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

Date: January 25

Beijing, China 2020

上合组织国家的科学研究：协同和一体化国际会议

参与者的英文报告

International Conference “Scientific research of the SCO countries: synergy and integration”

Part 1: Participants’ reports in English

2020年1月25日。中国北京

January 25, 2020. Beijing, PRC

9 785905 695865

Materials of the International Conference
“Scientific research of the SCO countries: synergy and integration” - Reports in English

(January 25, 2020. Beijing, PRC)

ISBN 978-5-905695-86-5

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。
作者对所引用的出版物，事实，数字，引用，统计数据，专有名称和其他信息的准确性负责

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.

ISBN 978-5-905695-86-5

CONTENTS

ECONOMICS

PEDAGOGICAL SCIENCES

PHILOLOLOGY

MEDICAL SCIENCES

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 48 authors from 7 countries (China, Russia, Uzbekistan, Kazakhstan, Azerbaijan, Tajikistan, 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”

风险管理的主要方法
THE MAIN METHODS OF RISK MANAGEMENT

Chernyakov Mikhail Konstantinovich
Doctor of Economic Sciences, Full Professor
Novosibirsk state technical University,
Akberov Kamal Cholu-ogly
Candidate of Economic Sciences, Associate Professor,
Novosibirsk state University of Economics and management
Razomasova Elena Aleksandrovna
Candidate of Economic Sciences, Associate Professor,
Novosibirsk state University of Economics and management

抽象。 本文分析了有关风险管理的现有观点，并确定了风险管理在企业管理系统中的位置。 定义了风险管理的主要原则和企业风险管理的能力。 描述了企业风险管理的主要方法。

关键字：风险风险管理风险管理风险管理方法

Abstract. *the article analyzes the existing views on risk management and determines the place of risk management in the enterprise management system. The main principles of risk management and the ability to manage risks in enterprises are defined. The main methods of risk management at the enterprise are described.*

Keywords: *risk, risk management, risk management, risk management methods*

Introduction

In the unstable economic environment of our country, the process of effective project management in various sectors of the national economy is complicated. In conditions of incomplete and inaccurate information, the risk of violation of the developed project plans and accepted modes of activity increases, which leads to financial losses during the implementation of projects. Due to imperfect forms of management and the instability of the economic, political, and financial environment, it is important to study approaches to methods and means of risk management in conditions of uncertainty and instability, which determines the relevance of the development of this manual.

To survive in modern conditions, business managers and project managers need to introduce new technologies and technical innovations, make bold and non-standard decisions, and this increases the risk of the project. Therefore, you should learn how to predict events, assess the level of risk, manage risk, go for it or eliminate it. The main tasks of project managers when making decisions are to take into account risk, manage it, reduce it to acceptable limits, and reduce possible losses. Therefore, an important issue is risk assessment in various fields of activity, and the development of appropriate risk management mechanisms.

The main purpose of risk assessment and justification is to ensure its minimal damage to the economic activity of the organization, so in scientific and economic practice, risk management is used, the purpose and task of which is to develop a set of measures to reduce the risk on the basis of the information received.

Risk management methods

Risk management is designed to provide an optimal ratio of profit (increase in market value) and risk for an entrepreneur, and its acceptable (acceptable) level. A clear understanding of the firm's business goals is a prerequisite for solving the risk problem. Based on specific goals, information about the external environment, internal indicators of the company's financial, production, and commercial activities in the past and in the current period should be collected, processed, and analyzed, and forecasts for the future should be made [3].

Information is rapidly aging, and therefore the decision-making entity must respond quickly and dynamically to its receipt, while simultaneously evaluating the quality of information and monitoring it.

When choosing a risk management strategy and tactics, the Manager must adhere to the following basic principles [8]:

- it is not advisable to risk significant for the sake of small;
- it is not advisable to risk more than your own funds (capital, etc.) allow);
- it is necessary to take care in advance (make a forecast) about the possible (probable) consequences of the risk.

The components of the risk management process are determined depending on the scope of the company's activities, its inherent risks, available resources, personal skill, professionalism, and risk appetite of the Manager (the subject of decision-making).

Risk management strategy is the art of managing risk in an uncertain situation, which is based on forecasting risk and applying various methods to reduce it. This strategy includes rules based on which risk decisions are made and how to choose a solution option.

There are four main principles to consider when choosing a particular risk management method in a particular situation [2]:

- transfer of risk to a third party (insurance) in those cases where the likely losses due to adverse events are significant and the probability of their occurrence is low;

- risk avoidance in those cases where the probable losses due to adverse events are significant and the probability of their occurrence is high;

- risk control in those cases in which the likely amount of damage due to the occurrence of adverse events is insignificant, and the probability of their occurrence is considerable;

- risk acceptance in those cases where losses due to adverse events are insignificant and there is a small probability of their occurrence.

These principles are shown schematically in the table.

Table

Loss	**Probability**	
	high	**low**
Significant	avoidance	insurance
Minor	control	risk acceptance

So, as a result of a thorough qualitative and quantitative analysis, the Manager, based on the obtained data, chooses one of the methods or a superposition of risk management methods [5]:

- avoiding;
- warning;
- acceptance (saving or even increasing)
- risk reduction (optimization).

Let's look at these methods in more detail.

1. Avoiding risk means simply avoiding a specific action that is burdened with excessive (catastrophic) risk. But it should be noted that avoiding risk for the Manager or investor often means giving up possible profits, and this causes the risk of an unused opportunity.

2. Risk prevention is a fairly effective tool that, however, only in some situations makes it possible to reduce risk in management.

For example, for banks (managers), there are several ways to support bad debt volumes at an acceptable level, i.e. to prevent the Bank's risk:

- not providing loans to risky clients, as well as to the Bank's management;
- monitoring of payments on loans;
- review of credit conditions.

To a certain extent, the Bank can prevent credit risk by raising (if possible) interest rates on loans. That is, an increase in revenue from reliable customers can offset losses from bad debts.

3. Accepting (maintaining or increasing) the degree of risk is fixing the risk for the Manager (investor), that is, under his responsibility. When investing in a particular business, the Manager must be sure that there are opportunities to cover possible losses or they do not threaten him.

For example, if a company has analyzed that the likely exchange rate fluctuations of a particular currency will be favorable in the future, then the company can accept almost any risk of that currency without insuring against losses for a certain period.

Risk hedging

Risk insurance is one of the most commonly used methods of risk reduction. Insurance against commercial, technical, legal and political risks is particularly relevant in the market conditions. Insurance becomes not only a method of protecting businesses from natural disasters, but also protection from adverse changes in the economic environment. It helps to improve financial and legal relationships between different market participants.

The essence of risk insurance is expressed in the fact that the investor agrees to give up part of the income to avoid risk, i.e. he is ready to pay for reducing the risk level to zero [6].

If the concept of the cost of risk is considered as the sum of the actual losses of the owner of this risk and for reimbursement of such damages and their consequences, the insurance helps to reduce the amount (cost of insurance) to the amount of the insurance premium.

The risk should not be withheld, that is, the Manager should not leave it when the amount of losses is relatively large compared to the savings on the insurance premium.

Today, insurance costs for enterprises in developed industrial countries vary from 1 to 20% of annual sales, depending on the industry, the location of the company, and so on.

The Manager can transfer the following types of risks to the insurance company [9]:

- risk of damage / destruction of property as a result of fire, natural disaster, technological accident, etc.;
- the risk of full or partial disability by an employee of the company in the performance of official duties as a result of an accident;
- the risk associated with the need to compensate for losses incurred by a third party as a result of certain actions (lack of necessary measures) on the part of the company and its employees, as well as the risk of losses caused to this company by unskilled or dishonest actions of its employees;
- financial and commercial risks that can be realized in the form of a loss of profit, an increase in the period of circulation of funds, etc. as a result of external unpredictable factors.

The insurer, when receiving payment for the insurance service, assumes the risk. It must compensate for the consequences of implementing this risk, but in an amount not exceeding the amount of the insurance amount, because the insurance amount is a measure of the insurer's obligations. This is how the insurance risk function is implemented.

The insurer provides compensation for losses due to the closed redistribution of monetary value between insurance participants-legal entities, as well as individuals who are exposed to the same type of risk. The relationship regarding insurance payments is probabilistic, since it is not known beforehand when an insurance event will occur, what its force will be, and who of the insured will be affected by it.

It should be emphasized that insurance compensates for losses or part of them in monetary form, and does not compensate for inventory items, so it can not completely eliminate the risk of delay in the reproduction process. At the same time, within the framework of the preventive insurance function, the probability of risk realization may be reduced, for example, as a result of the insurer installing fire-fighting equipment at the enterprise that insures its property. Using a system of discounts or premiums to the insurance premium, the insurer can encourage the client to take the necessary measures to reduce the risk level (keeping it at a certain level).

The information that the potential policyholder receives when assessing the risk by the insurer can be used to make further decisions on risk management, for example, to serve as a signal that work in this direction should be stopped, that this type of property is absolutely dangerous to store at this production site or in this room.

Hedge

One of the specific forms of financial risk insurance is hedging, which allows you to exclude or limit the risks of financial transactions through adverse changes in the exchange rate, prices of goods, services, interest rates, etc. in the future.

There are two classes of hedging operations that are the basis for forming investor behavior strategies in the stock market [1]:

- increase hedging or purchase hedging, which is an exchange operation for the purchase of fixed-term contracts. This type of hedging is used when you need to insure against possible price increases for certain assets in the future. It allows you to set the purchase price much earlier than the product will be purchased;

- downside hedging or sales hedging is an exchange operation related to the sale of a fixed-term contract for any asset (commodity), with insurance against future price falls on it.

Diversification

Diversification is the process of distributing invested funds between different investment objects that are not directly related to each other [5]. Using the principles of diversification, investment funds conduct their activities, which sell their shares to clients, and the money they receive is invested in various securities pur-

chased on the stock market and brings a steady average income.

Diversification makes it possible to avoid some of the risk when distributing funds between different types of activities. For example, when an investor purchases shares of different joint-stock companies instead of shares of a single joint-stock company, it increases the probability of receiving an average income and reduces the degree of risk.

Risk management accounting

Risk management involves defining a risk management body that can be a financial Manager, risk Manager, or appropriate management apparatus.

The world practice of business development and entrepreneurship shows that the Institute of consultants, both external and internal, is widely used. The system of consulting firms occupies a fairly important place in the infrastructure of the market economy. Domestic companies are clearly aware of the need for such consulting, in which the consultant performs not only local correction of "narrow" problems, but also, in-depth studying the specifics of the client organization, deals with complex issues of strategic development of this enterprise [7].

Currently, in order to survive in the competitive struggle, enterprises and organizations are developing new types of services, new forms of business, putting not only their employees in the first place, but also fighting for each client. To do this, the market is studied, the necessary information is collected, possible economic risks are analyzed and evaluated, and a risk management strategy is developed.

A risk management system is used to manage and control risks. It includes several elements:

- the subject of risk management;
- risk management object;
- current risk control.

Based on this, the risk management system is a unity of interrelated elements that ensure the implementation of the risk management process.

In the management process, the management subsystem (the management subject), based on objectively existing principles, significantly affects the subsystem that is managed (the management object) in various ways, in order to ensure that the goal is fulfilled. In other words, the negative impact of risk factors will be minimized [4].

We formulate the tasks of risk accounting in enterprise management:

1. Qualitative and quantitative analysis of all components of the risk complex.
2. Selection and justification of risk management methods based on the principles of its rationalization.
3. Making decisions on the company's activities based on the rational risk criterion, taking into account its optimization strategy.

Conclusion

It can be concluded that risk management is an important factor in the effectiveness of an organization, because without it it is almost impossible for it to determine its goals for the future. If a company sets goals rather than taking risks into account, it is likely to incur losses. And since it is impossible to completely avoid risks, they can and should be managed consciously, not forgetting that all types of risks are related to each other and their level is not static, but constantly changes under the influence of changes in the external and internal environment. That is, the task of risk management is not only to identify and prevent these risks, but also to be able to manage and minimize them, which will help companies act more confidently when making future business decisions.

Generalization of the main approaches to decision making in risk management gives us grounds to form the main ways of risk management in organizations in a period of uncertainty of the external environment:

1) avoiding possible risks, which involves rejecting unreliable programs, projects, and unverified partners;

2) hedging, which is a form of insurance against possible losses by entering into an agreement that would balance the transfer of risk from one person to another;

3) risk prevention through the creation of specialized risk management units, the formation of reserves to cover possible losses or advance financing of venture programs and development projects;

4) full or partial risk insurance;

5) diversification, the essence of which is to minimize the maximum possible losses in one case, but at the same time the number of different types of risk that need to be controlled is growing;

Risk management is an integral part of enterprise management, and the risk management system (strategy and tactics) forms risk management.

In real economic situations, in conditions of a large number of risk factors, various ways can be used to reduce the final level of risk that affects certain aspects of the company's activities. Therefore, their correct choice plays an important role in the risk management system.

References

1. Albrant V. I. Management and development risks of the digital economy = Management and development risks of the digital economy / V. I. Albrant; M. K. Chernyakov // problems of maintenance of competitiveness of economic systems at various levels : collection of scientific works. V. vseros. student science. Conf.-competition, Khabarovsk, March 28, 2019-Khabarovsk: RIC HSUEP, 2019. - Pp. 12-15. - ISBN 978-5-7823-0716-5.

2. Chernyakov M. K. Classification of risks of digital economy = Classification of risks of digital economy / M. K. Chernyakov, M. M. Chernyakova / / Financial economy. - 2018. - No. 6. - Pp. 384-389.

3. Chernyakov M. K. Dynamic model of social risks in the digital economy / M. K. Chernyakov, M. M. Chernyakova, K. C. Akberov // Advances in Economics, Business and Management Research. - 2019. - Vol. 81 : Modern Management Trends and the Digital Economy: from Regional Development to Global Economic Growth : 1 intern. sci. conf. (MTDE 2019).- Pp. 373-378.

4. Chernyakov M. K. Innovative risks of digital economy = Innovative risks of digital economy / M. K. Chernyakov, M. M. Chernyakova / / National priorities of Russia. - 2018. - No. 4 (31). - Pp. 63-68.

5. Chernyakov M. K. Technological risks of the digital economy [Electronic resource] / M. K. Chernyakov, M. M. Chernyakova // Journal of Corporate Finance Research : электрон. журн.. - 2018. – Vol. 12, № 4. – Pp. 99–109. - Mode of access: https://cfjournal.hse.ru/article/view/8132. - Title from screen - DOI: 10.17323/j.jcfr.2073-0438.12.4.2018.99-109.

6. Galushkina A. M. Assessment and management of risks indivisibilities in the digital economy = Assessment and management of risks indivisibilities in the digital economy / A. M. Galushkina, M. M. Chernyakova // problems of maintenance of competitiveness of economic systems at various levels : collection of scientific works. V. vseros. student science. Conf.- competition, Khabarovsk, March 28, 2019-Khabarovsk: RIC HSUEP, 2019. - Pp. 33-37. - ISBN 978-5-7823-0716-5.

7. Kolokoltseva K. G. Risks of cybersecurity in the system of ensuring economic security / K. G. Kolokoltseva; M. K. Chernyakov, M. M. Chernyakova / / School Of V. D. Novodvorsky: materials of 13 international journals. science.-practical. Conf. undergraduates, students and young scientists, Barnaul, 28 Nov. 2018-Barnaul: publishing house-new-format, 2019. - Pp. 135-139. –ISBN 978-5-91556-532-5.

8. Kuznetsova E. S. risk management of innovations in the digital economy = Risk management innovation in the digital economy / E. S. Kuznetsova; Chernyakov M. K. // problems of maintenance of competitiveness of economic systems at various levels : collection of scientific works. V. vseros. student science. Conf.- competition, Khabarovsk, March 28, 2019-Khabarovsk: RIC HSUEP, 2019. - Pp. 88-92. - ISBN 978-5-7823-0716-5.

9. Management of competitive risks in the digital economy / M. K. Chernyakov, M. M. Chernyakova, A. A. Kozlova, Yu. A. Ponikarovskaya / / Socio-economic policy of the country and the Siberian region in the digital economy: materials of 11 international conferences. science.- prakt. Conf., <url>. 100th anniversary of the Financial University, Barnaul, 26-27 Sept. 2019-Barnaul: Graphis, 2019. - Pp. 333-335. - ISBN 978-5-7904-2393.

彼尔姆地区农业经济效率与农村地区可持续发展的综合关联

INTEGRATIVE CORRELATION OF THE EFFICIENCY OF THE AGRICULTURAL ECONOMY AND SUSTAINABLE DEVELOPMENT OF RURAL TERRITORIES OF THE PERM REGION

Bukhtiyarova Tatyana Ivanovna
Doctor of Economic Sciences, Full Professor
The Russian Presidential Academy of National Economy and Public Administration, Chelyabinsk branch
Chelyabinsk, Russia
Nemykina Julia Sergeevna
Senior Lecturer
The Russian Presidential Academy of National Economy and Public Administration, Chelyabinsk branch
Chelyabinsk, Russia

抽象。 当前组织和管理农村地区农业经济效率的做法要求建立新的方法来建立两个地方之间的关系，这可以通过使用现代数学工具来确定。 本文定义了农村领土实体发展的基本决定因素，并阐明了每个决定因素的概念。 使用数学工具的质量取决于评估机构，基础设施方面的有效性以及价格，创新和投资因素的影响的理论依据的质量。 集成相关性使您可以在电源和管理组织的各个级别上定义和指定解决方案。

关键词：决定因素，概念，基础设施，经济的市场开放度，市政农村地区。

Abstract. *The current practice of organizing and managing the efficiency of the agricultural economy in rural areas requires new approaches to establishing the relationship between the two local areas, which can be determined by the possibilities of using modern mathematical tools. This article defines the basic determinants of the development of rural territorial entities, and clarifies the concepts of each determinant. The quality of using mathematical tools is determined by the quality of the theoretical justification for evaluating the effectiveness of institutional, infrastructure aspects, and the impact of price, innovation, and investment factors. Integrative correlation will allow you to define and specify solutions at all levels of the organization of power and management.*

Key words: *determinants, concept, infrastructure, openness of market openness of the economy, rural areas of the municipality.*

In the modern system of organization and management of socio-economic development of territories, an indicative system for assessing the level of development of the agricultural economy and its relationship to the development of rural territories in the conditions and consequences is increasingly being used. Indicative method of assessing economic development and rural territories provided for in legislative acts of the Russian Federation (RF Government Resolution from May 31, 2019. N 696 "about the approval of the state program of the Russian Federation "Complex development of rural territories" and about modification of some acts of the Government of the Russian Federation").

An indicative assessment of the relationship between the efficiency of the agricultural economy and the development of rural areas is most relevant for industrial-oriented regions, which include the object of research in Perm region.

Integrative correlation of the assessment is an assessment of the penetrating relationship between the agricultural economy of the Perm region and the development performance of individual municipalities of the Perm region.

Using the" body " of integrative correlation, we consider the formation and implementation of conditions for improving the quality of life of the population. That is why integrative correlation can be considered as an active tool for implementing the goals of the state program - “Concept of Territorial Development”.

Goals of the state program:

• Maintaining the share of the rural population in the total population of the Russian Federation at least 25.3 percent in 2025.

(in 2017 (base year) - 25.7 percent);

• Achieving the ratio of the average monthly available resources of rural and urban households to 80 percent in 2025

(in 2017 (base year) – 67 percent);

• Increasing the share of the total area of comfortable residential premises in rural localities to 50 percent in 2025.

(in 2017 (base year) - 32.6 percent).

The basic principles of factor analysis methodology, economic and statistical analysis, and time series theory were used in the development of integrative correlation of the Perm region. The study identified the Determinants of rural development as:

- determinant of institutional development,
- infrastructure opportunities in the region,
- market size
- the openness of the economy.

Features of rural areas that reflect the development of rural areas:

These determinants are determined on the basis of a monographic review of the

economic-management and economic-statistical literature. In our opinion, these determinants characterize the possibilities of resource, investment, information, financial and innovative elements of the organizational and economic potential of individual municipalities and the Perm region as a whole.

The complex interaction of these factors (determinants) allows us to determine the level of implementation of key functions of any municipality, to provide a reliable assessment of the level of economic growth of the territory in the context of the mechanism for making management decisions of a specific rural territory. Using the basic principles of economic theory and econometric statistics, we consider the determinants of territorial entities from the positions of institutional, social, infrastructure, and other approaches. The integrative correlation algorithm allows and requires determining the main development vectors for the given determinants: the determinant of the effectiveness of political institutions; the determinant of the effectiveness of economic institutions; the determinant of the effectiveness of social institutions; production infrastructure; social infrastructure; environmental infrastructure; management infrastructure. prices; territory; innovations; investments).

The deterministic approach involves moving from large systems to smaller ones.

The principles of N. Taleb's subtractive knowledge were used to specify the indicators. The essence of this principle is that we save only important representative statistical data and do not use institutional data with fuzzy indicators, on this basis, a new indicator – a determinant of institutional development-is constructed.

When forming the determinant of institutional development, it is necessary to use the classification of institutions. This typology of social, political and economic institutions is given in the Constitution of the Russian Federation. The formation of the determinant of institutional development in the study is carried out in the following directions [1].

Defining the dual characteristics of institutions, we employ firstly, restrictions, and secondly, incentives. In General, it is possible to determine the analytical capabilities of this determinant, but it is necessary to take into account the synchronicity and asynchrony of interactions between constraints and incentives, which allows us to determine the overall structure of the determinant of institutional development.

The determinant of institutional development must take into account in turn two types of indicators - “the determinant of freedom, the determinant of stability”, each of which assumes the presence of certain concepts.

