hour	Desa-lination rate, %	Break-through time, hour	The time of complete saturation of the solid phase, hour
ZSHL JSC BPPM	52	56	1,5	3	0,15	99,82	2	8,2
ZShL OJSC SCSKK	40	65	1,20	2,5	0,15	99,82	1,40	8
SiO_2	16	19	0,15	2,9	0,40	99,80	1	7
$A1_2O_3$	20	23	0,15	1	1	99,70	1	7
Coal SKT	8	10	4,45	7,15	0,10	99,84	0,20	6

It has been established that in some cases, according to the sorption properties of the ZHL, the BCMC is not inferior to such industrial sorbents as activated carbon of the type - SKT, $A1_2O_3$ and SiO_2. The universality of ZHL is explained by the presence in its composition of certain components that exhibit both individual sorption properties and the total synergistic effect, which makes it possible to classify it as a class of microporous sorbents. A wide spectrum of action is indicated for various pollutants, starting with heavy metals (Hg), hardness salts and to the extraction of dissolved organic pollutants. The resulting sorbent in terms of efficiency of extraction of pollutants is many times higher than such industrial waste traditionally used as sorbents, such as slag, sawdust, clay, soot, siplast, etc.

Using the method of mathematical modeling on the basis of the obtained experimental data, equations 1-5 were calculated that describe the physicochemical transformations occurring during the adsorption of chloro lignin sulfonate waters by sludge-lignin ash:

1. dC1/dt =- K1C5C1 - K2(C0 - C4)C1 - K3C2C1 + K5C22;
2. dC2/dt = K1C1C5- K3C2C1- K5C22 - - K6C2(C0 - C4);
3. dC3/dt = K3C2C1 - K4(C0 - C4)C3;
4. dC3/dt = K2(C0 - C4)C1 + K4(C0 - C4)C3 + K6(C0 - C4)C3;
5. C6 [mg/g] = (C1 + a1C3) / 0,27,

where: Co is the full capacity of the sorbent; C is the lignin concentration, mg / l; C_2 - concentration of intermediate products, mg / l; Sz-concentration of final products, mg / l; C_4 — lignin concentration on the sorbent, mg / g; C_5 - alkali concentration, mg / l; C_6 - chromaticity 0, HKSH; K_1 is the lignin decomposition rate constant; K_2 - lignin sorption rate constant; K_3 is the rate constant for the formation of the final product from lignin and the intermediate product; K_4 is the rate constant of sorption of the final product; K_5 is the rate constant for the association of intermediate products; K_6 is the rate constant of sorption of intermediate products; a1 is the coefficient of the excess ratio of the contribution of the final product to the color compared to the original lignin.

Using the obtained sorption isotherm curves of chloro lignin sulfonate waters, the process activation energies were calculated, which in the initial period of time correspond to physical adsorption and amount to 27.8 kJ / mol, and with an increase in temperature over 50 ° C, the chemical adsorption with activation energy 94 is the determining factor of the process , 87 kJ / mol, which levels the degraded and associated molecular transformations of chloro lignin. It has been established that during the adsorption of sulfate lignin on sludge-lignin ash, both chemical and physical bonds are formed. The results obtained are confirmed by IR spectra [3, 4].

It should be noted that the production of ash by burning lignin sludge is accompanied by the release of various types of pollutants into the atmosphere. However, the work carried out in the region of Lake Baikal indicates that the main contribu-

tion to the total equivalent is from 0.1 to 1.4 te / kg dry weight, which is not a very high level, uniformly make all the low-chlorinated homologs of furan and especially hexachlorobenzofuran [4, five]. The distribution of this type of homologue is not typical for pulp and paper industry, but is typical for contamination with chlorinated pesticides or the operation of incinerators.

The main technological processes of the proposed technology have passed successful industrial tests and, if implemented, will not only solve one of the most important environmental problems of processing man-made sludge-lignin raw materials, but also get an economic effect by obtaining a marketable product - a highly efficient sorbent.

A multilateral and profound solution to the problem of waste disposal and recycling is a long and painstaking process that a number of generations of scientists, ecologists, technicians, engineers, economists, workers in various fields and many other specialists will have to deal with.

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