In the great Soviet encyclopedia, the infrastructure of the territory(region) is represented by two elements: production and non-production (social). The first element will include infrastructure sectors that serve material production (Rail-

ways, water supply, electrification, etc.). The second element is industries that are indirectly related to the production process (training, various levels of education, health care, etc.) [2].

Research on infrastructural development of territories and industries has expanded the concept of "infrastructural support" and "infrastructural" conditions.

When considering agricultural production, depending on the function performed, the infrastructure is divided into production, social, and environmental. To assess the level of organization and management effectiveness from our point of view, it is advisable to allocate an independent component – the "infrastructure" of management.

Each of these elements has its own concepts.

The next determinant to consider is the determinant of determining the size of the market. Knowing the size of the market provides the authorities and management with an objective assessment of the market situation, allows them to determine opportunities for the development of rural areas, establish a rating of competitive opportunities of the territory, choose the main directions of development of agricultural sectors of the territory, production volumes, and a plan for the production development of the territory.

To determine the size of the market, the study introduced the following parameters: prices for agricultural products, resource characteristics of the territory, innovative component, and investment support. According to the authors, the results of the monographic review of market size estimation methods have not been developed for universal market size estimation methods.

The investment climate of the studied market in the study is limited by the analysis of the structure of funding sources (the Total amount of financial support for the State program is 2,288. 0 billion rubles, including at the expense of funds:

- federal budget – 1 061.1 billion rubles
- budgets of subjects of the Russian Federation – 174.0 billion rubles
- extra-budgetary sources – 1052.9 billion rubles

It is planned to spend 79.2 billion rubles from the Federal budget for 2020.) investments from various sources of financing should be considered in detail.

To determine the level of intensification of agricultural production, it is necessary to study innovative technologies.

Basic concepts are defined for each size determinant.

To solve the problems of food security of the population of Russia it is necessary to have the information phase of the regional markets in the context of individual types of agricultural products, develop the market model of differentiated products for the formation of medium and long term forecasts to establish and justify recommendations for regulation of agricultural products. Tools for solving this problem can be models and methodological approaches to forecasting agro-

food markets, as well as the results of analysis of the world and Russian markets for calculating development trends.

Forecasts of development and market capacity will allow management bodies to form plans and measures for agar policy in General and in the context of problematic sectors of the Russian agro-food market. The calculation of the determinant of economic openness provides for the identification of the most important market segments, the definition of methods and models for forecasting agro-food markets, calculations of the degree of economic openness in order to form a model of partial equilibrium of the food sector in a particular territory and a model of the General equilibrium of food supply in the region and Russia as a whole. This conceptual approach will require forecasting production, imports, and demand for domestic products, taking into account statistical data on production, the impact of seasonal factors, and changes in producer and consumer prices. The database includes concepts: export coefficient, import coefficient, commodity exchange coefficient, gross product growth rate, employment level, state of individual industries, and the size of monetary and financial reserves.

Thus, methodological generalization of the approach to the aggregated indicator of the development site with four determinants (the determinants of institutional development, infrastructural capacity of the site, the openness of the economy and the size of the market) objectively requires the use of mathematical tools of data processing that is most relevant in the context of national project "digital economy" in agriculture. Later, we calculate concepts and determinants.

$$Dp = \sqrt[4]{Dp_{1,st} Dp_{2,st} Dp_{1,sv} Dp_{2sv}} \quad (1)$$

$$De = \sqrt[3]{De_{1,st} De_{1,sv} De_{2sv}} \quad (2)$$

$$Ds = \sqrt[5]{Ds_{1,st} Ds_{2,st} Ds_{3,st} Ds_{1,sv} Ds_{2sv}} \quad (3)$$

$$D_1 = \sqrt[3]{Dp\ De\ Ds} \quad (4),$$

where,

D1 is a determinant of institutional development for the region,
Di is the determinant of the i-th of the Institute,
Dij, k is the determinant of the i-th Institute,
j is the number in order, and
k is the coefficient of stability or freedom.

Similarly, we calculate the determinants of the infrastructure capabilities of the region (territory) D2, the openness of the economy D3, and the size of the market D4.

At the last stage of assessing the current situation, we calculate the aggregated indicator of the territory.

$D = \sqrt[4]{D_1 D_2 D_3 D_4}$

Next, we evaluate the forecast values of territories using a similar method and get the values of aggregated indicators taking into account the forecast.

Further, we can offer management solutions for a specific territory based on the received data.

References

1. The Constitution of the Russian Federation (adopted by popular vote 12.12.1993) (as amended, amended Laws of the Russian Federation on amendments to the Constitution of the Russian Federation from 30.12.2008 № 6-FKZ, from 30.12.2008 № 7-FKZ, from 05.02.2014 No. 2-FKZ, from 21.07.2014 No. 11-FCL) // collected legislation of the Russian Federation. - 04.08.2014. - No. 31. - article 4398; Official Internet portal of legal information - http://pravo.gov.ru/ - 2014. - July 21.

2. Great Soviet encyclopedia], edited by O. Y. Schmidt. - Moscow: Soviet Encyclopedia, 1992. – 921 c.

3. Semin A. N., bukhtiyarova T. I., Nemykina Yu. S., ORGANIZATIONAL and ECONOMIC POTENTIAL of RURAL TERRITORIES: an INDICATIVE APPROACH to MANAGEMENT., AGRARIAN BULLETIN OF THE URALS, NO. 9

4. Bukhtiyarova T. I., Demyanov D. G., Nemykina Yu. S., MECHANISM of FUNCTIONING AND development OF the potential OF agriculture in the PERM REGION., RUSSIAN AGRICULTURAL ECONOMICS, NO. 9

确定优先投资方向以刺激俄罗斯经济部门发展的理由

JUSTIFICATION OF PRIORITY INVESTMENT DIRECTIONS TO STIMULATE SECTORAL DEVELOPMENT OF THE RUSSIAN ECONOMY

Gertsekovich David Artashevich
Candidate of Technical Sciences, Associate Professor
Irkutsk State University, Irkutsk, Russia
Podlinyaev Oleg Leonidovich
Doctor of Pedagogic Sciences, Full Professor
Irkutsk State University, Irkutsk, Russia
Larin Sergey Nikolaevich
Candidate of Technical Sciences, Lead Research Officer
Central Economics and Mathematics Institute,
Russian Academy of Sciences
Moscow, Russia

抽象。 该文章证实了与俄罗斯经济部门结构的发展有关的最有吸引力的投资促进领域。 选择的基础是资产组合分析的基本规定，以及基于2000–2006年期间统计数据构建的模型“利润率风险”。 根据2008–2009年期间的统计数据进行的测试表明，该工具包具有实用性，可以使用所表达的模型简单性来选择与行业发展相关的最有希望的投资刺激领域。 未来根据2010–2016年期间的统计数据综合的模型显示出所进行投资的有效性下降，这必然会导致这种情况。

关键词：行业发展，盈利能力，风险，“盈利风险”模型，投资吸引力评估，投资组合分析。

Abstract. *The article substantiates the most attractive areas of investment promotion in relation to the development of the sectoral structure of the Russian economy. The basis for the selection was the fundamental provisions of the portfolio analysis, as well as the constructed model "Profitability-Risk" based on statistical data for the period of 2000-2006. Its testing on the basis of statistical data for the period of 2008-2009 showed the practical suitability of this toolkit for choosing the most promising areas of investment stimulation in relation to industry development with the expressed simplicity of the model used. The model synthesized in the future on the basis of statistical data for the period 2010-2016 showed a decrease in the effectiveness of investments made, which entailed.*

Keywords: *industry development, profitability, risk, "Profitability-risk" model, investment attractiveness assessment, portfolio analysis.*

Introduction

Under the conditions of sanctions restrictions, the sectoral development of the Russian economy is largely determined by a reasonable choice of priority areas for stimulating investment and the optimal distribution of limited financial resources. Since sanctions restrictions have affected almost all sectors of the Russian economy, the issues of choosing promising areas for investment in the development of certain industries are becoming highly relevant. In addition, as the main criterion for resolving issues of stimulating industry development through additional investments, it should be getting the maximum profit at the lowest possible risk.

Purpose of the study

The aim of this work is to determine the most promising sectors of the Russian economy by the ratio of profitability/risk for additional investments in their development. The selection of industries that meet this criterion was carried out on the basis of the profitability-risk model, which was developed taking into account the key provisions of the portfolio theory ("Markovitsa" model [1, 4, 6, 7, 8, etc.]), as well as statistical data on investments in fixed assets by sectors of the Russian economy for the periods from 2000 to 2006 and from 2011 to 2016 [5].

Materials and research methods

The analysis was carried out in twenty-three sectors (see table. 1), four of which are leading: agriculture, hunting and forestry; fishing and fish farming; mining; manufacturing industries. The listed industries, in turn, are structured into sub-sectors, which were also analyzed in this article. The selection of priority areas of industry development for the subsequent stimulation of investments was carried out according to the level of expected profitability, the amount of risk and the ratio of profitability to risk. Table 1 presents the expected profitability, risk and their ratio, calculated according to statistical data for 2000-2006.

Table 1

Expected profitability, risk and their ratio by industry for the period 2000-2006

№	Fixed capital investment by industry	Profitability (%)	Risk (%)	Profitability/ risk ratio
1	**2**	**3**	**4**	**5**
1	Agriculture, hunting and forestry	37,88	23,17	1,64
2	Fisheries and fish farming	15,12	25,02	0,60
3	Mining	22,71	13,4	1,70
3.1	Fuel and energy mining	22,54	14,66	1,54
3.2	Mining, except fuel and energy	25,92	13,67	1,90
4	Manufacturing	25,06	7,045	3,56

Table 1 continuation

№	Fixed capital investment by industry	Profitability (%)	Risk (%)	Profitability/ risk ratio
1	**2**	**3**	**4**	**5**
4.1	Manufacture of food products, including beverages, and tobacco	19,67	7,285	2,70
4.2	Textile and clothing	15,16	25,84	0,59
4.3	Production of leather, leather products and footwear	52,14	33,6	1,55
4.4	Wood processing and woodworking	16,52	27,79	0,59
4.5	Pulp and paper industry; publishing and printing activities	32,91	14,47	2,28
4.5.1	Production of pulp, wood pulp, paper, cardboard and products from them	19,74	15,9	1,24
4.5.2	Publishing and printing, replication of recorded media	35,42	17,26	2,05
4.6	Production of coke and petroleum products	21,08	10,94	1,93
4.7	Chemical production	31,45	17,85	1,76
4.8	Manufacture of rubber and plastic products	26,95	26,07	1,03
4.9	Manufacture of other non-metallic mineral products	36,5	25,86	1,41
4.10	Metallurgical and fabricated metal products	31,69	21,1	1,50
4.10.1	Metallurgical production	31,69	21,1	1,50
4.10.2	Manufacture of fabricated metal products	32,22	22,22	1,45
4.11	Manufacture of machinery and equipment	30,72	39,1	0,79
4.12	Manufacture of electrical equipment, electronic and optical equipment	34,1	26,86	1,27
4.13	Production of vehicles and equipment	21,26	11,06	1,92

The highest profitability for the analyzed period was shown by the industry "Agriculture, hunting and forestry". It is 37.88% (see table. 1). The lowest profitability is accounted for by the industry "Fisheries and fish farming", which is 15.12%. The maximum risk, namely 27.79%, goes to the industry "Wood processing and the manufacture of wood products", the minimum risk was shown by the industry "Manufacturing", which accounts for only 7.05%. The highest value in terms of the ratio of profitability to risk is demonstrated by "Manufacturing" (3.56%), and the smallest by "Textile and Sewing" and "Wood processing and woodworking" (0.59%).

Out of twenty-three analyzed sectors, only four (“Fisheries and fish farming”, “Textile and clothing production”, “Wood processing and woodworking” and “Production of machinery and equipment”) have a profitability-risk ratio of less than one. Thus, the indicated industries by this criterion can certainly be attributed to outsiders.

The approach is based on the basic principles of the portfolio theory of G. Markowitz (1952) [3]. The analysis of various industries according to the ratio “Profitability/Risk” was carried out in several stages:

1) using MS EXCEL, a scatter plot was constructed (see Fig. 1), where the risk is plotted on the abscissa axis - standard deviation, and the average expected return on the ordinate axis;

2) then those industries were excluded in which the yield in the period under review turned out to be negative or close to zero;

3) further, on the basis of the obtained intermediate results, sectors of the economy were analyzed in pairs for the following conditions:

a) identifying industries with approximately the same profitability, but significant differences in risk (excluding industries whose assessment of the expected risk was greater);

b) there were identifications of industries with approximately the same risks, but with different returns (the sectors with the lowest returns were excluded in accordance with the basics of portfolio theory).

Figure 1 presents a scatter chart where the risk value is plotted on the abscissa axis, and the expected profitability on the corresponding line of economic activity is plotted on the ordinate axis.

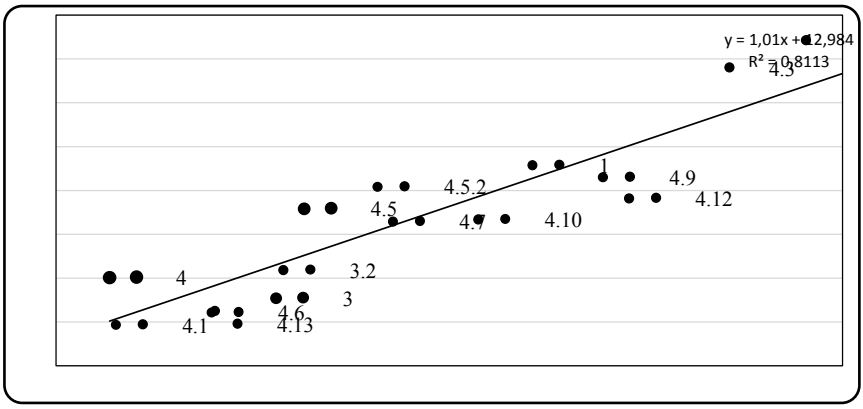


Fig. 1. *The diagram "Profitability-risk" according to 2000-2006.*

Note: industry numbers correspond to the data in table 3.

Based on the analysis performed on the basis of the "Profitability-Risk" model, the leading sectors include: manufacturing; food production, including drinks, and tobacco; production of coke and petroleum products; production of vehicles and equipment; mining; mining, except fuel and energy; pulp and paper production; publishing and printing activities; publishing and printing activities, replication of recorded media; chemical production; metallurgical production and production of finished metal products; agriculture, hunting and forestry; production of other non-metallic mineral products; manufacture of electrical equipment, electronic and optical equipment; manufacture of leather, leather products and footwear.

Results and discussion

In terms of the expected risk, the industry "Production of leather, leather products and footwear" has the highest values with the highest estimates of expected profitability, i.e. it is most consistent with the expectations of risk-averse investors. Using MS EXCEL, the "Data Analysis" add-in, the "Regression menu", the "Profitability-Risk" model was synthesized:

$$Dx = 1{,}01Rs + 12{,}98;\ R^2 = 0{,}81 \quad (1).$$

Here Dx – average expected profitability (%), Rs – risk level (%), R^2 – determination coefficient. The value of the determination coefficient and the empirical coefficients of the "Profitability-Risk" model, reliable at a 95% level, testify to its practical suitability.

The results of the verification of the "Profitability-Risk" model based on the statistical data of 2008-2009 are presented in Table 2.

Table 2

Verification results of the "Profitability-Risk" model for the period 2008-2009

Industry Number	2006	2008	2009	Gain (%) in 2008 to 2006	Gain (%) in 2009 to 2006
1	223,4	399,7	325,2	78,92	45,57
3	700,3	1174	1112	67,60	58,76
3.2	63,4	106,4	88	67,82	38,80
4	721,9	1136	1298	57,32	79,75
4.1	127,8	194	157,1	51,80	22,93
4.3	2,2	2,3	1,6	4,55	-27,27
4.5	32,7	50,7	33,9	55,05	3,67
4.5.2	13,0	14,2	8,30	9,23	-36,15
4.6	66,6	121	171	81,68	156,76
4.7	78,2	135,6	105,9	73,40	35,42
4.9	47,1	150,9	113	220,38	139,92
4.10	174,8	290,1	241,8	65,96	38,33

Table 2 continuation

Industry Number	2006	2008	2009	Gain (%) in 2008 to 2006	Gain (%) in 2009 to 2006
4.12	21,5	40,8	33,5	89,77	55,81
4.13	41	97,8	92,2	138,54	124,88
Total gain (%)				1 062,01	737,16
Gain (%) (per industry)				141,60	98,29

The results obtained suggest that the proposed approach is quite suitable for determining the most promising sectors of the Russian economy in terms of profitability/risk and additional investments in their development. The average growth per industry in 2008 compared to 2006 was 141.6%, and in 2009 98.3%. The decline in performance in 2009 was due to the impact of the 2008-2010 crisis (falling oil prices, collapse of world stock markets, etc.).

The positive results of the verification of the model contributed to the fact that work in this direction was continued. Specifically, according to data for the period from 2010 to 2016, an updated "Profitability-Risk" model was built (see Table 3).

Table 3

Expected profitability, risk and their ratio by industry for the period of 2010-2016

№	Fixed capital investment by industry	Profitability (%)	Risk (%)	Profitability/risk ratio
1	**2**	**3**	**4**	**5**
1	Agriculture, hunting and forestry	13,48	18,33	0,74
2	Fisheries and fish farming	22,18	23,65	0,94
3	Mining	14,54	6,63	2,19
3.1	Fuel and energy mining	14,64	5,62	2,61
3.2	Mining, except fuel and energy	14,36	21,62	0,66
4	Manufacturing	10,14	8,44	1,20
4.1	Manufacturing of food products, including beverages, and tobacco	5,65	6,97	0,81
4.2	Textile and clothing	1,29	29,94	0,04
4.3	Production of leather, leather products and footwear	2,40	34,38	0,07
4.4	Wood processing and woodworking	17,33	35,54	0,49

Table 3 continuation

№	Fixed capital investment by industry	Profitability (%)	Risk (%)	Profitability/risk ratio
1	**2**	**3**	**4**	**5**
4.5	Pulp and paper industry; publishing and printing activities	8,85	16,5	0,54
4.5.1	Production of pulp, wood pulp, paper, cardboard and products from it	9,39	18,92	0,50
4.5.2	Publishing and printing, replication of recorded media	10,63	28,6	0,37
4.6	Production of coke and petroleum products	12,6	23,56	0,54
4.7	Chemical production	24,64	13,4	1,84
4.8	Manufacture of rubber and plastic products	8,15	18,68	0,44
4.10	Metallurgical and fabricated metal products	8,13	9,48	0,86
4.10.1	Metallurgical production	8,06	11,13	0,72
4.10.2	Manufacture of fabricated metal products	9,29	8,65	1,07
4.11	Manufacture of machinery and equipment	8,9	14,17	0,63
4.12	Manufacture of electrical equipment, electronic and optical equipment	17,14	18,06	0,95
4.13	Production of vehicles and equipment	13,34	15,39	0,87

The highest profitability for the period from 2010-2016 is shown by the "Chemical Production" industry (24.64%) (see Table 3). At the same time, the "Textile and clothing" industry (1.29%) accounted for the lowest profitability. The maximum risk, namely 35.54%, goes to the industry "Wood processing and woodworking", the minimum risk is demonstrated by the industry "Extraction of fuel and energy minerals", which shows only 5.62%. This industry in terms of profitability to risk showed the highest results (2.61%), while the worst result (0.04%) was shown in the "Textile and Sewing Production" sector.

Figure 2 presents a scatter plot based on data in table 3.

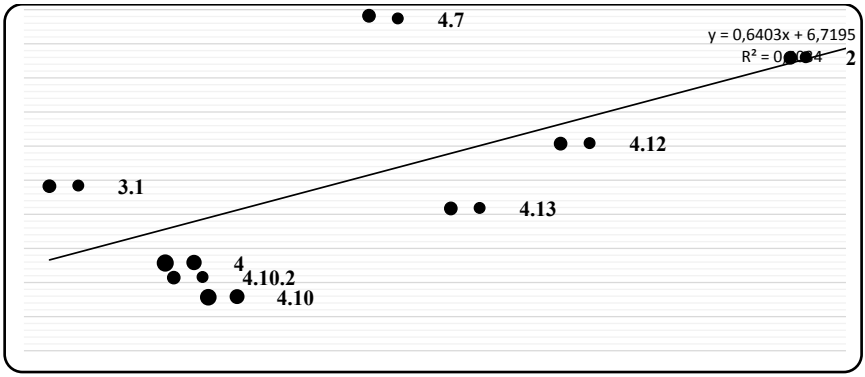


Fig. 2. *The "Profitability-risk" diagram based on data for 2010-2016.*
Note: industry numbers correspond to the data in table 3.

The leading industries according to the results of processing statistical data in 2010-2016 include: fuel and energy mining; manufacturing industries; manufacture of finished metal products; metallurgical production and production of finished metal products; production of vehicles and equipment; manufacture of electrical equipment, electronic and optical equipment; chemical production; fishing and fish farming.

The model "Profitability-risk" based on data for 2010-2016 has the form:

$Dx = 0{,}64Rs + 6{,}72;\ R^2 = 0{,}40$ (2).

Conclusion

The "Profitability-Risk" model, built on the basis of 2010-2016 statistics, has a significantly lower determination coefficient. This, according to the authors, is primarily due to the fact that among the leading industries found on the basis of 2010-2016 statistics there is a pronounced leader [2] - the "Chemical Production" industry. Moreover, this industry has maintained a practically unchanged ratio of profitability to risk for the periods 2000-2006 and 2010-2016, while other industries in the time period of 2010-2016 showed significantly lower results in relation to profitability at risk for the period of 2000-2006 (see. tab. 1, 3). Of course, the revealed decrease in the effectiveness of economic activity in almost all sectors is associated, on the one hand, with the consequences of the economic crisis of 2009, and on the other hand, with the negative impact of sanctions restrictions. The same conclusion is also due to a decrease in the angle of inclination in the "Profitability-Risk" model, which is based on statistical data for the period of 2010-2016.

Thanks

This article was prepared with the financial support of the Russian Foundation for Basic Research, project № 18-010-00079a "Prediction of development strategies for business entities of the Russian economy under the conditions of sanctions restrictions."

References

1. Burenin A.N. Securities and derivatives market. - M.: 1 Federal Book Trade Company. 1998. – 352 P.

2. Gertsekovich D.A. Quantitative methods for analyzing financial markets. - Irkutsk: ISU Publishing House. 2008. – 335 P.

3. Gertsekovich D.A. The choice of priority areas for investing in the stock markets according to the profitability-risk model. // Economics and entrepreneurship. 2018. № 9 (98). Issue 12. P. 673-680.

4. Damodoran A. Investment Valuation: Tools and Methods for Valuing Any Assets. M.: Alpina, 2007. – 1340 P.

5. Investments in Russia. 2017: Stat. coll. / Rosstat. - M.; 2017. – 188 P.

6. Fabozzi F.J. Investment management. - M.: INFRA-M, 2000. – 932 P.

7. Sharp W., Alexander G., Bailey J. Investments. - M.: INFRA-M, 2016. – 1040 P.

8. Markovitz H.M. Portfolio selection. // J. of Finance. 1952. V. 7, № 1. P. 77-91.

在区域层面上实施俄罗斯经济农业发展战略的结构优化
STRUCTURAL OPTIMIZATION OF THE IMPLEMENTATION OF THE STRATEGY FOR AGRICULTURAL DEVELOPMENT OF THE RUSSIAN ECONOMY AT THE REGIONAL LEVEL

Podlinyaev Oleg Leonidovich
Doctor of Pedagogic Sciences, Full Professor
Irkutsk State University, Irkutsk, Russia
Gertsekovich David Artashevich
Candidate of Technical Sciences, Associate Professor
Irkutsk State University, Irkutsk, Russia
Larin Sergey Nikolaevich
Candidate of Technical Sciences, Lead Research Officer
Central Economics and Mathematics Institute,
Russian Academy of Sciences
Moscow, Russia

抽象。 本文提出了在俄罗斯联邦地区范围内优化实施农业发展战略的结构的新方法。 这项研究的主要目的与选择最佳作物种植区域有关。 为了实现这一目标，建议使用“风险风险”模型工具，该工具是在投资组合分析的基本原则基础上形成的。 该模型的一个显着特征是其简单性和多功能性。 它的应用不需要特殊的培训，并且该模型本身适用于任何市场。 该模型的实用价值已通过具体的区域性建议和关于最佳作物种植的建议得到证实。

关键词：农业，区域，农作物，获利能力，风险，“获利风险”模型，投资组合分析。

Abstract. *The article proposes new approaches to the structural optimization of the implementation of the agricultural development strategy in the context of the regions of the Russian Federation. The main objective of the study is related to the choice of regions for the optimal cultivation of individual crops. To achieve this, it was proposed to use the “Profitability-Risk” model tools, which was formed on the basis of the basic principles of portfolio analysis. A distinctive feature of the model is its simplicity and versatility. Its application does not require special training, and the model itself is applicable to any markets. The practical value of the model is confirmed by specific regional recommendations and recommendations on the optimal cultivation of individual crops.*

Keywords: *agriculture, region, crops, profitability, risk, model "Profitability-risk", portfolio analysis.*

Introduction

Under the conditions of sanctions, Russian producers of agricultural products were able to, not only significantly increase production, but also significantly replace imported products with domestic products. It is no coincidence that today agriculture is one of the sectors most attractive for investment. However, the basis for investing is the optimal use of financial resources. In other words, only an industry that is capable of returning them to the investor with an additional profit in a short time can attract additional investments. To solve this problem in relation to Russian agriculture, it is necessary to create the most profitable investment portfolio, which will provide for such an investment so that in each region those crops are cultivated, the yield of which in this region will be maximum. Therefore, of particular importance in the implementation of agricultural development strategies are methods of forming investment decision-making systems [2, 3, 4, 5].

Purpose of the study

The purpose of the work is to share ideas that form the basis of modern portfolio theory and are formulated by many authors [1, 6, 8, 9, 10], with data on crop yields in various regions of the Russian Federation [7]. Its achievement will determine:

1) regions showing the best ratio of profitability and risk for key crops for them;

2) specific crops for the region in which investment should be made in order to maximize expected income with an optimal level of risk.

Materials and methods

The article used statistical data on crop yields in different regions of the Russian Federation for 2010-2017 with a time interval of one year [7].

The proposed approach is based on the basic provisions of G. Markowitz's portfolio torii [10]. A quantitative analysis of the yield dynamics of various crops [2, 3, 4, 5] according to the "profitability-risk" model was carried out in several stages:

1) using MS EXCEL, a scatter plot was constructed where the risk is plotted on the abscissa axis (standard deviation), and the average expected profitability on yield is plotted on the ordinate axis;

2) then regions with no data on profitability are excluded, as well as if their profitability in the period under review turned out to be negative or close to zero;

3) based on the results obtained, the regions are divided in pairs taking into account the following conditions:

- the profitability and yield of key crops was approximately the same, but the risks had significant differences (excluding the region, where the assessment of the expected risk was greater);

b) the risks were approximately at the same level, and the profitability and yield of crops varied (the region with the lowest profitability and yield was excluded, in accordance with the provisions of portfolio theory).

Results and discussion

1. *Cereals and legumes.* In the period under review, Tatarstan showed the maximum yield (28.65), and the minimum (-2.73) - Buryatia. The maximum risk (89.24) - Kamchatka Krai, and the minimum (6.44) - Dagestan. The maximum ratio of profitability to risk (1.58) – the Bryansk Oblast, and the minimum (-0.14) - the Republic of Buryatia. Note that for the Bryansk and Ryazan Oblasts, the Republic of Crimea and Primorsky Krai, the ratio of profitability to risk is more than one. After conducting a consistent analysis of profitability, risk and excluding regions that are "outsiders" according to the accepted criteria, the following diagram was obtained, presented in Figure 1.

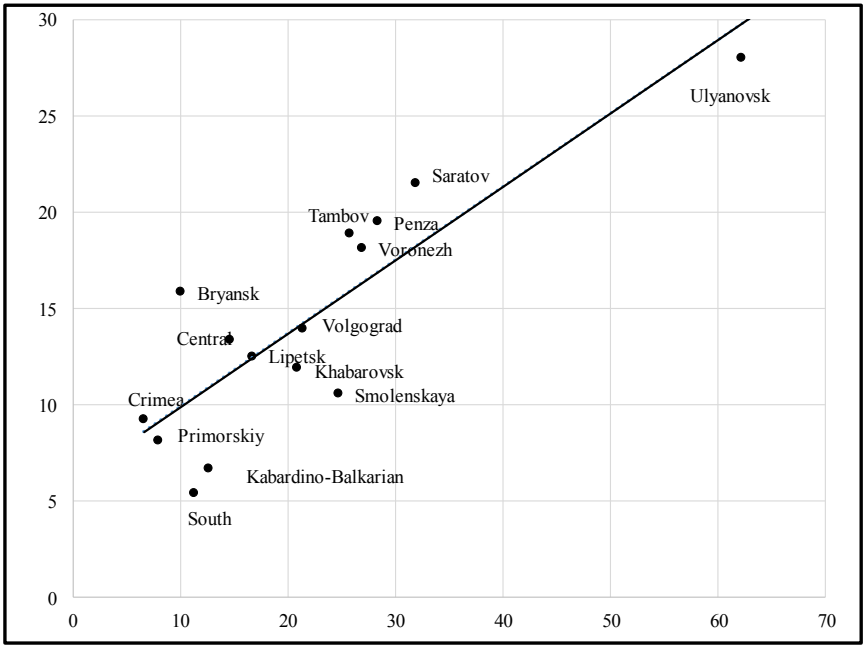


Fig. 1. *Leading regions for grain and leguminous crops*

The analysis conducted on grain and leguminous crops showed the following:

- for investors inclined to risk, the Ulyanovsk Oblast is the most attractive;

- we can conditionally distinguish two subgroups of regions with an average profitability-risk ratio:

1) Saratov, Penza, Tambov and Voronezh Oblasts (risk in the range from 26% to 32%);

2) Bryansk, Volgograd, Lipetsk, Smolensk Oblasts, Khabarovsk Krai and the Central Federal District as a whole (risk in the range from 10% to 25%).

– other regions (Crimea, Southern Federal District, Primorsky Krai and Kabardino-Balkaria) are priority for reasonable investors avoiding risk [9], while the Bryansk Oblast should be highlighted in terms of the ratio of profitability to risk (1.58).

Then, using MS EXCEL, the "Data Analysis" add-in, the Regression menu based on the expected profitability and risk level for the group of leading regions of the Russian Federation, the "Profitability-Risk" model for grain and leguminous crops was synthesized:

$$Dx = 0{,}38Rs + 6{,}07;\ R^2 = 0{,}73 \quad (1).$$

Here Dx – average expected profitability (%), Rs – risk level (%), R^2 – coefficient of determination. The found angle of inclination of the "Profit-Risk" model allows:

a) identifying the value of the ratio of profitability to risk for a group of leading regions for each crop;

b) conducting a comparative analysis of the synthesized ratios among all crops considered in this article;

c) quantifying the effectiveness of investments in growing a specific crop.

The synthesized model (1) has a coefficient of determination that is acceptable for practice, the obtained empirical coefficients are 95% higher than the corresponding standard errors and, therefore, can be used for the optimal distribution of financial resources in order to obtain maximum profitability with reasonable values of acceptable risk.

2. *Potatoes*. Penza Oblast showed the maximum value both in potato yield (55.3) and in risk degree (140.83), the Yamalo-Nenets Autonomous Okrug showed the minimum value in yield (-5.68), and the lowest risk (0.77) - the city of Sevastopol. The maximum in relation to profitability to risk (1.53) is demonstrated by the Astrakhan Oblast, and the minimum (-1.41) - by the Republic of Crimea. From the general list we distinguish: Pskov, Astrakhan and Volgograd Oblast, Krasnodar Krai and the Southern Federal District. These regions in the considered time interval showed the ratio of profitability to risk more than one.

Next, a scatter plot was constructed that allows one to identify both "leaders" and "outsiders" among the considered regions. For this purpose, regions with a

negative yield increase were excluded from the general list of regions. Regions with the same profitability but with a higher degree of risk were also excluded. The final diagram is shown in Figure 2.

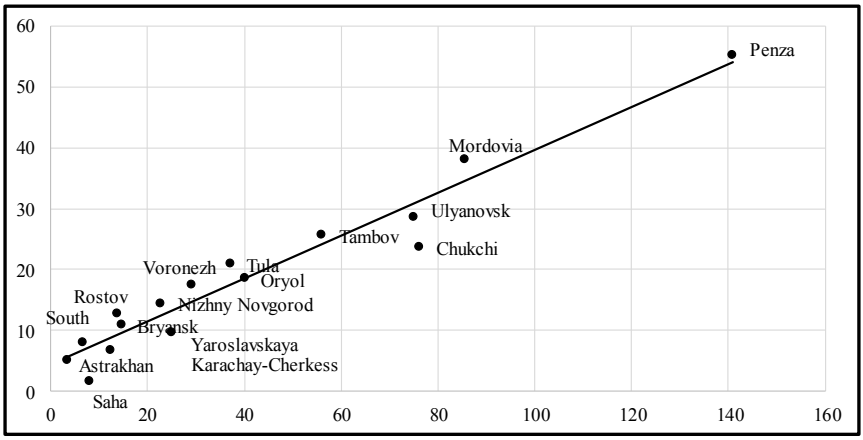


Fig. 2. *Leading regions for potato yields*

As a result, regions were identified that are of interest to investors avoiding risk or with a neutral attitude towards it. At the same time, the Southern Federal District and the Astrakhan Region showed a ratio of profitability to risk of more than one and, therefore, are the most attractive of the above regions for growing potatoes.

The synthesized profitability-risk model for potatoes has the form:

$Dx = 0{,}36Rs + 3{,}16;\ R^2 = 0{,}92$ (2).

3. *Vegetables*. The maximum value of profitability on vegetable yield (100.22) is observed in the Chukotka Autonomous Okrug, and the minimum (-5.86) in Moscow. The maximum value in terms of risk level (233.04) is also in the Chukotka Autonomous Okrug, the minimum (2.29) is in the Republic of Buryatia. The highest value in relation to profitability to risk (1.52) is observed in the North Caucasus Federal Okrug, and the minimum (-0.74) in Sevastopol.

Regions with a negative increase in productivity were excluded from the general list. Among pairs of regions with the same degree of risk, a number of regions with lower profitability were excluded. Further, regions were excluded that, with relatively equal returns (in pairwise comparisons), had a higher degree of risk. The final view of the scatter chart, taking into account all of the listed exceptions, is presented in Figure 3.

The synthesized "Profit-Risk" model for vegetables has the form:

$Dx = 0{,}42Rs + 1{,}49.\ R^2 = 0{,}98$ (3).

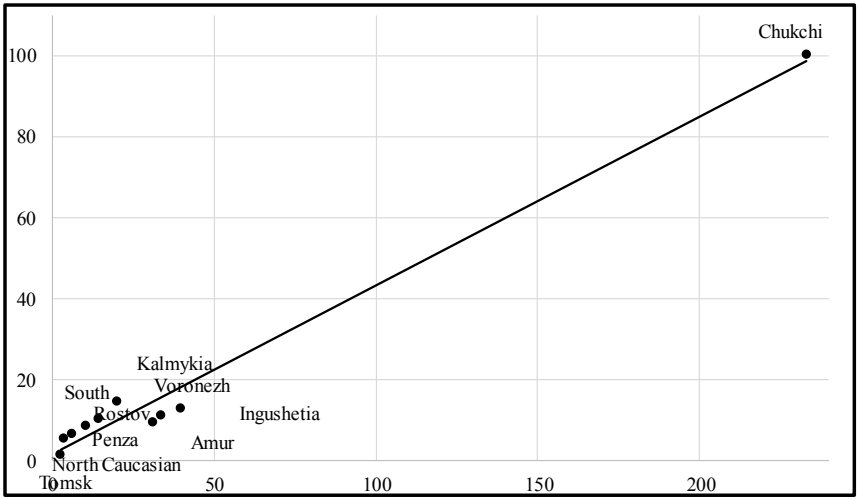


Fig. 3. *Leading regions for vegetable productivity.*

Obviously, the regions: Tomsk, Penza, Amur, Rostov and Voronezh Oblasts, the Southern and North Caucasian federal districts, the republics of Ingushetia and Kalmykia are more suitable for investors avoiding risk.

4. *Sunflower.* The maximum value for both risk (103.14) and the yield of sunflower (42.88) was shown by Krasnoyarsk Krai, and the minimum value at risk (4.71) was shown in the Udmurt Republic, the lowest profitability (-49.39) was shown in Kaluga Oblast. The maximum in relation to profitability to risk (5.66) is also shown by the Udmurt Republic, and the minimum (-1.33) - by Kaluga Oblast.

Based on these data, a scatter plot was constructed identifying the leading regions in terms of sunflower yield. Further, during the analysis, Kaluga Oblast, the republics of Crimea and Altai, Transbaikal and Primorsky Krai were excluded, since these regions showed a negative increase in productivity. Excluded regions with the same profitability, but with a higher degree of risk and regions with the same degree of risk, but with lower profitability. The final view of the diagram is presented in Figure 4. The synthesized model "Profit-Risk" for sunflower has the form:

$$Dx = 0{,}33Rs + 7{,}99.\ R^2 = 0{,}65 \quad (4).$$

Among regions that are attractive to investors who avoid risk, one should give preference to Udmurtia, since in this region the ratio of profitability to risk is more than one.

5. *Sugar beet.* The maximum value for sugar beet yield (47.07) was demonstrated by the Samara Oblast, and the minimum value (0.63) was demonstrated by

the Karachay-Cherkess Republic. The highest risk value (130.41) was shown by Samara Oblast, and the lowest risk (7.76) - by Bryansk Oblast. The maximum in relation to profitability to risk (1.95) is demonstrated by the Bryansk Oblast, and the minimum (0.03) - by the Karachay-Cherkess Republic. Based on these data, a scatter plot was constructed for sugar beet yields.

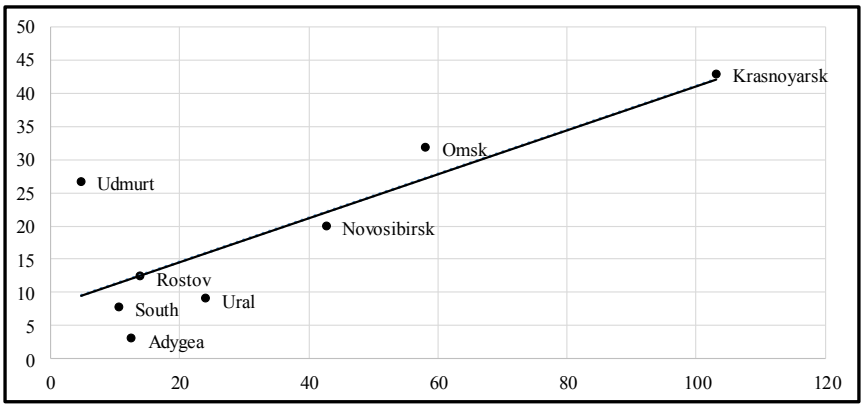


Fig. 4. *Leading regions for sunflower yield*

Subsequently, during the analysis, regions with almost the same profitability, but with a higher degree of risk and regions with the same degree of risk, but lower profitability were excluded. We omitted the final view of the diagram for sugar beets due to the limited volume of the article. The synthesized "Profitability-risk" model for sugar beets has the form:

$Dx = 0{,}31Rs + 5{,}35;\ R^2 = 0{,}89$ (5).

The results of a comparative assessment of the considered crops using the generalized model "Profitability-Risk" are presented in Figure 5.

The synthesized model "Profitability-Risk" has the form:

$Ds(av) = 0{,}0012Rs(av) + 0{,}27;\ R^2 = 0{,}71$ (6).

As follows from the model, with relatively similar performance for different crops (the angle of inclination is close to zero), their respective risks vary significantly.

This conclusion, according to the authors, can significantly simplify the procedure for choosing the most suitable cultures. Namely: finally, we believe that based on data for 2010-2017, the best choice is grain, sunflower and potatoes.

Conclusion

Putting the stated results into practice (choosing the optimal structure of crops grown for each region of the Russian Federation) will significantly increase the yield of agricultural crops, the effectiveness of investments, and reduce the expected risks.

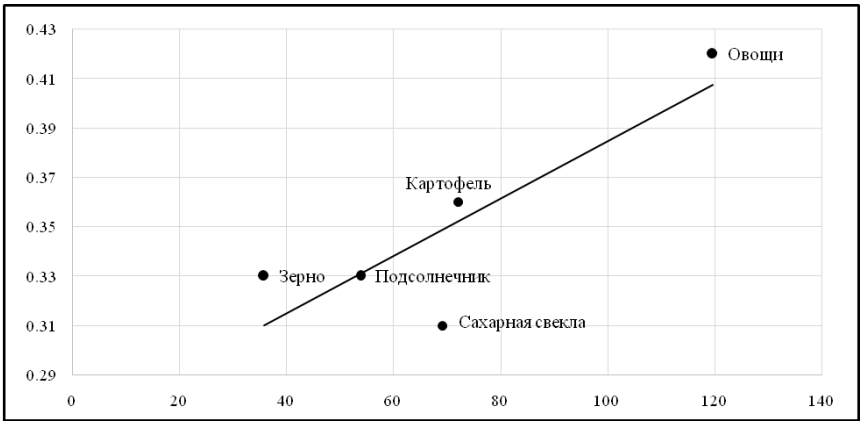


Fig. 5. *The combined model "Profitability-risk"*

Thanks

This article was prepared with the financial support of the Russian Foundation for Basic Research, project № 18-010-00079a "Prediction of development strategies for business entities of the Russian economy under the conditions of sanctions restrictions."

References

1. Burenin A.N. Securities and derivatives market / A.N. Burenin – M.: 1 Federal Bookselling Company, 1998. – 352 P.

2. Gertsekovich D.A. The choice of priority areas for investing in the stock markets according to the "profitability-risk" model. // Economics and entrepreneurship. 2018. № 9 (98). Issue 12. P. 673-680.

3. Gertsekovich D.A., Podlinyaev O.L. Development of investment priorities based on the profitability-risk model // Materials of the Nineteenth All-Russian Symposium "Strategic Planning and Enterprise Development". Section 2. Models and methods for developing an enterprise strategy, Moscow April 10-11, 2018. - M.: CEMI RAS, 2018. P. 267-270.

4. Gertsekovich D.A., Podlinyaev O.L. A two-level model for optimizing the investment policy of agricultural holdings under the conditions of sanctions restrictions (on the example of the Sayan Broiler agricultural holding) // Problems of Socio-Economic Development of Siberia. Bratsk: BrSU. 2018. № 1 (31). P. 17-22.

5. Gertsekovich D.A., Podlinyaev O.L., Tonkikh A.V. Forecasting world prices for agricultural products as a tool for the operational adjustment of the investment policy of economic entities. // Russia and China: challenges of globalization, prospects for cooperation in the Siberian-Far Eastern space: coll. sci. works of Int. sci.-pract. conf. Irkutsk, October 22-24. 2018, FSBEI HE "IGU". Irkutsk: Publishing house of the ISU. 2018. P. 205-212.

6. Damodoran A. Investment Valuation: Tools and Methods for Valuing Any Assets. - M.: Alpina, 2007. – 1340 P.

7. Investments in Russia. 2017: Stat. Sat / Rosstat. - M.; 2017. – 188 P.

8. Fabozzi F.J. Investment management. - M.: INFRA-M, 2000. – 932 P.

9. Sharp W., Alexander G., Bailey J. Investments. - M.: INFRA-M, 2016. – 1040 P.

10. Markovitz H.M. Portfolio selection. // J. of Finance. 1952. V. 7. № 1. P. 77-91.

控制经纪人强制关闭客户头寸的时间
CONTROL TIME WHEN CLIENT POSITIONS ARE FORCIBLY CLOSED BY THE BROKER

Emelyanova Ellina Sergeevna
Candidate of Economic Sciences, Department head
Bank of Russia

抽象。 本文讨论了使用未发现头寸的服务在经纪人客户帐户上形成负余额的示例，并定义了形成负客户余额的关键因素。 此外，可以得出结论，当经纪人平仓客户头寸时，控制时间很重要。

关键字：未平仓头寸，风险承担标准，控制时间，平仓客户头寸。

Abstract. *The article discusses examples of the formation of negative balances on the broker's client account when using the service of uncovered positions, and also defines the key factor in the formation of negative client balances. In addition, it is concluded that the control time is significant when a broker closes a client's position.*

Keywords: *uncovered positions, risk coverage standard, control time, closing client positions.*

According to the current Decree of the Bank of Russia dated 08.10.2018 №4928-Ю "On requirements for brokering when a broker makes certain transactions with securities and concludes contracts that are derivative financial instruments, liquidity criteria for securities provided as security for a client's obligations to a broker, when such transactions are made by the broker and such transactions are concluded agreements, as well as on the mandatory standards of a broker making such transactions and concluding such agreements" (Registered in the Ministry of Justice of Russia on March 04, 2019 № 53942) (hereinafter - the Decree) the broker should not allow the negative value of the risk coverage standard to occur when executing client orders assigned by the broker in accordance with the Instruction to the category of customers with a standard or increased risk level (hereinafter - RCS1), or reduction of RCS1 relative to its previous negative value. In other words, the basic rule that must be observed when making transactions with uncovered positions ("margin transactions") is that the value of the client portfolio of securities should not be lower than the initial margin level. If the value

decreases below this level, the client is sent a corresponding notification about the need to either sell part of the securities or deposit additional funds into the client's account so that the portfolio's value is restored to the initial margin level. If the value of the portfolio continues to decline and falls below the minimum margin level, the broker has the right to forcefully sell the client's securities (hereinafter - close positions) in order to restore the value of the portfolio to the required level.

At the same time, the Decree provides that the broker must close clients' positions with a negative value of the risk coverage standard when changing the value of the client's portfolio, classified by the broker as a client with a standard or high risk level (hereinafter - RCS2) until RCS2 reaches zero. Often, the long time allotted for closing customer positions during a period of high market volatility can lead to the formation of negative balances on the client's account. Below are examples of the implementation of this type of risk.

For example, for client A, whose portfolio at the beginning of the trading day at 10:00:00 was 458 thousand rubles, at the time the broker closed the positions at 13:05:57, the negative balance was 12 thousand rubles, i.e. the actual debt to the broker formed in 3 hours.

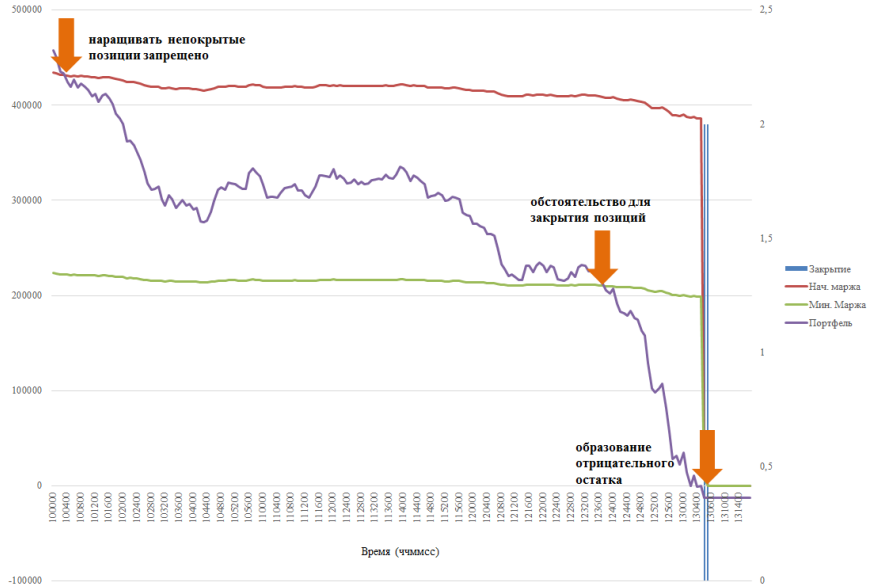


Fig. 1. *The schedule of changes in the value of the portfolio and margin indicators for client A*

A similar situation was observed for client B, whose portfolio at the beginning of the trading day at 10:00:00 was 485 thousand rubles. At 12:55:55, when the closing of the positions was completed, the negative balance with the client amounted to 19 thousand rubles, i.e. actual debt to the broker also formed in 3 hours.

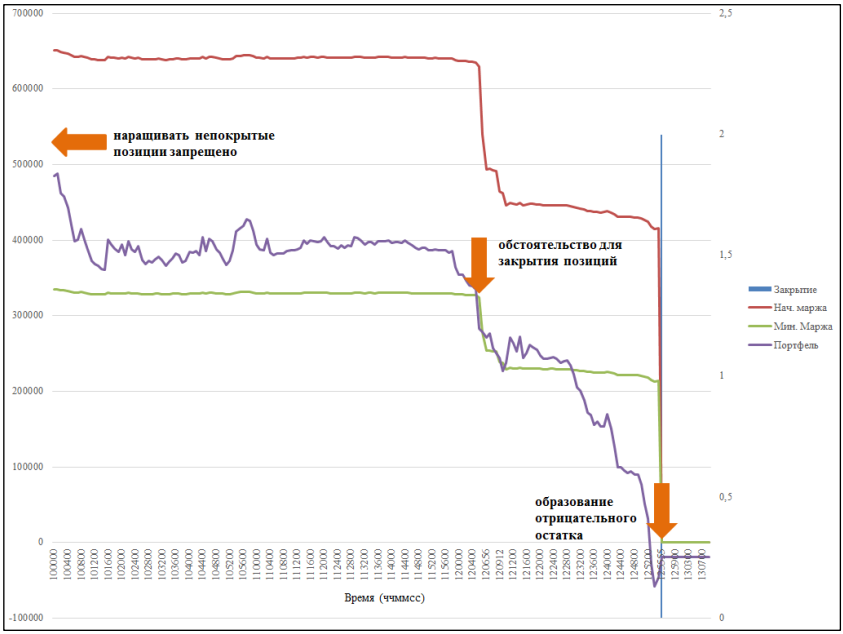


Fig. 2. *The schedule of changes in the value of the portfolio and margin indicators for client B*

However, portfolio drawdowns may be more significant. For example, at the beginning of the trading day at 10:00:00, the value of client C's portfolio was almost 16.5 million rubles. By 12:54:00, the portfolio value became equal to zero, and the broker partially reduced the uncovered positions. At 13:05:00 the value of the portfolio reached its minimum value -2.2 million rubles, then a rebound and repeated closing of positions by the broker took place, after which for more than a day and a half the broker did not close the remaining unclosed positions of the client, while the value of the client's portfolio by the time of the final closure went to the negative zone and at 17: 46:05 amounted to -740 thousand rubles. Thus, the client lost over 17 million rubles in 2 trading days.

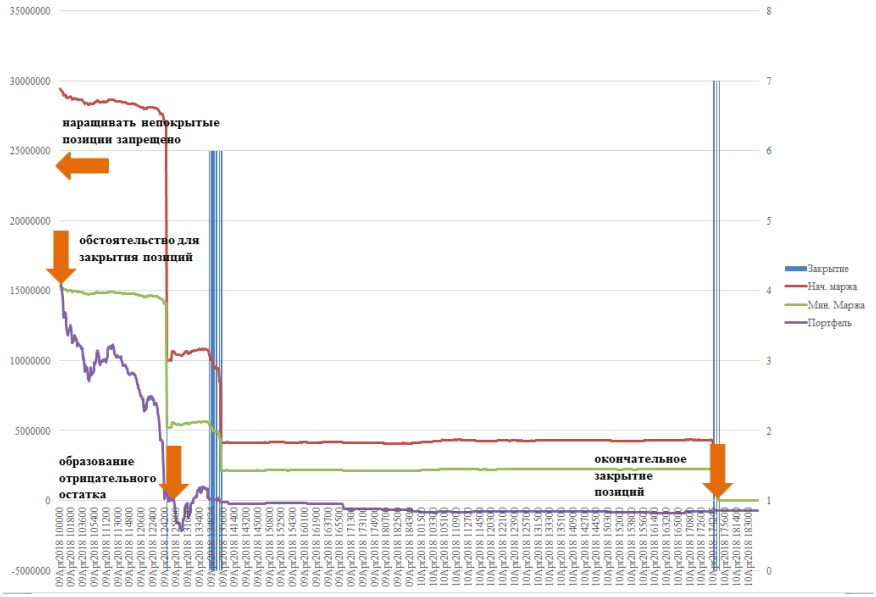


Fig. 3. *Schedule of changes in portfolio value and margin indicators for client C*

Based on the foregoing, we can conclude that when negative customer balances are formed, the key factor is the time during which the risk manager "holds the client" until the forced closure. As a rule, the average time from the occurrence of the grounds for closing clients' positions to the very moment of closing is 3 hours.

It is also worth noting that the control time for determining the grounds for the forced closing of client positions established by the broker should be sufficient to prevent the formation of client debt to the broker due to untimely closure, since the client may have a negative account balance much earlier than the broker begins to reduce his uncovered position.

现代俄罗斯的不平等问题：分析，成因和后果
THE PROBLEM OF INEQUALITY IN MODERN RUSSIA: ANALYSIS, CAUSES AND CONSEQUENCES

Kalandarov Omar Shamilevich
Bachelor
Financial University under the Government of the Russian Federation, Moscow

抽象。 本文探讨了现代俄罗斯的不平等问题。 分析了俄罗斯和国外的不平等统计数据。 考虑了现代条件下俄罗斯收入不平等的原因和后果。 研究了减少不平等的措施。

关键词：不平等，收入，指标，原因，后果，措施，统计。

Abstract. *The article explores the problems of inequality in modern Russia. The statistical data on inequality in Russia and foreign countries are analyzed. The causes and consequences of income inequality in Russia in modern conditions are considered. Measures to reduce inequality are investigated.*

Keywords: *inequality, income, indicators, causes, consequences, measures, statistics.*

Over the past 60 years, Russia has experienced dramatic jumps in income inequality several times. Starting from the most favorable period of equality of the golden five-year period (the eighth five-year plan for the development of the national economy of the USSR: 1966 - 1970), when the wealthiest 10% of citizens accounted for 21.6% of total income, and the least well-off half 31% of income, times of transition to the market. After shock therapy, by 1996, 10% of the richest citizens accounted for 45% of total income, when the “poor” half of people received only 10%. In 2016, 10% of the richest Russians retain 45.5% of total national income. And the less affluent half of citizens account for 17% of national income. Comparing the situation in 1996 and 2016, we can say that the increase in the share of the least wealthy half of the population in national income was due to the ruin and impoverishment of the middle class.

Thus, inequality is an urgent problem for Russia. Recently, the situation is only taking root. Evidence for this can be found in statistics. In order to visually see the actual income difference between different groups of the population, we will consider the data on the distribution of total cash income and the characteristics of the differentiation of the cash incomes of the population provided by the Federal

State Statistics Service from 1970 to 2018, as well as data from WID (World Inequality Database), an international organization, monitoring the state of inequality [5], [1].

Based on the data, primarily on the basis of the Gini coefficient, it becomes obvious that income inequality, having reached its peak in the post-crisis years, remains at a fairly high level (exceeding 0.4). The gap between poor and rich citizens is widening amid the general growth of the economy, which is accompanied by a rapid increase in incomes of Russians. The largest share of the average income growth is the group of the richest Russians, while the real incomes of the poor, as well as their standard of living, may decrease. It is also important that over the past 5 years no changes have occurred, while the general negative mood among the population is only increasing. A characteristic feature of Russia is that inequality in society is closely linked to poverty. The number of poor in our country (people with incomes below the subsistence level) is quite large: 12.9% of the total population (almost 19 million people) [5]. On the other hand, there is no positive correlation between inequality (Gini coefficient) and the share of the poor in the period from 1995 to 2018. On the contrary, the correlation is strong negative (-0.85). This suggests that in Russia during this period, during the increase in inequality, the share of the poor fell, while during the reduction of inequality the share of the poor grew. This is most likely due to the period of high oil prices at the beginning of the 2000s, when the income level of the population was generally higher, and oil companies received super-profits.

It should also be noted that Russia is characterized by an extremely high share of the shadow economy. Therefore, statistics in many respects do not correctly reflect the real situation with salaries, a significant part of which is issued in envelopes, with income from entrepreneurship, when often the enterprise itself does not exist according to documents. Statistical authorities estimated the share of income hidden in the shadow economy at 29.3% of the total. It is extremely difficult to take these data into account, and that is why often at the output we see the results of statistical analysis that are untrue in accordance with our life experience [2].

Consider the level of income inequality in other states. The most equal societies are primarily concentrated in Europe, their Gini coefficients are in the range between 0.2 and 0.3. I must say that many of them are developed countries with a perfect social security system, for example: Denmark, Germany, Austria, Belgium, Finland, the Netherlands, Norway (the state with the most even income distribution throughout the world), Sweden and France.

At the other extreme are states whose Gini coefficients exceed 0.6, for example: Madagascar, Botswana, South Africa and Namibia. All these countries are located in South Africa.

Each state with a Gini coefficient of more than 0.5 is considered to be very unequal. Many of them are in Latin America, for example: Brazil, Bolivia, Colombia, Chile, Honduras, Costa Rica, Paraguay and Panama. However, some of these countries are located in Africa (Rwanda, Mauritania and Côte d'Ivoire) and Asia (Thailand, the Philippines and Cambodia).

In most other countries, Gini coefficients are distributed between 0.3 and 0.5. The PRC and the United States of America are located on the far edge of the pole of this distribution in which inequality is stronger: 0.45–0.5. States such as Poland, Uganda, Italy, New Zealand are on the other side (approximately 0.3). That is, we can say that the Gini coefficient of 0.35 is a certain boundary between relatively equal states and those countries that are not. So, comparing the Gini coefficients of Russia and other countries, it is clear that our inequality is quite above average.

The main factor that determines the high level of inequality in our country is the low level of wages, which does not ensure the implementation of the reproductive and stimulating functions of remuneration. Currently, even the average salary does not provide normal conditions for the reproduction of workers and members of their families and more plays the role of social benefits. The difference between the maximum and minimum wages is about 10-15 times in the organization, 20-45 times between the subjects of the Russian Federation and 20-40 times within the industry. The low level of wages is largely determined by the low minimum wage and the inefficiency of trade unions in Russia.

Another reason for inequality and poverty in Russia is the lack of jobs, unemployment. According to Rosstat, at the end of the second quarter of 2018, unemployment was at 4.8%. This situation in the labor market has developed under the influence of the 2014 crisis, sanctions, as well as the high tax burden linking private enterprise.

We must not forget the slightly older causes of inequality. Tom Picketti, in his studies, notes the unfair privatization of the nineties as a major factor in inequality in Russia. This becomes especially apparent when analyzing various post-communist transition strategies to the market. Very quick "shock therapy" and voucher privatization disoriented the majority of the population. In such chaos, only small groups (sometimes criminalized) were able to acquire a large number of vouchers, take possession of most of the capital and resources in the country, gain political weight and use this to enrich themselves even more. The top accumulated over-savings often didn't invest back into the country, but led them offshore, which slowed down the economy and strengthened inequality.

The last reason we highlight rent-oriented behavior [6]. Taking advantage of access to power, a monopoly position, lack of proper control, and the weakness of civil society institutions, many representatives of the wealthy elite concentrate large sums of money on themselves, unjustly secretly "suck" money from the

population. An example of rent-seeking in Russia is the unfair distribution of the state order, when the price per unit of output can be very high and the quality can be below the average on the market.

At present, when drawing up socio-economic plans, the issue of inequality needs to be given more attention. It is also important to take advantage of the experience of foreign countries that have managed to minimize inequality and poverty.

One of the effective tools for balancing the well-being of the population is changes in fiscal policy. Exemption from tax burden of low-income people, large families will help maintain the income of poor people at a level above the subsistence level. At the same time, the introduction of a progressive tax will reduce inequality, stimulate the wealthy not to save money, but to invest it in securities, in production, to give funds to charity, etc. In addition, luxury goods will be properly taxed, because it's on they often at our elite leaves a significant part of the funds, which thereby are used inefficiently; this measure will also stimulate the rich to invest in the economy, and, which is important, will help reduce social tension. This also includes the creation of benefits for low-income groups of the population, and, again, for large families (the birth rate problem is also acute in Russia, the birth rate is decreasing from year to year). This can be expressed in assistance in paying for education, kindergarten, in assistance with the purchase of housing, etc.

The second most important lever to overcome inequality for our country is to increase the minimum wage. This measure increases the income of the poor, stimulates consumer demand and reduces the gap between the salaries of managers and subordinates.

Analyzing the approach of modern economists, we have come up with several real steps to reduce economic inequality in our country:

1. Amend the tax code of the Russian Federation, regarding the introduction of a progressive scale of the tax rate on personal income in the range from 5% to 25%, which will allow replenishing the federal budget an additional amount of about 1 trillion. rubles starting in 2020.

2. Amend the federal budget on the use of the funds of the National Wealth Fund to finance measures aimed at improving the living standards of low-income categories of the population.

3. The Central Bank of Russia should prepare a decision to reduce the key rate to inflation so that the cost of credit for the population and organizations is at the level of 3-4% per year.

These measures will help to accumulate the necessary means to combat inequality. Despite the large number of opponents of the progressive tax, this measure has been successfully applied in many countries. For example, of the member countries of the Big Twenty (G20), Russia alone does not use a progressive tax.

4. Implement an import substitution program, for which at least 1,000 industrial enterprises and 500 large agricultural enterprises should be commissioned annually. This will create over one million jobs annually.

5. Affordable loans will allow to create and develop a small business in the field of services and production of consumer goods. About this will give about 400 thousand jobs a year.

This will allow unemployed citizens to get an opportunity to find a job and increase their income compared to unemployment benefits, which will passively solve the problem of inequality. At the same time, there will be an intensification of production in industry (both in connection with more affordable loans, and due to increased competition due to the opening of new factories).

6. In parallel, within 5 years it is necessary to gradually increase the minimum wage to 15 thousand rubles per month.

7. The cost of living should also be gradually increased, over three years, to 15 thousand rubles, and further (at current prices, excluding inflation).

8. Citizens with income below the subsistence level should be exempted from paying personal income tax (PIT).

9. To implement social support for families with children, it is necessary to consider the possibility of increasing tax deductions from personal income tax for categories of working parents with minor children, which will help support families with incomes per family member below the established subsistence level for the country. This will allow parents to concentrate more on the development of their children (it must be remembered that the well-being of the child in the future is largely composed of the well-being of their parents).

10. In order to avoid distrust of citizens to new reforms, a moratorium on the introduction of taxes and mandatory payments until 2024 should be introduced.

Thus, in the medium term, our country will be able to get rid of the negative effects of socio-economic inequality, reduce poverty and accelerate its economic growth.

So, on the basis of statistical data, we were convinced of the reality of the problem of inequality in Russia. At the moment, inequality in Russia is at a high level, as can be seen by the Gini coefficient (0.411). Similar indicators are observed in China, the USA, Singapore, Turkmenistan, etc. An unexpectedly strong negative correlation (-0.85) between poverty and inequality in modern Russia (from 1995 to 2018) was also observed. It is important to understand that the correlation does not prove any cause-effect relationships, but only indicates the conformity of trends. It seems to us that the unifying factor for inequality and poverty was the oil recovery of the beginning of the 2000s. Inequality itself accelerated during this period, although against the background of a general increase in incomes, this was not so noticeable. The causes of inequality today are low salaries and unem-

ployment, the impact of unsuccessful transformation in the 90s and the resulting rent-seeking behavior of the top.

Nevertheless, Russia still has an objective opportunity to reduce inequality and poverty in the medium term. First of all, due to the new fiscal policy (progressive tax and benefits for the poor), and then by stimulating small and medium-sized businesses through cheaper loans, increasing the minimum wage and minimum living wage, wider access to education, etc.

References

1. Income inequality, Russian Federation, 1905-2015 [electronic resource] // World inequality database. URL: http://wid.world/share/#0/countriestimeseries/sptinc_p90p100_z/US;FR;DE;CN;WO;RU/last/s/k/p/yearly/s/false/19.2985/60/curve/false/country (appeal date 01.05.2019)

2. 2. Aganbegyan A.G. Overcoming poverty and reducing inequality in income and consumption in Russia // ECO. 2017. №9 (519). P. 71.

3. 3. Malkina Marina Yurievna Institutional foundations of income inequality in the modern economy // Journal of institutional studies. - 2016. - №1. - P. 100-120. URL: https://elibrary.ru/item.asp?id=25894365 (appeal date 20.04.2019)

4. 4. Pletnev Dmitry Alexandrovich Review of the book by J. Stiglitz "The Price of Inequality" (M.: Eksmo, 2015. 512 P.) // Bulletin of ChelSU. 2018. №7 (417). URL: https://cyberleninka.ru/article/n/retsenziya-na-knigu-dzh-stiglitsa-tsena-neravenstva-m-eksmo-2015-512-s (appeal date: 20.03.2019).

5. Federal State Statistics Service. Inequality and poverty // URL: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/population/poverty/ (appeal date 10.05.19)

6. The price of inequality. How does stratification of society threaten our future: [translation from English] / D. E. Stiglitz. – Moscow: Eksmo, 2015 – 512 P. – (Top Economics Awards).

7. Experts have recognized inequality in Russia comparable to 1905. // RBC URL: https://www.rbc.ru/economics/16/12/2017/5a33e2fc9a79471b6d846e24 (appeal date: 10.04.2019).

基于国家-私营伙伴关系的乳制品业发展的全球经验

THE GLOBAL EXPERIENCE OF DEVELOPMENT OF DAIRY FARMING ON THE BASIS OF STATE-PRIVATE PARTNERSHIP

Pashina Liubov Leonidovna
Doctor of Economic Sciences, Head of Department
Far Eastern State Agrarian University

摘要本文以公私合作伙伴关系为基础，分析了世界奶牛育种发展的经验。该研究的主要内容是分析通过分阶段发展，工业实施的公私伙伴关系的部门结构，以公私伙伴关系的总成本为基础的公私伙伴关系形成的世界惯例-在欧洲实施的项目。俄罗斯公私合营项目市场发展的优先领域之一是金砖国家之间的合作。本文揭示了奶牛育种中公私合作的目的和目标。根据国际惯例，提出了奶牛育种行业的公私合作项目分类。作为主要证据，可以相信，国外公私合营的主要形式是有针对性的计划的制定和实施，并且如世界市场所示，利用公私合营，有可能增加对华投资的吸引力。奶牛养殖业，并确保向创新发展道路过渡。

关键词：世界经验牛育种奶牛育种伙伴关系公私伙伴关系

Abstract. *The article is devoted to the analysis of world experience in the development of dairy cattle breeding on the basis of public-private partnership. The main content of the study is to analyze the world practice of the formation of public-private partnerships through phased development, the sectoral structure of public-private partnerships implemented by industry, at the total cost of public-private partnerships - projects implemented in Europe. One of the priority areas for the development of the market for public-private partnership projects in Russia is cooperation at the level of the BRICS countries. The article reveals the goals and objectives of public-private partnership in dairy cattle breeding. Guided by international practice, a classification of public-private partnership projects of the dairy cattle breeding industry is proposed. As key evidence, it is believed that the main form of public-private partnership in foreign countries is the development and implementation of targeted programs and, as the world market shows, using public-private partnerships, it is possible to increase the investment attractiveness of the dairy cattle breeding industry and ensure a transition to an innovative development path.*

Keywords: *world experience, cattle breeding, dairy cattle breeding, partnership, public-private partnership*

In modern conditions of socio-economic development of countries and individual regions (territories), public-private partnerships (PPPs) are considered as a mechanism for improving the provision of public goods and services through partnerships between the state and the private sector, in which the active role of public authorities in ensuring national economic interests is preserved [1].

In world practice, public-private partnership (PPP) tools are used to attract private investors in order to implement publicly important investment projects. The organizational and economic mechanism for implementing partnerships between the state and private companies of various organizational and legal forms is quite extensive. It should be noted that the choice of forms, methods and tools of public-private partnerships depends on the level of socio-economic development of individual regions, as well as on tasks and priority in implementing the content areas of investment policy.

In world practice, the formation of public-private partnerships occurs through phased development. The first stage is characterized by activities to form the foundations of economic policy and basic concepts of public-private partnership, with the construction of the primary market of PPP services. At this stage in the development of public-private partnerships are individual countries in Eastern Europe and Latin America. Most countries have reached the second stage of development, which includes the creation of a national PPP structure, the formation of a legislative framework, the growth of the involved sectors of the economy, and the formation of the institutional environment (Germany, France, Spain, Italy, the USA, Canada, Japan, Russia, and New Zealand). Currently, countries such as the United Kingdom, Australia, Ireland, and South Korea are in the third stage of PPP development. These countries removed legal barriers to the development of PPPs and introduced their own models for the implementation of such projects.

The experience of developing the institutional mechanism of PPPs at the international level has shown that it has received the greatest development in countries with developed market economies in which conditions have been created (institutional, legal, political and economic, etc.) for effective interaction between private companies and the state.

Analysis of PPP projects in European countries for the period of 2010-2017 showed that the total value of all implemented projects amounted to 259.3 billion euros. Most of the projects have been implemented in the transport infrastructure sectors and the total amount of their financing is 143.41 billion euros [2.3]. It should be noted that the priority development of transport infrastructure is characteristic for any stages of economic development, both for periods of recession and rise.

Russia's transition to the third stage of the development of PPPs, as well as minimizing the negative impact of the sanction policy of the Western bloc of countries on the economy, is possible under the condition of accelerated economic

integration of the country into the world economy through integrated unions (for example, the Eurasian Economic Union, BRICS, etc.).

For Russia, in the framework of PPPs at the international level, it is possible to attract investors to the regions of the country with the aim of implementing joint investment projects in the scientific field, industry, agriculture, telecommunications and information technologies, transport and energy infrastructure. The territorial aspect, as well as the economic and resource potential of the country, with rational and effective development (taking into account the principle of allocative efficiency) will allow for significant economic growth in Russia and create conditions for import substitution [4].

Today, certain experience has been gained in implementing joint investment projects in the framework of PPP between Russia and China. In particular, the following projects are under construction: Huadyan - Teninsky combined cycle power plant with a capacity of 450 MW in Yaroslavl (partners - the Russian company TGK-2 and the "Huadian" corporation); the construction of a border bridge across the Amur River in the area of the cities of Blagoveshchensk (RF) - Heihe (China) [5].

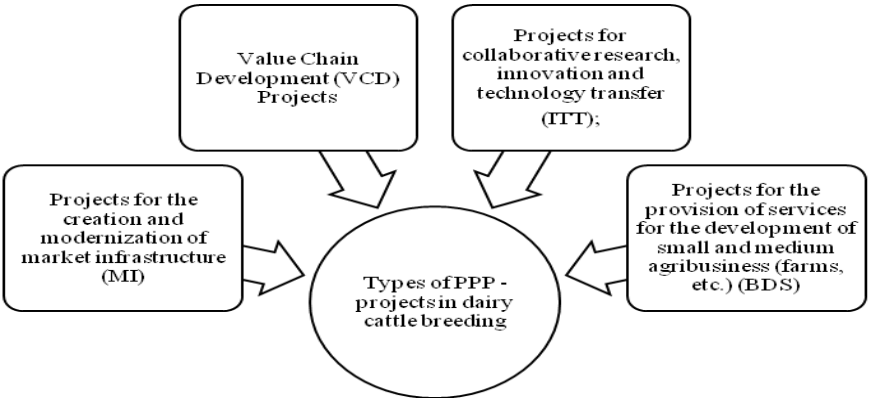


***Figure 1** – Classification of public-private partnership projects in the industry dairy farming [1]*

To address issues related to food security, it is necessary to carry out an active search for tools to stimulate the innovation and investment attractiveness of agricultural sectors and, in particular, dairy cattle breeding. The development of production infrastructure and an increase in the functioning efficiency of the dairy cattle breeding industry will have a positive impact on the socio-economic development of the regional economy. International experience shows that PPP is an effective tool for attracting investment in dairy cattle breeding. The main tasks of implementing PPP projects in dairy cattle breeding are as follows:

- increasing the competitiveness of dairy products;
- food security;
- the formation of sustainable dairy production;
- development of rural areas;
- improving the quality and availability of dairy products.

All PPP projects in the dairy industry can be classified according to specific targets. Guided by international practice [6,7], we offer the following classification of public-private partnership projects for the dairy cattle breeding industry (Fig. 1):

The presented classification in Figure 1 is not exhaustive, but reflects the diversity of models and areas of PPP coverage in projects implemented by the international community in dairy cattle breeding. The classification helps to identify possible "entry points" for public-private partnerships in this industry when implementing various projects:

1. VCD projects – aimed at creating production and processing infrastructure, stimulate the consolidation of dairy products in the domestic and foreign markets;

2. ITP projects – aimed at the development and implementation of innovative technologies and various novations and innovations to increase the efficiency of dairy cattle breeding;

3. MI projects – focus on the development of shopping centers, storage warehouses, the creation of transport or logistics systems for the movement of dairy products;

4. BDS projects – designed for the development of small and medium-sized agricultural enterprises, through the mechanism for the implementation of information, methodological and grant support.

The use of these types of partnerships varies according to the regional principle, for example, in Latin America in dairy cattle breeding, projects fall into the VCD and BDS categories, in Asian countries there is parity between VCD and ITT projects, and MI prevails. Partnerships with VCD and ITT dominated the African continent.

Successful development of PPP in dairy cattle breeding in foreign countries is achieved by fulfilling the following conditions:

1. clear advantages for private investors, which are expressed in revenue from the implementation of the project data, as well as in the opportunity to expand its presence in the domestic and foreign markets are identified;

2. emergence of high-quality products at an affordable price for consumers;

3. advantages for state authorities are identified, which consist in fulfilling social obligations to provide high-quality dairy products to the population, and to implement sectoral development programs.

Every year, the number of cattle in the world is increasing significantly, while financing of the public sector in veterinary services does not meet the needs. Successful experience in increasing the availability of veterinary services in the framework of PPPs was obtained in West Bengal, which consisted in the creation of specialized veterinary centers with the involvement of unemployed educated youth [8]. These centers have improved the efficiency and accessibility of veterinary services, thereby creating favorable conditions for expanded reproduction in the dairy cattle breeding industry. One of the important directions of PPP is the cooperation of the state and business structures to improve the genetic potential of cattle. The initiative to create highly productive cattle breeds is being successfully implemented in Ethiopia, Tanzania, and India [9, 10]. PPP - projects in these countries are aimed at increasing the productivity of the dairy industry through the training of specialists in artificial insemination, increasing the availability of highly productive animals and the creation of animal health monitoring systems for small farms.

In Latin America, PPP stimulates the progress of research and development (R&D) in dairy farming [11]. Ongoing projects are aimed at increasing innovation and investment attractiveness and have various advantages over other institutional mechanisms that contribute to the progress of R&D. In particular, they are capable of:

- reducing the costs and risks associated with research;
- increasing the effectiveness of research due to synergies between partners, and ensure wider dissemination among groups of potential users;
- leading to increased research and economic potentials;
- ensuring increased competitiveness in the market by improving quality;
- promoting the development of small-scale production by launching a cooperation mechanism.

Today, when implementing various projects in the regions of Russia, PPP is designed to increase the investment attractiveness of the dairy cattle industry and ensure the transition to an innovative development path.

References

1. July data and research // Official website of the Asian Development Bank. [Electronic resource] – URL: https://www.adb.org/ (appeal date: 30.12.2019)

2. PPP dairy and their financing in Europe // Official date website date European Bank investment bridge bank. [Electronic resource]– URL: https://www.eib.org/en/ (appeal date 10.05.2019).

3. Kappeler A. PPPs and their Financing in Europe: Recent Trends and EIB Involvement / A. Kappeler // European Investment Bank. – Luxembourg. – 2013. – 10 P.

4. Kulkov V.N. From Yekaterinburg to Ufa: BRICS - the first round of 2009-2013. Economic pillars, regional vectors, the basis of priority sectors analysis of sustainable industrial development / Kulkov V.N. // UNIDO in Russia. [Electronic resource] - URL: http://www.unido-russia.ru/archive/special_02 (appeal date: 09.01.2020)

5. Nenya, A.S. Public-private partnership as a condition for the development of dairy cattle breeding: appl. dis. sci. deg. cand. econ. sci: 08.00.05. Date of the dissertation July 4, 2019. Approval date December 10, 2019 / Nenya Anton Sergeevich; Far East. tourism state. agrarian. un-t – Blagoveshchensk,2019. – 159P.

6. Agribusiness // Official website of the PPP knowledge laboratory. [Electronic resource] – URL: https://pppknowledgelab.org/sectors/agribusiness west (appeal date: 24.07.2019)

7. PPP page on the World Bank website // World Bank official website. [Electronic resource] – URL: http://ppi.worldbank.org (appeal date: 07.01.2020)

8. Porter M.E. Executive summary of the clusters of innovation national report / M.E. Porter // Clusters of innovation: regional foundations of U.S. Competitiveness [Electronic resource]. –URL: https://www.hbs.edu/faculty/Publication%20Files/COI_National_05202014_ad0fe06c-674c-494b-96f6-6882db4e6aaf.pdf (appeal date: 05.01.2020)

9. Presented by Land O' Lakes at the African Dairy Genetic Gains Program Annual Planning Meeting, 20-23 February 2017 [Electronic resource]. - Access: https://www.slideshare.net/ILRI/adgg-paid-feb2017 (appeal date 12.05.2019)

10.Public-Private Partnership in Milk Development in Yarkhand // Official website of the Institutional Repository of the National Agricultural Research System of India. [Electronic resource]: http://krishikosh.egranth.ac.in/handle/1/5810023019 (appeal date 31.05.2019)

11.H. Frank. Building Public–Private Partnerships for Agricultural Innovation. Food Security in Practice technical guide series // Frank H., Tola J., Engler A., González C., et al. [Electronic resource]. – URL: https://ageconsearch.umn.edu/bitstream/46707/2/Building%20Public-Private%20partnerships.pdf (appeal date: 07.01.2020)

认知视觉技术对学生数学教育的影响–数学教学方法的一种创新方法
COGNITIVE-VISUAL TECHNOLOGY OF STUDENTS 'EDUCATION IN MATHEMATICS - AN INNOVATIVE APPROACH IN THE METHODOLOGY OF TEACHING MATHEMATICS

Dalinger Viktor Alekseevich
Doctor of Pedagogic Sciences, Full Professor,
Head of Department
Omsk State Pedagogical University

抽象。 本文建议在认知视觉技术的基础上构建数学教学过程，以形成知识，技能和能力，这将最大限度地发挥视觉思维的潜力。 这项技术的主要地位是广泛地和有目的地使用认知可视化功能。

关键字：左半球学生，右脑学生，认知视觉技术，可视化数学问题，显式使用可视化，隐式使用可视化。

Abstract. *The article proposes to build the process of teaching mathematics on the basis of cognitive-visual technology for the formation of knowledge, skills and abilities, which will maximize the potential of visual thinking. The main position of this technology is the wide and purposeful use of the cognitive visualization function.*

Keywords: *left-hemisphere students, right-brain students, cognitive-visual technology, visualized mathematical problems, explicit use of visualization, implicit use of visualization.*

The success of the student in the educational process directly depends on the methodology used by the teacher and the teaching technology.

An analysis of the school practice of teaching students math shows that the main emphasis of teachers is on logical thinking, that is, on the work of the left hemisphere of the brain.

In domestic psychological literature, a feature of the perception process is characterized by a leading sensory system and distinguish right-hemisphere students (visuals, kinesthetics) and left-hemispheric students (audials).

Scientists talk about the differentiation of the hemispheres according to the type of tasks being solved (speech, verbal - spatial, figurative) and according to the method of processing the incoming information. Such a division is conditional,

since we are not talking about the sequential work of the hemispheres, but about their relative activity in solving a particular problem.

Most often, the teacher is based on their own preferences in the field of teaching and when these preferences do not coincide with the educational preferences of students, a conflict of styles arises. Betty Lou Leaver notes that “the teaching system ... is not very focused on the source of success or failure in training - on the student himself” [1, p. 7].

So, the problem arises: "How to make learning mathematics so that it is based on the balanced work of both the left and right hemispheres of the brain, that is, on a reasonable combination of logical and visual-figurative thinking?"

In the context of the problem under consideration, the statement of B. M. Vladimirsky is interesting, noting that “we don’t need to teach better. It is necessary to teach differently ... Newly emerging specialized languages lead to new patterns of understanding, less related to speech, but more oriented to visual images, form and color ”[2, p. 4].

We propose building a math learning process based on cognitive-visual approach to the formation of knowledge, skills, which allows you to maximize the potential of visual thinking. One of the main provisions of this approach is the wide and purposeful use of the cognitive visualization function.

One of the advantages of the cognitive-visual approach is that it takes into account the individual characteristics of students and, in particular, the features of the left and right cerebral hemispheres. Today, the question of the functional asymmetry of the cerebral hemispheres and especially the consideration of this asymmetry in the practice of teaching mathematics is becoming even more relevant.

A. G. Mordkovich proclaims two slogans related to teaching school mathematics: “Less scholasticism, less formalism, less rigid models, less reliance on the left brain! More geometric illustrations, more visualization, more plausible reasoning, more soft models, more reliance on the right hemisphere of the brain! ”[3, p. 4].

A. L. Sirotyuk notes: “Until now, many experts overestimate the role of the left hemisphere and logical thinking in the formation of the child’s mental activity. And such products of the right hemisphere as intuition, rhythm, creating images, etc., are unfortunately not appreciated in a modern school. School methods develop mainly the left hemisphere, ignoring the second half of the child's mental abilities. However, it is known that it is the right hemisphere that is associated with the development of creative thinking of the child ”[4, p. 223].

The problem of implementing the principle of visualization in teaching mathematics can get a fundamentally new solution if we can find such methodological support for the student’s activity that will enable them to include the functions of their visual thinking in order to obtain productive results in mastering mathemat-

ical concepts, to strengthen the developing function of mathematics. The use of visual images in teaching can turn from an auxiliary, illustrative technique into a leading, productive methodological tool that promotes the mathematical development of students. The language of images is the main means of visualization in the study of mathematics, which allows you to consciously operate with concepts and conclusions, fix and "revive" them in memory.

The problem of implementing the principle of visualization in teaching mathematics can get a fundamentally new solution if we can find such methodological support for the student's activity that will enable him to include the functions of his visual thinking in order to obtain productive results in mastering mathematical concepts, to strengthen the developing function of mathematics. The use of visual images in teaching can turn from an auxiliary, illustrative technique into a leading, productive methodological tool that promotes the mathematical development of students. The language of images is the main means of visualization in the study of mathematics, which allows you to consciously operate with concepts and conclusions, fix and "revive" them in memory.

In the implementation of cognitive-visual technology for teaching mathematics, visualized tasks play a large role.

We call a visualized task in which the image is explicitly or implicitly involved in the condition, the answer, sets the method for solving the problem, creates support for each stage of the solution to the problem, or either explicitly or implicitly accompanies at certain stages of its solution. The purpose of visualized tasks is the formation of a visual image that helps to resolve emerging problems. Visualized tasks allow you to transfer information about learning opportunities, certain characteristics of students' mental activity and thereby serve as tools for diagnosing educational and personally significant qualities, and are also one of the main tools for implementing a cognitive-visual approach to teaching mathematics. (The reader will find a comprehensive discussion about the use of visualized tasks in our works [6,7,8]).

Of course, visualization does not solve the problem of teaching schoolchildren the skills of deductive thinking, but the purposeful and systematic connection of reserves of visual thinking when working with specially selected material to form the skills of deductive inference undoubtedly helps this. The student's visual thinking activity in the process of proof will contribute to the formation of heuristic techniques and increase the level of logical rigor.

The use of visualized tasks raises an important problem of teaching in high school - the problem of organizing search educational activities of students. A special type of search is visual search, the most important tool of which is "educated and organized" vision. Visualized tasks serve as a means of building visual search skills.

Visual search is the process of generating new images, new visual forms that carry a specific visual-logical load and make visible the value of the desired object or its property. The starting point of such a process is the stock of ready-made visual images known to the student, the structure and elements of information, and the visually visible connections between them.

When working with a drawing, it is important to develop such skills in students as: to bring a geometric figure under a concept; to isolate the geometric figure in the drawing; set the shape of the geometric shape; include the same drawing element in different geometric shapes; find common elements in different geometric shapes; diversify the geometric figure in the drawing; rethink the figure in terms of another concept.

Note that the following three basic requirements should be presented to the drawing: the drawing must be true, visual, and easy to do.

In solving mathematical problems, an image can be used either explicitly or implicitly, but in either case it leads to a search for a way to solve the problem [9, 10, 11]. Below we give examples of the implicit and explicit use of a visual image in solving mathematical problems.

Exercise in which a visual image is used implicitly

Exercise 1. For what values of the parameter a does the system of equations have more than two solutions $\begin{cases} 7ax + 4y = -8, \\ x + 7ay = 49a^2. \end{cases}$

The solution to the problem is facilitated if a straight line is seen in each of the equations of the system. In this case, the image of the line is used by us implicitly (lines are not built). Two lines can intersect (one solution), be parallel (not a single solution), coincide (an infinite number of solutions - this is exactly what is asked in the problem).

Convert the system:

$$\begin{cases} y = -\dfrac{7a}{4}x - \dfrac{8}{4}, \\ y = -\dfrac{1}{7a}x - \dfrac{49a^2}{7a}. \end{cases}$$

The lines coincide if their angular coefficients are equal and the free terms are equal, thereby we the following system:

$$\begin{cases} -\dfrac{7a}{4} = -\dfrac{1}{7a}, \\ \dfrac{49a^2}{7a} = -\dfrac{8}{4}. \end{cases}$$

Solving the system, we get the answer to the task: $a = -\frac{2}{7}$.

Exercise, in the solution of which the visual image is used explicitly

Exercise 2. Prove Identity $\arcsin x + \arccos x = \frac{\pi}{2}$.

The reader knows the proof of identity using a derivative. We will use the image of the terms on the left and right sides of the identity: arcsin *x* –is the angle whose sine is *x*, and arccos *x* – is an angle whose cosine is x; the sum sign means the addition of two angles; on the right side of the identity $\frac{\pi}{2}$ denotes the value of the right angle. Thus, we go to Fig. 1.

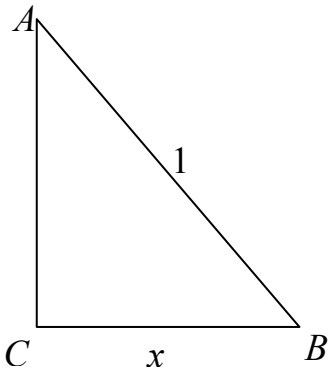


Fig. 1. *Figure for exercise 2.*

We have: $\frac{x}{1} = \sin \angle A$, $\frac{x}{1} = \cos \angle B$. From these equalities we obtain: $\angle A = \arcsin x$, $\angle B = \arccos x$, and since the triangle is rectangular and, using the theorem on the sum of the angles of the triangle, we finally obtain $\arcsin x + \arccos x = \frac{\pi}{2}$.

The reader who has expressed interest in the problem at hand will be interested in acquaintance with the content of the articles. [15,16,17].

References

1. *Betty Lou Liver. Teaching the whole class. – M: New School, 1995. – 48P.*
2. *Vladimirsky B. M. Computer textbooks: structural analysis and psychophysiological requirements of computer science // Computer tools in education. – 2000. – № 1. – P. 3–8.*
3. *Mordkovich A. G. Methodological problems of studying the elements of mathematical analysis in a comprehensive school // Mathematics in school, 2002. – № 9. – P. 2–12.*
4. *Sirotyuk A. L. Neuropsychological and psychophysiological support of training. – M.: SC Sphere, 2003. – 288 P.*
5. *Zhukovsky V.I., Pivovarov D.V., Rakhmatullin R. Yu. Visual thinking in the structure of scientific knowledge. – Krasnoyarsk: Publishing House of Krasnoyarsk University,1988.–178 P.*
6. *Dalinger V.A. Visual Images of Mathematical Objects as a subject and a tool for studying: textbook. – Omsk: Amphora Publishing House, 2013. – 74P.*
7. *Dalinger V.A., Simonzhenkov S.D.Methodics of teaching mathematics. Cognitive-visual approach: textbook for academic undergraduate. – 2 ed., rev. and add. – M.: Yurait Publishing House, 2017.–340 P.*
8. *Dalinger V.A. Visual images as a subject of study and a means of teaching mathematics // Mathematics in school. – № 5. – 2017. – P. 40-47.*
9. *Smirnov V.A., Smirnova I.M. Visualization of tasks for finding the distance between intersecting lines // Mathematics at school. – №6. – 2019.– P. 10-16.*
10. *Smirnov V.A., Smirnova I.M. How to make the study of geometry theorems more effective? // Mathematics at school. – №3. – 2017. – P.34-39.*
11. *Krachkovsky S.M. Multivariate visual-graphic representation of mathematical problems // Mathematics at school. – №1. – 2013. – P. 51-63.*
12. *Krachkovsky S.M. Change the visual image of geometric objects // Mathematics at school. – №8.–2015.– P.12-14.*
13. *Shabashova O.V. The task system as a means of forming skills to use the functional-graphical method for solving problems with parameters // Mathematics in school. – №5. – 2019. – P. 43-59.*
14. *Fishman B.E., Eirich N.V. Cognitive dynamic computer visualization as a condition necessary for students to master mathematical concepts // Modern high technology. – №9 (2). – 2016.– P.355-359.*
15. *Potoskuev E.V. On the principle of visualization in geometry // Mathematics at school. – №5. – 2017. – P. 18-26.*
16. *Potoskuev E.V. On the community of visualization and reasoning logic in solving geometric problems // Mathematics at school. – №3. – 2018. – P. 40-48.*
17. *Elezarova N.G., Ponaryadova R.S., Palkina M.A. On the systematization of geometric knowledge of students (on the example of solving the problem in different ways) // Mathematics in school. – №5. – 2018. – P. 7-11.*

《教育和技能的未来：2030年教育项目》是讨论的主题
«THE FUTURE OF EDUCATION AND SKILLS: EDUCATION 2030 PROJECT» ÀS A SUBJECT OF DISCUSSION

Varyuschenko Viktor Ivanovich
Candidate of Historical Sciences, Associate Professor
Gaikova OksanaViktorovna
Candidate of Pedagogical Sciences, teacher of history higher category municipal budget educational institution secondary school № 26.

抽象。在经济合作与发展组织（OECD）的主持下，制定了“教育和技能的未来：2030年教育项目”。目前，大约有十二个国家在其中进行合作。参与者试图了解用户和劳动力市场的教育需求将如何变化，以及如何制定政策以在将来拥有大量需求的专家并最大程度地减少劳动力的流失。该项目涉及课程的国际比较分析，目的是建立一个数据库，以促进国家课程的发展和完善。在包括俄罗斯在内的不同国家，也许没有正统地阅读该项目的目的。本文在讨论该项目的俄文版本时提出了一个有争议的版本。该材料侧重于在组织有争议的社会问题的组织中对教师进行额外的专业教育。参与该项目实施的不同国家的专家，以及对组织有争议的科学问题感兴趣的研究人员，都可能会对这些材料感兴趣。

关键词教育项目，教育空间，附加专业教育，研究工作，课程。

Abstract. *«The Future of Education and Skills: Education 2030 Project» has been developed under the auspices of the Organization for Economic Cooperation and Development (OECD). Currently, about two dozen countries cooperate in it. Participants are trying to understand how the educational demand from both users and the labor market will change, as well as how it is necessary to develop policies in order to have in-demand specialists in the future and to minimize the loss of labor force. The project involves an international comparative analysis of curricula with the aim of creating a database to facilitate the development and improvement of national curricula. In different countries, including Russia, perhaps not orthodox reading of the purpose of the project. This article proposes a version of the controversy in the discussion of the Russian version of the reading of the project. The material is focused on the use in the system of additional professional education of teachers in the organization of discussion of debatable social issues. The material may be of interest to specialists from different countries involved in the implementation of this project, as well as researchers interested in the organization of discussion of controversial issues of science.*

Keywords: *Educational project, educational space, additional professional education, research work, curriculum.*

Introduction

The Organization for Economic Cooperation and Development (OECD), as an international organization, implements a number of large-scale projects in the field of education, focused on different levels of education and lifelong learning.

As the current situation of development in education requires not only timely decisions, but also to some extent predict future development, asked a question about how to change educational inquiry from both users and from the labour market and how policy must be developed in the future to be sought-after professionals and to minimize the loss of labor force.

The success of the school system depends on policy decisions to address future challenges. In this regard, the project will create a common understanding of competencies related to specific knowledge, skills and values in the future.

The project includes two main areas:

1. **Development of a conceptual learning framework consistent with the 2030 development goals and targets**. Since the concept of "competences", their technical characteristics and other aspects differ significantly at the international level, from the OECD point of view, it becomes necessary to organize an international discussion on competences and their varieties, which will be in demand in 2030. The discussion will help to develop a certain position, which can be further applied by countries in the development of the objectives of educational systems and their clearer definition.

2. **An international analysis of training programs**. Because countries are often faced with multiple demands and requests for educational programmes that lead to curriculum overload, and changes in the educational system are influenced by political and competing objectives, changing one element (curricula, assessment, teaching practices, etc.) will only be effective if other related elements of the system are changed. The project involves an international comparative analysis of curricula with the aim of creating a knowledge base to facilitate the development and improvement of curricula that are empirical and systematic. It is also planned to analyze the learning environment that can most effectively support the development of competencies.

The project involves participation:

- ***Countries*** to create and establish a common understanding of competencies, curricula and related aspects.

- ***Experts*** to be included in an international multidisciplinary expert network to organize discussions with politicians, schools, networks and social partners.

- ***School networks*** for the exchange of practices at the international level, gaining access to the results of advanced research, including their own experience in the results of the study.

- ***Social partners*** to contribute to the future development of education and the results of the project. [From: *Elena Sabelnikova. International project "Education 2030"*. https://globalcentre.hse.ru/nletter10.1]

Motivation for discussion

The motivation for writing this article was familiarity with the project "The Future of Education and Skills: Education 2030", developed under the auspices of the Organization for Economic Cooperation and Development (OECD) and currently being implemented in a number of countries and Russian reading of this project. Careful reading prompted some thoughts about this project, which may be useful for developers of other educational projects. Without claiming to know the truth in the last instance, we hope that this material will allow you to start a serious scientific discussion on the problem of general education and its reform in the modern world. Citation in the article is carried out according to the text of the material "About the Project "Education 2030" published on the website of the Federal Institute for Education Quality Assessment (FIEQA). [*About the Education 2030 Project. What is "Education 2030 ?*"

See: https://fioco.ru/Contents/Item/Display/2201455; *Zvereva Diana Aleksandrovna. About the Education 2030 Project. What is "Education 2030?*" See: https://zvereva-ppsoch2.edumsko.ru/articles/post/1523927].

Doubts, objections and suggestions

Increasing social, economic and environmental problems, accelerating globalization and the rapid pace of technology development make it necessary for the school to prepare students to use these processes for the benefit of humanity. "The Future of Education and Skills: Education 2030 Project" is currently being implemented in a number of countries under the auspices of the Organization for Economic Cooperation and Development (OECD). Any educational project is designed to solve a problem and answer whom to teach, why to teach, what is the purpose to teach how to teach. The project "The Future of Education and Skills: Education 2030" has no problem with the task force. These are "children who are currently in primary school, and by 2030 will represent the bulk of the population entering working age." Therefore, by the time a new model of general education is developed, these students will have left school and will not be affected by it. We think it would be more correct for the target group to determine the participants of the educational process in the school: the new model of education will affect not only students, but also change the nature of the work of teachers. Why the authors of the project convincingly justified and did not reveal a special problem. The aim of the project, as stated by the initiators, is to study and forecast the possible future

of school education in the world, both general and professional. The objectives of the project are the analysis of the main educational programs of different countries, the development of the conceptual framework of education and the design of the learning environment that can most effectively support the development of students competencies. Thus, the problem area is "what and how to teach."

At the same time, it is quite definitely stated that graduates of 2030 will have to master professions that do not yet exist, own technologies that have not yet been invented, solve problems that can not be predicted. Nevertheless, teachers, parents, concerned persons are called upon to give them the necessary knowledge and competencies that will help them ensure the well-being of our future, stability and prosperity of the world. The situation is strikingly reminiscent of the famous fairy tale, where the hero is tasked: "Go there, I do not know where, and bring it, I do not know what."

The initiators of the project set out to help countries find the answer to two questions:

- *What knowledge, skills and personality characteristics will students need to lead the world to prosperity?*

- *What standards will contribute to the effective development of this knowledge, skills and personal characteristics?*

And to do this good deed, in their opinion, should, first of all, persons who determine educational policy, experts, communities of teachers and students, as well as all interested in our successful future.

As for the list of persons involved: let's leave aside "all interested", bearing in mind that "seven nurses have a child without an eye", and for all the others we recognize quite reasonable participation in determining "what standards will contribute to the effective development of this knowledge, skills and personal characteristics". But to understand how these categories can determine "what knowledge, skills and personal characteristics students will need" in order to "master professions that do not exist yet, to own technologies that have not yet been invented, to solve problems that can not be predicted", it seems very problematic. It is a sphere of application of efforts of absolutely other categories of society which generate new technologies, professions, face problems and set tasks before the sphere of education.

What is the reason for the reassessment of the capabilities of "education policy makers, experts, teacher and student communities"? I think this is the inertia of mankind's thinking, formed in the conditions of agricultural and industrial civilizations, when the pace of updating knowledge and technology was not as explosive as in the current information civilization. The tasks set for education by the then development of science and technology could be solved for tens or even hundreds of years stereotypically. This gave rise to the illusion that education itself sets goals and objectives. Today, in a sometimes unpredictable future, the school is

trying to reform, setting itself, as before, tasks designed for 11 years. And during this time, scientific knowledge has time to radically update 3-4 times. "Education for life" has been replaced by "lifelong education".

A few words about "the well-being of our future, stability and prosperity of the world". Using abstract concepts to achieve specific goals always leads to problems. Whose prosperous future are we talking about? There are the "Golden billion", for whom "a prosperous future" is the possession of all the resources of the world and the reduction of human pressure on the Earth, there are endangered peoples of the "third world", for whom "a prosperous future" is a daily bowl of rice and a bottle of water. "Stability and prosperity of the world". Hardly anyone will turn the tongue to call the modern world prosperous. So we have to ensure its stability? How many would agree? If we are talking about prosperity, then whose and at whose expense? And what is meant by prosperity itself? Since the project is always aimed at creating something that was not, and I want it to be, it is very important to treat the terms and concepts used responsibly, not to allow their ambiguous interpretation.

The creators of the project talk about "the need for a broad view of educational outcomes: individual and collective well-being." Promoting the concept of inclusive growth, they agree that "well-being is not only about access to resources, wealth, housing, work and income, it is closely linked to health, sustainable social relations, education, security, life satisfaction and a clean environment" and state that "in XXI century, progress has contributed to the growth of well-being". A few lines above read: "in many regions, inequality in living standards and opportunities continues to grow."

Obviously, the "broad view of educational outcomes" should be evidenced by the following passage:" Education plays a crucial role in the development of knowledge, skills and personal competencies that will enable people to benefit and benefit from a stable future. Learning to set clear goals, interact with others, find new opportunities, offer different solutions to problems - all these skills will become necessary in the coming years. Education should not just prepare young people for adulthood, it should give students everything to become active, responsible and engaged citizens." Why according to the developers of the project "all these skills will become necessary in the coming years"? Wasn't all this relevant in the XIX and XX centuries? And what is the breadth of the view? Perhaps the lack of breadth of view could be saved by depth of thought?

The initiators of the project derive students independence from the "world of uncertainty", and the understanding of the "need for continuous learning" is attributed to 2030. They write: "Independence implies a sense of responsibility for one's own life, for influencing other people, for shaping the conditions for changing the world for the better. Independence is the ability to understand the motives of their activities and set goals on the way to achieving the goal. For the development of

independence, it is necessary not only to accept the student as an individual and a person, but also to understand the versatility of his relations with teachers, classmates, family, society – with all those who influence the educational process." Open any Soviet methodical manual on pedagogy and you will find it all. And in the pedagogical literature of the pre-Soviet period it was quite well described, as well as in the pedagogical literature of foreign countries.

The authors believe that two factors will help students develop independence:

- "An individualized educational environment that supports the interests and motivates each individual student, draws on diverse educational experiences, shapes their own learning projects, and supports interaction with other students.

- Creating a sustainable foundation in the form of basic reading and math literacy. In addition, in the era of digitalization, the ability to work in a technologically rich environment becomes as important a factor as mental or physical health."

On these aspects it is necessary to stop and think over ways of their realization. Individualized educational environment is undoubtedly one of the most important components of the new model of school education. Today it does not exist or it exists in its infancy, if school education is considered in a global perspective. Thus, there is no environment, but you want to have. There is a problem being solved in the course of the project.

With reading and mathematical literacy is more difficult. What is meant by them? The ability to read for information society as melkotravchato sounds. Wherever it goes to talk about learning to work with large amounts of diverse information. Putting mathematical literacy first just because the era of digitalization is coming is somehow not convincing. Mathematics is one of the languages that humanity uses. Therefore, it is not God, but only an instrument. The task of school education is to have a cultured comprehensively educated person at graduation, and mathematical literacy will only be an element. There is no need to fetishize the individual components of education. All the more, that the problem not in low mathematical or technical literacy graduates schools, and in raschelovechenii the most rights. A return to humanism is on the agenda. Undoubtedly, learning to "work in a technologically rich environment" is a very important aspect of education, but an even more important aspect behind a "technologically rich environment" is not to lose sight of people and to remain a Person yourself.

There can be no objections to the competencies "to create new values", "to solve problems and contradictions" and "to take responsibility", but what does innovation have to do with it? These competencies are declared throughout the history of mankind, unless different words are used. The problem is not in proclaiming the value of these competencies, but in having them at least in the majority of the world's population. It is difficult to agree with the classification of them into "three additional categories" of transforming "competencies".

The authors of the project write: "Creating new values. In order to successfully cope with the challenges ahead, students must think creatively, develop new products and services, create jobs, new businesses, sectors, social models, develop innovative techniques, ways of thinking and living.

The foundation of competence is the ability to adapt, creative thinking, curiosity and openness to new things." It is appropriate to ask, where are the "new values"? It lists human actions that are designed to reinforce existing values. But the problem is that the existing values do not satisfy the majority of the population. So for beautiful theoretical formulations can hide not beautiful practical policy.

The authors of the project write: "Resolution of problems and contradictions. In a world of unequal opportunities, young people will need the ability to resolve conflicts and defuse tensions, to find a balance between justice and freedom, independence and community, innovation and tradition. In an interdependent world, people only achieve well-being when they understand the needs and desires of others. To be ready for the future, we need to learn to think and act in a coherent way, taking into account alternative ideas and views in the short and long term." Note that the" world of unequal opportunities" by the authors of the project is considered as a constant, and, accordingly, all these "good" qualities are designed to protect the foundations of the "world of unequal opportunities". The authors do not see that the existing socio-economic models have exhausted their progressive potential and their replacement with new ones based on different values in contrast to the values of the "world of unequal opportunities" is on the agenda.

The authors of the project write: "Taking responsibility. Interaction with novelty, change, diversity, uncertainty implies the ability of a person to think independently and to work in a team. At the core of this competence is the ability to self-regulate, including self-control, personal effectiveness, responsibility, the ability to solve problems and adapt." It is all this that the evolution of man and humanity demonstrates to us. Man is a social being and therefore all these are attributes of his everyday existence. It was always declared. If the authors believe that this was not the case in practice, the question is why it was not and what needs to be done to make it happen. Simply repeating the declaration does not change or solve anything, it simply does not formulate the problem. And without a formulated problem, there can be no real solution.

After all this, the authors of the project proclaim "12 principles of designing an educational program". And that no one doubts their thoroughness, they assure that they "have passed the test of time in different cultures and contexts." And somehow aside there is that the principles which have passed "test of time in various cultures and contexts" of the leaving world, can and not work in the conditions of the new emerging world. Naive belief in the "time-tested" is at the heart of any cosmetic changes in education, but when carrying out a radical reform of educa-

tion, we need not faith in authorities, but specific knowledge of whom, why, what and how to teach.

The principles of design of the educational program allocated by authors concern the sphere of their professional activity where they feel, as a fish in water, and therefore do not cause any significant objections and, most likely, will become a basis of the developed educational programs. The question is not whether the programs will be developed competently or not, but whether they will allow the new school to solve new problems, or will reverse the old versions of the old school's work.

Sources for discussion

1. Education 2030. Incheo Declaration. Framework for Action Towards Inclusive and Equitable Quality Education and Lifelong Learning for All. (Final draft for adoption). http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/ED/ED_new/pdf/FFA-ENG-27Oct15.pdf

2. Organisation for Economic Co-operation and Development (OECD). Future of Education and Skills 2030 Concept Notes, 2019.

http://www.oecd.org/education/2030-project/

https://perspectives.uwcsea.edu.sg/points-of-view/taking-part-oecd-education-2030-project

3. The Future of Education and Skills Education 2030.

https://www.oecd.org/education/2030/E2030%20Position%20Paper%20(05.04.2018).pdf

4. OECD Future of Education and Skills 2030: OECD Learning Compass 2030

https://www.youtube.com/watch?v=M3u1AL_aZjI

5. OECD Learning Compass 2030 Provides Teachers, Students, and Employers with Milestones for Workforce Success. By David Ross

https://www.gettingsmart.com/2019/06/oecd-learning-compass-2030-provides-teachers-students-and-employers-with-milestones-for-workforce-success/

6. The Future of Education and Skills Education 2030

https://www.oecd.org/education/oecd-education-2030-flyer-2019.pdf

7. Михо Тогума, старший аналитик Управления образования и навыков OECD. Образование 2030. Переосмысление ОЭСР ключевых компетенций

https://conferences.nis.edu.kz/wp-content/uploads/2016/09/OECD-Learning-Compass-2030%D0%A0%D0%A3%D0%A1%D0%A1_.pdf

达吉斯坦流行病在俄罗斯作家中的作用
（以A.A. Bestuzhev-Marlinsky，L.N. Tolstoy，V.I. Nemirovich-Danchenko的作品为例）

THE ROLE OF DAGESTAN PAREMIAS IN THE WORK OF RUSSIAN WRITERS (ON THE EXAMPLE OF THE WORKS OF A.A. BESTUZHEV-MARLINSKY, L.N. TOLSTOY, V.I. NEMIROVICH-DANCHENKO)

Gasharova Aida Ruslanovna
Candidate of Philological Sciences, Research Officer at the Department of Folklore
G. Tsadasi Institute of Language, Literature and Art
Dagestan Federal Research Center of the Russian Academy of Sciences

抽象。 对语言和文学中民族成分的研究是当前语言学的重要任务之一。 我们的工作目的是证明达吉斯坦民俗（即谚语和谚语）在俄罗斯文学中的作用。 本文讨论了达格斯塔尼（Dagestani）流行病在十九世纪俄罗斯作家作品中的使用，作者利用这些作品来建立他们与特定生活状况的联系，以增加艺术品的信息含量，欣赏力，表现力， 并增强其对读者的影响。

关键词：语言和诗意的创造力，小的格言体裁，达吉斯坦爱病症，俄罗斯文学，谚语和谚语，传统主义，解释，借用，转型。

Abstract. *The study of the national component in language and literature is one of the important tasks of the philological science of the present. The purpose of our work is to demonstrate the role of Dagestan folklore, namely proverbs and sayings, in Russian literature. The article discusses the use of Dagestani paremias in the works of Russian writers of the XIX century, which are used by the authors to establish their connection with a specific life situation, to increase the information content of a work of art, appreciation, expressiveness, and enhance their impact on the reader.*

Keywords: *verbal and poetic creativity, small aphoristic genres, Dagestan paaremias, Russian literature, proverbs and sayings, traditionalism, interpretation, borrowing, transformation.*

“Caucasian, “eastern” themes in the history of Russian literature have acquired the character of a literary tradition. Appeal to the adjacent, economically, culturally, politically connected with Russia to the Caucasus was inevitable in the conditions of constant relations” [1, p.129].

The diverse creative ties of Russian literature of the second half of the XIX century with Dagestan folklore are also manifested in small aphoristic genres. Of all the genres of folklore, Russian writers preferred paremias as one of the main means of describing and self-characterizing a character in a work of art. An active appeal to folk wise sayings was typical of that time, because familiarity with folk morality and philosophy through the study of proverbs and sayings contributed to a better perception and understanding of the character and mores of the people studied. Equipping his works with folk sayings, paremias do not seem alien quotes, but harmoniously merge with the author's speech.

Folk proverbial speech influenced the work of A.A. Bestuzhev-Marlinsky. The writer does not perceive folklore abstractly, in isolation from the medium, performers. He is not interested in folklore works as individual “exhibits”. He considers folklore primarily in connection with life. Marlinsky was one of those writers who “did not get his impressions of Dagestan life through random sources, but received them as a result of direct communication with the population of the city of Derbent and other places in Dagestan” [7, p. 590-591].

Proverbs and sayings of Derbents, which are not obsolete and are currently functioning, noted publicist F.N. Orudzhev [8].

Closely connected with Dagestan and its folklore is the story “Mulla-Nur” [2, p. 122–261], which saw the light after Marlinsky’s departure from Dagestan. In the very design of the story, Marlinsky pays tribute to folklore, using small folklore genres as chapters for epigraphs. First, he gives them in the original language (with Russian transliteration), and then translates.

So, the proverb serves as the epigraph to the fourth chapter: “From the place where it burns, smoke always rises”, the eighth chapter is preceded by the epigraph, signed by the author as “proverbial verse”: “Do not go through the crafty bridge: let rapids take you; do not lie in the shadow of a fox: let the lion tear you apart!” The story also ends with a proverb. So, in the final chapter it is said: "Enemies arise from a native tribe."

“Proverbs are scattered in the story, including those of Dagestan origin, for example: “A coward dies a hundred times, brave dies once”, “Headache from small children, heartache from big ones”. It is the proverbs that are the source of the aphoristic coloring of the heroes' speech” [5, p. 195]. Such is the speech of Iskander-bek: “Take a weapon, take a horse; but as long as there is a charge in the muzzle, and the soul in the body, the hand of shame will not touch either this castle or this bridle!” [7, p. 386].

Oriental aphorisms and folk proverbs, which are one of the artistic means that create the reader a sense of authenticity of material, fill the novel “Ammalat-bek” [2, p. 3–121]. For example: “Don’t sell a falcon in the sky, sell when you put it on the glove”, “Not the winner, who has the field, the one who has the glory, but

the glory to the one who values death above captivity", "It's better to die from a bullet, than from a shameful rope". There are rare, but no less colorful proverbial sayings: "The tiger in no match for the Dagestan wild boar", "The Avar's heart is as solid as the granite of its mountains, the heart of the Dagestan is tempered as their glorious damask", "Lies cannot bring happiness," "Even in heaven, angels are few", etc.

In the story we find the first mention in Russian literature of the traditional inscriptions made by Dagestanis in arms. An aphorism is carved on the dagger of Ammalat-bek: "Be slow to resent, but soon to revenge". The same aphorism is also given as an epigraph to the story.

The Caucasus had a great influence on the famous "Caucasian tales" by L.N. Tolstoy, in which "there is significant material with a detailed description of mountain life, stories about the traditions and rituals of the inhabitants of the Caucasus" [4, p. 226]. This influence is so deep that in places the writer "uses phrases from their languages".

Tolstoy's knowledge of the folklore and ethnographic characteristics of the highlanders is most evident in Hadji Murad [7]. So, a figurative expression, a symbolic comparison of a brave young man with a falcon, a hawk, is characteristic not only of Dagestan, but also of Russian song folklore. Talking about his flight from the Russians, Hadji Murad proudly exclaims: "I, like a hawk, having folded my wings, jumped down into the abyss." A similar expression can be found in the famous Avar folk song "About the limp Razhbadin", in which it is sung how the hero rushed at the enemy "having squeezed wings like an eagle-falcon" // «кьуркьби данде къараб цIум-хъарчигъа».

As semantic and textual parallels, a number of characteristic examples can be given.

What is the semantic and expressive-figurative function of folklore and ethnography of this story? Folklore genres (songs, proverbs, sayings) manifest themselves in the story in different ways: they either merge into the context of the story, sometimes not completely, but in semantically main parts, or are fully present in the text.

Tolstoy has an unusually subtly developed sense of language. Many phrases that are pronounced in the story by the Avars, in these cases give the impression of being literally translated from the Avar language, so Tolstoy was able to liken his style to the style of the Dagestan, which he seems to translate literally from his own language before speaking. Such phrases can be an example: "We needed his blood for khans. We pretended to submit, but only thought how to take blood from him" (ав.: кьисас босизе – бобосизе; лезг.: кьисас къахчун – кьисасдиз кьисас хъувун) or "We ordered to say that we agree to accept the Gazavat, if only he would send a learned person to explain how to keep it."

The imagery of the language of the story also brings it closer to highland folklore. For example, Tolstoy speaks of "as a donkey's head" about the small aul Tselmes (the birthplace of Hadji Murad). So the small size of the aul is characterized by Avars («ХIамил бетIер гIанасеб росо») and laks («ттукул бакIукса щар»). Or, another example: "cowards, drunken mice." This expression is not familiar to the Russian reader, and in Dagestan the image of a drunk and boastful mouse is a household word (the proverbial expression is taken from the parable about how the mouse was captured by a cat).

The aphoristic genres of Dagestan folklore, widely represented in the story, are for the most part borrowed from the first issue of the Collection of Information on Caucasian Highlanders [9]. Without any changes to the story, proverbs are introduced: Avar - “The rope is good when it’s long and the speech when it’s short” («РагIи къокьаб лъикIаб, квар халатаб лъикIаб»); лакская – “A woman has as much mind in her head, as there is hair on an egg” («Ккунукрай чIаракссар хъаннин аккъIубусса») and other. From the Collection, the writer also borrowed some factual material for the future Caucasian story.

It seems interesting to us how, in the presentation of Tolstoy (in the story "Hadji Murad"), the Avar proverb takes on the character of a parable. When Hadji Murad is asked his opinion about women at the Vorontsov’s ball, he diplomatically replies: “We have a proverb ... a donkey treated a dog with hay, and the dog treated donkey with meat - both remained hungry ... Each nation has its own custom” [7, p. 120]. Indeed, the Avars have a proverb: «Гьойца хIамие гьан кьурабила, хIамица гьой хер барабила, кIиябгоги бакъуца хварабила» – « A dog gave meat to a donkey, donkey laid hay to a dog, both died of hunger ».

More often than proverbs, Tolstoy uses numerous sayings that are especially easy to merge with the context, especially since the author often paraphrases them. For example, Hadji Murad thinks of Shamil: "He is a fox - he will deceive." This is given in the canonical (i.e., last, final) edition of the story. In previous versions it was more voluminous: “Gamzat was a fox, but Shamil was a fox’s tail.” This expression has Dagestan roots: according to the traditional in Dagestan folklore, the expression of fox cunning is the fox tail. In oral life, this proverb has a slightly altered speech form. For example, Lezgins say: “If you are a fox, then I am a fox’s tail” («Вун сикI ятIа, зун адан тум я»). For Avars this proverb sounds like this «Мен цер батани, дун царал рачI буго». In this example, we see how the saying, gradually paraphrasing more and more and moving away from its base, could give rise to the above comparison of Shamil with the fox.

In the same example, we see how Tolstoy, in the process of working on a story, having collected many Dagestan folklore materials, not only does not try to use them completely, but, on the contrary, rejects a lot of things in his quest for simplicity and accuracy of presentation, leaving only quintessence.

Thus, the influence of proverbs and sayings on Tolstoy's prose works was manifested either in the form of their literal reproduction in the context or in the rephrased form, more often in the form of sayings that are close in spirit to them; thereby contributing to the creation of images and plots that reveal the idea of folk proverbs. Using foreign proverbs, Tolstoy simultaneously rethought and rebuilt them in the Russian folk style. Dagestan words and expressions, creatively processed by the writer, organically entered the system of Tolstoy's works.

The proverbial elements are also reflected in many stories of I. V. Nemirovich-Danchenko [6]. His knowledge of Dagestan folklore is evidenced by his frequent and bold appeal to local sayings and proverbs. For example: “Corn at home is better than sorbet at a bazaar”, “Raise any stone - and under it you will find varnish”, “The falcon that lowers its wings from the fact that the crows spread over it is bad. Folklore material by the author is redesigned in its own way original, without preserving the details that give out the source.

Thus, the Dagestan folk paremias (proverbs and sayings), as well as “winged words”, borrowed from oral and poetic creativity, had a noticeable effect on some works of Russian writers. Using sayings and proverbial sayings in their work, they revived their presentation, which, to some extent, contributed to the authenticity of the text of a work of art.

References

1. Abdulaeva M.Sh. Russian-Dagestan literary discourse in the context of a dialogue of cultures // Theory and practice of social development. 2011. № 2. P. 129-132.

2. Bestuzhev-Marlinsky A.A. Ammalat Bek. Mullah Nur. Makhachkala: Dagknigoizdat, 1968. 261 P.

3. Bestuzhev-Marlinsky A.A. Works in two volumes. v. 2. M.: "State publishing house of fiction", 1958. 740 P.

4. Gadzhalova G.R. Reflection of the national culture of the peoples of the North Caucasus in L. N. Tolstoy’s short story “Prisoner of the Caucasus” // Philological sciences. Questions of theory and practice. Tambov: Diploma, 2018. № 4 (82). Part 2. P. 225–228.

5. Gasharova A.R. Dagestan folklore motifs in the work of A.A. Bestuzhev-Marlinsky // Litera. 2019. № 6. P. 185–196.

6. Gasharova A.R. Reflection and transformation of Dagestan folklore and ethnography in the work of V.I. Nemirovich-Danchenko // Bull. Sarat. un-ty. New ser. Ser. Philology. Journalism.2019. V. 19, Issue 2. P. 204–207.

7. Magomedov A. J. Ethnocultural realities of Dagestan in the stories of A.A. Bestuzhev "Ammalat-bek" and "Mulla-Nur." In the collection: Problems of the study of national cultures: proceedings of the International Scientific Conference. Makhachkala: IALI DSC RAS, 2015. P. 584–592.

8. Orudzhev F.N. In the footsteps of Dede Korkuda. Derbent 2005. 38P.

9. Collection of information about the Caucasus: V. 1–7 / ed. N. Seidlitz. Tiflis, 1871–1885. V. 1. 1871. 342 P.

10. Tolstoy L.N. Haji Murat. Makhachkala: Dagknigoizdat, 1979. 352 P.

“阿拉伯Chrestomathy”（1875-1876年）V. F. Girgas和V. R. Rosen在俄罗斯
“THE ARABIC CHRESTOMATHY” (1875-1876) BY V. F. GIRGAS AND V. R. ROSEN IN RUSSIA

Akinina Olga Grigoryevna
Candidate of Philological Sciences, Associate Professor
Institute of Asian and African Countries
Lomonosov Moscow State University

注解。 V.F.教授 吉尔加斯（Girgas，1835-1887年）是第一位阿拉伯主义者，可以被认为是俄罗斯阿拉伯科学新学院的创始人。 他的主要兴趣扩展到阿拉伯语法理论的研究。 V.R.教授 罗森（1849-1908）是他的学生，东方科学新学校的发展主要与罗森（V. R. Rosen）的名字有关。 V.F.创作的基本作品之一 Girgas和V.R. 罗森（Rosen）是“阿拉伯语的Chrestomathy”（1875-1876年），从出现之初就获得了光荣的宣传和知名度，并被许多西方大学的最佳教科书之一使用。 即使到现在，Chrestomathy仍然在研究古典阿拉伯语言时保持其能力的重要性和批判性选择文本的所有重要性。

关键字。 阿拉伯语Chrestomathy，V.F.教授 Girgas，V.R.教授 罗森，19世纪，俄罗斯。

Annotation. *Professor V.F. Girgas (1835-1887) was the first arabist, who may be considered the founder of the new school of Russian Arabic science. His main interests extended to studying of the Arabic grammatical theories. Professor V.R. Rosen (1849-1908) was his pupil and the development of the new school of Oriental sciences was mainly connected to V. R. Rosen's name. One of the fundamental works created by V.F. Girgas and V.R. Rosen is “The Arabic Chrestomathy” (1875-1876), which acquired an honourable publicity and popularity from the moment of its appearance and came into use as one of the best textbooks at a number of the western universities. Even now the Chrestomathy has maintained all its importance of a competent and critical selection of texts when studying the Arabic language.*

Keywords. *Arabic Chrestomathy, Professor V.F. Girgas, Professor V.R. Rosen, 19th century, Russia.*

By the end of the 19th century the teaching of Arabic in Russia developed rapidly in different universities, for example, in Moscow and Kazan, due to the understanding of all the state matter importance of this oriental language. As for St. Petersburg, the teaching of Arabic began there later than in the other scientific centers, when the two necessary conditions had been provided: the continuity of the teaching of the Arabic language at a higher school and gradual expansion of manuscript materials accessible for research.

In 1855 the Faculty of Oriental Languages was established at St. Petersburg University. From the autumn of 1865 Mr. V. F. Girgas (1835-1887), the first arabist, who may be considered "the founder of the new school of our Arabic science" started teaching there. [5, p. 136] The main interests of V. F. Girgas extended to studying of the Arabic grammatical theories which his doctorate thesis (1873) was devoted to. Mr. V. R. Rosen (1849-1908), his pupil, became well known much wider and some earlier than V. F. Girgas did, while the development of the new school of Oriental sciences was connected to V. R. Rosen's name. It is from the mid 80s that Rosen began to hold a leading position at the Faculty of Oriental languages where he had been the Dean for almost 10 years (1893-1902).

In the second half of the 19th century the compilation of a new Arabic chrestomathy became an imperative need for the Russian Arabic Science, as the only Arabic chrestomathy with a Russian dictionary, that is Chrestomathy by A. V. Boldyrev in its two publications (1824 and 1832) had gone out of date long before and did not meet the dictates of time, apart from that it had become a rare book. So in 1875-1876 the Professors V.F. Girgas and V.R. Rosen created the new "Arabic Chrestomathy". They wrote that it "was destined for reading under guidance of a professor, therefore the articles in it are not arranged in accordance with the language difficulty". [4, p. 4]. The authors preferred a chronological order in each of the four sections: history, geography, grammar and poetry, "having introduced in the beginning a considerable number of short anecdotes and more or less long stories". [4, p. 4].

V.F. Girgas and V.R. Rosen limited themselves to the works of the "blooming period" of the Arabic literature (from the 3rd to the 7th centuries of Hijra) for the prose extracts (the extract from Ibn Baṭṭūṭa is the only exception). As for the Poetry the authors took works from the pre-Islam period before the 7th century. When selecting the articles the preference was given to those ones that represented something integral, so that the reader could obtain a definite idea about the author's manner of describing.

The excerpts included into the Chrestomathy were taken from both published and unpublished works, which were thoroughly listed in the preface to the textbook. In this respect it can be opposed to the Chrestomathy by A. V. Boldyrev, who wrote: "About the choice and arrangement of the plays placed in … the Chrestom-

athy I let the educated connoisseurs to judge who will also see easily the sources which I have taken the materials from". [2, p. II].

Prose works on historical and geographic subject matters, as well as excerpts from grammatical treatises were included into the First Part of the Chrestomathy by V. F. Girgas and V. R. Rosen. This Part consisted of the following works:

Sources	Arabic name of the section and its literal translation
	من كتاب الجامع الصحيح للإمام العلامة ابي عبد الله محمد البخاري From the book "Al-jāmi' aṣ-ṣaḥīḥ" by the outstanding scientist, imam Abū 'Abdullāh Muḥammad al-Bukhārī
Abū 'l-Qāsim Maḥmūd az-Zamakhsharī ربيع الأبرار "The Spring of the Pious", al-Abshighī كتاب المستطرف في كل فن مستظرف "The Book of Extracts from Each Fine Art"; the Chrestomathy by Arnold (Arnold F.W. Chrestomathia Arabica. Halis, 1853)	نوادر وحكايات Short anecdotes and stories
Abū Muḥammad 'Abdullāh bin Kutayba ad-Dīnawarī كتاب عيون الأخبار The book "The Sources of Information"; Abū 'Uthmān 'Amr bin Baḥr al-Jāḥiẓ كتاب المحاسن والاضداد "The Book about Amenities and Opposites"; كتاب المستجاد في فعلات الأجواد "The Book of the Worthy Person in Generous Affairs" – the manuscript by an unknown author; Muḥammad Ziyāb al-'Itlidī اعلام الناس بما جرى للبرامكة مع بني العباس "The Notification of the People about what Happened between the Barmakids and the 'Abbasids"	حكايات Stories

Abū ’l-Fatḥ Muḥammad ash-Shahrastānī كتاب الملل والنحل “The Book of Sects and Creeds”	آراء العرب في الجاهلية The Arabs’ views at the pre-Islamic period
Abū Muḥammad ‘Abd al-Malik bin Hishām كتاب سيرة رسول الله The Book “The Life of the Prophet“	من كتاب سيرة رسول الله From the book “The Life of the Prophet”
Abū ‘Abdullāh Muḥammad al-Wāqidī كتاب المغازي "Book of (History and) Campaigns"	غزوة بدر الكبرى The Great battle at Badr
Abū Ja‘far Muḥammad bin Jarīr aṭ-Ṭabarī تاريخ الملوك “History of (the Prophets and) Kings”	من تاريخ الملوك للطبري From “History of the Kings” by aṭ-Ṭabarī
Abū ‘Umar Aḥmad bin ‘Abd Rabbihī al-Andalusī كتاب العقد “The (Unique) Necklace”	أخبار الحجاج The News about disputes
Abū Ḥanīfa Aḥmad bin Dāwud ad-Dīnawarī كتاب الأخبار الطوال “General History”	ذكر أواخر دولة بني أمية The recollection about the last days of the State of the Omeyyads
Abū ’l-Ḥasan ‘Ali al-Mas‘ūdi كتاب مروج الذهب ومعادن الجواهر The book “The Meadows of Gold and Mines of Gems”	ذكر خلافة محمد الامين The recollection about the caliph Muḥammad al-Amīn
‘Izz ad-Dīn Abū ’l-Ḥusayn ‘Ali bin al-Athīr كتاب الكامل في التاريخ “The Complete History”	نبذة في سيرة السلطان صلاح الدين بن ايوب The story about the life of the sultan Ṣalāḥ ad-Dīn bin Ayyūb
Abū Isḥāq Ibrāhīm al-Iṣṭakhrī كتاب مسالك الممالك The Book ”Routes of the Realms”	ارض الشام The land of Syria
Abū ’l-Qāsim bin Ḥawqal كتاب المسالك والممالك “The Book of Journeys and Countries”	العراق Iraq
Shihāb ad-Dīn Yāqūt al-Hamawī معجم البلدان “The Dictionary of the Countries”	ذكر مدينة بغداد A Recollection of Bagdad

	رسالة احمد بن فضلان A letter by Aḥmad bin Faḍlān
Abū ‘Abdullāh Muḥammad bin Baṭṭūṭa كتاب تحفة النظار في غرائب الأمصار وعجائب الأسفار “A Masterpiece to Those Who Contemplate the Wonders of Cities and the Marvels of Travelling”	سفر ابن بطوطة الى دشت قفجك The Journey of Ibn Baṭṭūṭa to Desht-i Qypchaq
Abū Bishr ‘Amr bin ‘Uthmān Sībawayhi الكتاب “The Book”	من الكتاب لسيبويه From “The Book” by Sībawayhi
Abū ‘Ali al-Ḥasan al-Fārisī كتاب الإيضاح والتكملة “The Book of Explanation and Addition”	من كتاب الإيضاح في النحو للفارسي From the book on grammar “Al-īdaḥ” by al-Fārisī
Kamāl ad-Dīn Abū l-Barakāt ‘Abd ar-Raḥmān bin al-Anbārī كتاب الإنصاف في مسائل الخلاف بين النحويين البصريين والكوفيين The Book “A Fair Presentation of the Issues of Disagreements between the Linguists from Basra and Linguists from Kufa”	مسائل من كتاب الإنصاف في الخلاف للانباري From the book by al-Anbārī “A fair presentation of the issues of disagreements…”

The Second part of the chrestomathy included poetic works of such authors as:

The Poem was published in conformity with its conveyance and comment by Abū l-‘Abbās al-Mubarrad	لامية العرب للشنفرى Ash-Shanfarā “Lāmiyyat al-‘arab”
Abū Tammām “Hamāsa” (“Exhortation”); the divan by the Guzaylits, the commentary on “Maqamas” by al-Harīrī and al-Qazwīnī	قال تأبط شرا Said Ta’abbaṭa Sharran

The Divans of the Six Ancient Arabic Poets (London, 1870); The Kamil of al-Mubarrad, Leipzig, 1864-1875; Noeldecke “Beitrage zur Kenntniss der Poesie der alten Araber”;. Al-Yūsī (اليوسي) كتاب زهر الاكم في الأمثال والحكم The Book “Flowers of Hills in Proverbs and Wise Aphorisms”; as-Suyūṭī شرح شواهد المغني “Interpreting of Poetic Citations from “Al-Mughni”; Abū ’l-Faraj al-Iṣfahānī “Kitāb al-aghānī" “The Book of Songs” (“Abu’l Faradsch Ali Ispahanensis Liber cantilenarum”, Greifswald, 1840, t.1); Abū l-Faḍl Aḥmad bin Abī Tāhir Ṭayfūr (طيفور) كتاب المنثور والمنظوم “Book of Prose and Poetry”	قال امرؤ القيس Said Imru’u ’l-Qais
	قال عنترة Said ‘Antara
	قال زهير Said Zuhayr
	قال طرفة Said Ṭarafa
	قال علقمة الفحل Said ‘Alqama al-Faḥl
	قال النابغة الذبياني Said an-Nābigha adh-Dhubyānī
	قالت الخنساء Said al-Khansā’
	قال متمم بن نويرة اليربوعي Said Mutammim bin Nuwayra al-Yarbū‘ī
	قال عمر بن ابي ربيعة Said ‘Umar bin Abī Rabī‘a
“The Divan” by al-Akhṭal	قال الأخطل Said al-Akhṭal
Le divan de Ferazdak, Paris, 1873-1876	قال الفرزدق Said al-Farazdaq
Al-Qurashī جمهرة أشعار العرب “A Collection of Verses by Arabs”	قال الكميت بن زيد الأسدي Said al-Kumayt bin Zayd al-Asadī
Noeldecke “Beitrage zur Kenntniss der Poesie der alten Araber”;. “Kitāb al-aghānī” “The Book of Songs” by Abū ’l-Faraj al-Iṣfahānī	قال بشار بن برد Said Bashār bin Burd

Der Divan des Abu Nowas, Greifswald, 1861; Ahlwardt's introduction to his "El-fachri, Geschichte der islam. Reiche etc." Gotha 1860.		قال ابو نواس Said Abū Nuwās
Diwan Moslim ibn ol Walid etc. Lugd. Bat. 1875.		قال صريع الغواني مسلم بن وليد الأنصاري Said Ṣarī‘ al-Ghawānī Muslim bin Walīd al-Anṣārī
"The Divan" by Abū 'l-‘Atāhiya		قال ابو العتاهية Said Abū 'l-‘Atāhiya
Mutanabbī Carmina etc., Berolini, 1861		قال المتنبي Said al-Mutanabbī
"The Divan" by Abū 'l-‘Alā' al-Ma‘arrī لزوم ما لا يلزم "Unnecessary Necessity"		قال ابو العلاء المعري Said Abū 'l-‘Alā'al-Ma‘arrī
Al-Bayano-l-Mogrib par Ibn Adhari, Leyde 1849-51, t.II; Dozy, Notices sur quelques Mscr. Ar. ; al-Makkari, Analectes sur l'histoirede l'Espagne, t.I ; Dozy, Abd al-Walid, the History of the Almohades, etc.; Dozy, Scriptorum arabum Loci de Abbadidis, Lugd. Bat. 1846-63, t.I.	Said ‘Abd ar-Raḥmān bin Mu'āwiya ad-Dākhil	قال عبد الرحمن بن معاوية الداخل
	Said Sa‘īd bin Jūdī as-Sa‘dī	قال سعيد بن جودي السعدى
	Said Yaḥyā bin al-Ḥakam al-Bakrī Al-Jayyānī	قال يحيى بن الحكم البكري الجياني
	Said Abū Muḥammad ‘Ali bin Ḥazm	قال ابو محمد علي بن حزم
	Said al-Wazīr Abū 'l-Mughīra bin Ḥazm	قال الوزير ابو المغيرة ابن حزم
	Said Abū 'l-Walīd Aḥmad bin Zaydūn	قال ابو الوليد احمد بن زيدون
	Said al-Mu‘tamid ‘alā 'llāhi Abū 'l-Qāsim Muḥammad bin ‘Abbād	قال المعتمد على الله ابو القاسم محمد بن عباد
	Said Abū 'l-Baqā' Ṣāliḥ bin Sharīf ar-Rundī	قال ابو البقاء صالح بن شريف الرندي

With the purpose of working on the chrestomathy V. F. Girgas specially compiled "The Dictionary to the Arabic Chrestomathy and the Qur'an", that was published in 1881 in Kazan. The author explained the inclusion of all words that are found in the Qur'ān by the fact that their study is necessary to Arabists. Apart from that he sought "to spare for the starting time the students from the need in other dictionaries". [3, p. 3] As I. Yu. Krachkovski mentioned, the dictionary by V. F. Girgas "quite satisfied its tasks and served a reliable manual for the tuition purposes" which the Arabists had been using during quite a long period of time. [6, p. 203]

In the Chrestomathy by V. F. Girgas and V. R. Rosen the manuscripts were used from the Asian Museum, which appeared at St. Petersburg Academy of Sciences in 1818. For a long time this museum had provided the Academy with manuscript materials available for research. They appeared in the museum from various sources. For instance, in 1819 the Asian Museum managed to acquire a great collection of Arabic, Persian and Turkish manuscripts, compiled by Mr. Rousseau, a diplomat and bibliophile. In 1825 the museum collection was replenished with other acquisitions, and from that time on the Asian Museum's funds had kept increasing continuously. These collections immediately let Russia to equal with the Western countries, that had started to compose their collections as far back as from the 17th century.

The "Arabic Chrestomathy" (1875-1876) created by V. F. Girgas and V. R. Rosen was one of the fundamental works, which acquired an honourable publicity and popularity from the moment of its appearance. It came into use as one of the best textbooks at a number of the western universities and even now has maintained all its importance of a competent and critical selection of texts when studying the Arabic language.

References

1. Akinina, O.G., Arabskiye hrestomatii 19 veka v Rossii // Arabskaya Filologiya, Vipusk 3, Moskva, 2008.

2. Boldyrev, A. V., Novaya arabskaya hrestomatiya, Moskva, 1832.

3. Girgas, V.R., Slovar k Arabskoy hrestomatii i Koranu, Kazan, 1881.

4. Girgas, V. F., Rosen, V. R., Arabskaya hrestomatiya. Sankt Peterburg, 1875-1876.

5. Krachkovski, I.Yu., Izbranniye sochineniya, Moskva, Leningrad, 1958, vol. 5.

6. Krachkovski, I. Yu., Ocherki po istorii russkoy arabistiki, Moskva, Leningrad, 1950.

在天体换说结构中的文化成分
CULTURAL COMPONENT IN THE STRUCTURE OF THE PERIPHRASES OF CELESTIAL BODIES

Du Chunyang
Postgraduate
Tambov State University named after G.R. Derzhavin

摘要 ： 本篇文章致力于理解换说的单位和天体称名。论证换说不仅反映了语言的系统组织的特殊性 ，并且反应了民族文化的世界图景。以太阳和月亮的换说词汇含义为例，论证了在换说意义方面，天体形象在民族世界图景的方向符合现实，属于文化成分的换说意义的结构 ，占有特殊位置。
关键字: 换说名称，天体，文化成分

Abstract. *The article is devoted to the comprehension of peripheral units that nominate celestial bodies. It is proved that periphrases reflect not only the peculiarities of the systemic organization of a language, but also the national and cultural worldview. Using the example of the lexical meaning of the periphrases of the sun and the moon, it is proved that the perception of images of celestial bodies in the aspect of understanding the national picture of the world is actualized in peripheral meanings, where the cultural component holds a special place in the structure of peripheral meaning.*
Keywords: *peripheral names, celestial bodies, cultural component.*

Periphrases are characteristic product of human activity, in which national cultural images, tastes, customs are vividly reflected, and the unique knowledge of the people about celestial bodies is concentrated.

Understanding the term “periphrase” includes its main feature - a secondary descriptive nomination (“from Greek. Periphrasis - descriptive expression) - “a descriptive designation of an object, concept, phenomenon, person, suggesting its indirect, indirect name through underlining, highlighting any side, quality, sign, features of manifestation (or activity), essential, relevant in this *context*, in this situation ”[1, p. 489].

In this definition, the word “context” is noteworthy, which reflects the main components of periphrastic meaning: nominative, expressive, allegorical, individually-authored, pragmatic and others [2], which contribute to the realization of the integral meaning of the peripheral unit. Among these components the cultural component stands out.

The provision that each ethnic group in its own way divides the "surrounding world" has already become a textbook evidence that the specific relationship of language with reality is reflected in the linguistic forms of a particular language system. According to A.B. Novikova, periphrases are “a special type of stable combinations”, and “many periphrases include in their semantic and figurative structure a cultural component that reflects the national identity of a people - native speaker of a particular language, its history” [3, p. 5].

Thus, the successful understanding of Russian periphrases by native speakers of the Chinese language largely depends on the knowledge of the national-cultural component in the linguistic semantics and the cultural value system - worldview and lifestyle. In the study of peripheral units, historically transmitted patterns of meanings are important, a system of ideas inherited from ancestors, concepts expressed in traditional images, with the help of which a person consolidates and passes on to new generations his knowledge of life and his attitude to it [4, p. 50].

Periphrastic names of celestial bodies can be nationally specific, since each nation in its own way represents a picture of the world. In Russian, the word MOON - is not at all what the moon is in Chinese.

Cm.: WOLF SUN paraphrase in the poem “Night – an old friend…” by Vera Konstantinovna Kharchenko (a modern outstanding Belgorod linguistic scholar and famous poet).

«Светит волчье солнышко,
Освещает спящего,
Сеет полночь с донышка
Зерна предстоящего» (
«Ночь – подружка давняя…».

However, among Russian peripheral names for MOON in the Russian language, most often the reference component is not the word “солнышко”, but the neutral word “солнце” in combination with the adjective WOLF.

«Где ж ты СОЛНЦЕ моё ВОЛЧЬЕ?..
Дотянуть бы до ночи...
Повыл бы вдоволь тебе...»
Аксёнов Виталий «Волчье солнце»
«Порвалась в клочья тишина
Полночным воем,
Я Волк, а Ты моя Луна,
И я Твой воин…
Душа летит Тебе во след
И песней льётся,
Я Белый Волк,
А Ты мой свет,

Ты – ВОЛЧЬЕ СОЛНЦЕ.

Alexander Bunakov "*Волчье Солнце*"

In the minds of people in Russian culture, the image of the moon causes mystical associations, people associated the activity of animals with the night luminary.

An interesting fact is that dictionary interpretations do not provide an understanding of why the word “wolf” is so actively used in the Russian periphery of the MOON Cm: 1. Wolf is a predatory animal of the canine family [6]. 2. Wolf - a predatory animal related to the dog [7].

Meanwhile, in the story of Vasily Shukshin “Wolves” a description of the wolf is given with the help of the token “beast”, which is not noted in the dictionary entries. If in the dictionary definitions the combination “predatory animal” is given, then in the description of Vasily Shukshin the word “wolf” is not only a predatory animal, but also a fierce predator that always causes fear in humans.

«*Now I realized that a wolf - wolf, a beast. The most fierce dog can still stop something at the last moment: fear, affection, unexpected imperious shout of a person. This one, with a burning face, could only be stopped by death. He did not growl, did not scare ... He was catching up with the victim. And the look of his round yellow eyes was straight and simple*».

Representation of the image of the aggressive action of this beast is associated mainly with the actualization of such a thing as the “animal howl” of the wolf, causing a feeling of fear. In the novel "Live and Remember" Valentin Rasputin describes the wolf howl as a "creepy song" of a wolf, before which everything fades, freezes and hardens.

«*The wolf settled on the backs of the winterhouse and dragged on his creepy and sharp song in one long breath. Everything in the world faded before it - as such a thin cutting blade, gleaming in the dark, this voice stepped up to your throat*».

The examples of describing the image of the wolf in fiction objectify a set of signs that are realized in terms of the content of zoomorphic periphrase: MOON → NIGHT → WOLF → FEAR.

The artistic description of the image of the wolf and the periphery of the moon with the image of the wolf enrich the content of the moon's periphrastic nomination, which reflects a feeling of fear (in the period of early Christianity, the image of the wolf was a symbol of the devil and heresy, it was figured in the folklore of the Slavs as a werewolf).

In China, the image of MOON is not associated with a negative image. Among the common legends about MOON the following stand out: “They say that in the middle of the moon there are rabbits and toads.” Therefore the MOON is called «

SILVER BUNNY», «BUNNY», «TOAD-BUNNY», «GOLDEN TOAD», «SILVER TOAD». «SILVER HOOK» «JADE HOOK».

The moon in the Chinese tradition symbolizes “a home, memories of loved ones and pure love”, as well as loneliness and homesickness [8, p. 47]. The worship of the Moon in China has a long history, it is to some extent personified by the Temple of the Moon, which is located in Beijing, built by the Ming Dynasty specifically to pray to the Moon. Modern Chinese people deeply revere the full moon festival as a family holiday, when a long-awaited vacation and a meeting with relatives comes.

To represent the SUN in Chinese culture, the positive symbol of the *goat/sheep*, an animal that is associated with the best qualities and properties, is used.

In Russian culture, the peripheral nomination of the SUN is presented as a RED CALF in a poem by Sergei Yesenin. "The winds did not blow in vain ..." The poet nominates the key unit of Russian linguistic culture, reflecting the idea of the vocabulary of the semantic sphere “animal world” in rural life, reflecting the image of the “baby animal” calf, illustrating the deep nationality of understanding the source of life on earth - the sun.

«И невольно в море хлеба
Рвется образ с языка:
Отелившееся небо
Лижет КРАСНОГО ТЕЛКА».

Equivalent periphrastic expressions, as a rule, have a semantic-stylistic connotation, can reveal inconsistencies in the structural, component and semantic plans, as they rely on folk traditions that take into account the nominations of the realities of the culture of the respective country, which determines the national character of the periphrases, reflection of mentality elements in them a native speaker, that is, the character of a people about which Wilhelm von Humboldt wrote.

Not surprisingly, the mythological image of the Moon is widely represented among many peoples. The cultural connotation of the word is usually formed on the figurative-associative complex stereotypical for a particular national-cultural collective.

Thus, when portraying the images of celestial bodies in periphery, there is a cultural marking of national perception, which allows us to consider the concept of “image” as a combination of its direct and figurative means of explication. And the phrases “*Russian moon*” and “*Chinese moon*” actualize the perception of the image of the moon in the aspect of a different understanding of the semantic picture of the world. Cm.: the name of the work “The Russian Moon” by Georgy Savitsky and the line from the poem by poet Li Bo “Songs on the Border” translated by Anna Akhmatova: “*the soldiers said goodbye to the Chinese moon*”.

Thus, in peripheral names such dominant words as the SUN and the MOON

carry a conceptual characteristic, largely due to folk poetic traditions.

When considering the cultural component of the peripheral unit, it is important that the cultural and linguistic specificity reflects the unique content of the peripheral meaning.

Endowed with one cultural image of a celestial object, the periphrases of celestial bodies send us to certain associative cultural representations, which encourages scientists to again and again refer to periphrastic names as an object of research.

References

1. *Russian language. Encyclopedia. - M.: AST_PRESS SCHOOL. 2020.*
2. *Byteva T.I. Essays on Russian periphrastic. - M.: Elpis, 2008.*
3. *Novikov A.B. Dictionary of Periphrases of the Russian Language (based on material from newspaper journalism). – M.: Russian language, 2004. 352 P.*
4. *Wierzbi ka A., Słowa klucze. RóŜne języki róŜne kultury, Warszawa 2007.*
5. *Babushkin, A.P., Sternin, I.A. Cognitive linguistics and semasiology: monograph. Voronezh: LLC "Rhythm", 2018.*
6. *Ozhegov S.I., Shvedova N.Yu. Explanatory dictionary of the Russian language / Russian Academy of Sciences. V.V. Vinogradov Russian Language Institute. – M.: Azbukovnik, 1998.*
7. *Chernykh P.Ya. Historical and etymological dictionary of the modern Russian language. V. I-II. - M., 1993.*
8. *Wu Rui. Comparative analysis of the culturological connotation of color in Russian and Chinese // Russian language. - Beijing. – 1996. – № 2. P. 45-48.*

生前几个月非创伤性脑出血儿童体温的昼夜节律结构
THE STRUCTURE OF THE CIRCADIAN RHYTHM OF BODY TEMPERATURE IN CHILDREN WITH NON-TRAUMATIC CEREBRAL HEMORRHAGE IN THE FIRST MONTHS OF LIFE

Mukhitdinova Hura Nuritdinovna
Department Professor of the Tashkent Institute of Advanced Medical Education
Abdusalieva Tursuna Mutanovna
Department Assistant at the Tashkent Institute of Advanced Medical Education
Ikromova Mokhinur Furkat Kizi
Anesthetist-resuscitator of the Republican Scientific Center for Emergency Medicine

抽象。　作者揭示了未手术，手术和死亡儿童组之间体温昼夜节律结构的差异，这在治疗的第一，第三，第六天最为明显。 应激反应的迹象是早晨（标准时间为18小时）顶峰相的峰移动，下午（3小时）后萎缩。　体温昼夜节律的顶峰期和底相期的预测偏差可以用作控制儿童出生后头几个月非创伤性脑出血治疗效果的控制。

关键词：昼夜节律，体温，儿童，非创伤性出血，大脑。

Abstract. *The authors revealed differences in the structure of circadian rhythms of body temperature between groups of non-operated, operated and dead children, which were most manifested in the first, third, sixth day of treatment. A sign of a stressful reaction was a shift in the peak of acrophase in the morning (at a norm of 18 hours), and atrophy in the afternoon (at a rate of 3 hours). The bias of the projection of acrophase and bathiphase of the circadian rhythm of body temperature can be used as a control of the effectiveness of treatment for non-traumatic hemorrhage in the brain of children in the first months of life.*

Keywords: *circadian rhythm, body temperature, children, non-traumatic hemorrhage, brain.*

Relevance. According to some researchers, the circadian rhythm is absent in newborns and young children and is established after the second year of life. However, numerous studies have proved that cyclic diurnal fluctuations in body tem-

perature in a healthy child are established by 1.5-2 months of life, which coincides in time with the formation of diurnal rhythms of heart contractions and respiratory rate. Maintaining a normal circadian rhythm of temperature in children with diseases of the brain may indicate that the central mechanisms of thermoregulation in them are not damaged. At the same time, if no other reasons have been identified explaining the absence of a circadian rhythm in the child, this makes it possible to suspect the presence of false fever. The core temperature of the body is set in the anterior hypothalamus. Deviations in body temperature are recorded by the thermosensitive neurons of the preoptic nuclei, which then regulate the autonomic reactions of the sweat glands, blood vessels, somatic neurons, and skeletal muscles. An increase in body temperature contributes to a more effective fight against pathogens: strengthening non-specific, cellular and humoral immunity, as well as direct bactericidal action. A decrease in temperature below 36-36.1 °C usually reflects the failure of energy metabolism and is observed, as a rule, with I-III degree malnutrition, severe cardiac and vascular insufficiency, liver, kidney function failure, decreased thyroid function, adrenal gland, with hypoglycemia and other serious illnesses. The daily rhythm in children is more pronounced than in adults. The lowest body temperature is observed around 1 - 4 hours of the night, and the highest - from 17 to 18 hours. The difference between the highest and lowest points of the temperature cycle in children is greater than in adults. This difference in children can reach 1.4 °C. The range of temperature fluctuations during the day at a stable ambient temperature in the first days of life is about 0.3 °C, by 2-3 months it increases to 0.6 °C and by 3-5 years it reaches 1 °C [3.4]. Mortality in strokes in children range from 7% to 28%, the total mortality rate is 0.6 cases per 100,000 children per year. Mortality in non-traumatic cerebral hemorrhage reaches 29–41% [1,2,5,6]. The acute problem remains the surgical removal of the hematoma, ensuring the perioperative management of children with non-traumatic hemorrhage in the brain. There is insufficient information on the state of the structure of circadian fluctuations in body temperature in children with non-traumatic cerebral hemorrhage.

Purpose of work. Study and evaluate changes in the structure of circadian fluctuations in body temperature in children with non-traumatic cerebral hemorrhage.

Material and research methods. 53 patients were divided into 3 groups: 1 group - non-operated, 2 - operated, 3 - children with non-traumatic cerebral hemorrhage who died in ICU. The age of children of the 1st group at the time of the operation was 44.3±9.9 days, 2 group - 48.2±14.5 days, 3 group - 49.1±10.8 days. The length of stay in the ICU for children of the 1st group was 8±2.8 days, 2 group - 11.6±4.5 days, 3 group - 10.5±4.5 days. In the preoperative and postoperative periods hemostatic therapy was carried out, deficiency of the blood volume

components (hemo-, plasmotransfusion), barbiturates, nootropic, membranotropic drugs, decongestant therapy were compensated. Nutritional support was primarily enteral. Along with monitoring hemodynamic parameters, body temperature indicators were recorded at intervals of 1 hour. The research data were processed by the method of variation statistics using the Excel program by calculating arithmetic mean values (M) and mean errors (m). To assess the significance of differences between the two values, Student's parametric criterion (t) was used. The critical level of significance was taken equal to 0.05.

Research results and discussion. As can be seen from the data presented in table 1, the temperature of the children of the first group was at the level of 37±0.2° in the first four days, and normalized in the following days. Throughout the observation, a moderate hyperthermic reaction persisted throughout the observation in the operated patients (group 2). The peculiarity of the thermal reaction of the organism of the most severe children (3 group) is noteworthy. On the first day, in children of the 3rd group, the mesors of the circadian rhythm of the temperature turned out to be lower than in infants of the first and second groups, which we regard as the absence of an adequate systemic inflammatory reaction of the body to intracranial hemorrhage, apparently due to the functional failure of the thermoregulation center due to damage by the brain hematoma. In the first 8 days, the average daily level of body temperature was normal, and only on the 9-10th day did a hyperthermic reaction appear within 37.1 °C. The "normal" average daily temperature in the first week of intensive care can be explained by the immunodeficiency state. Subfebrile condition for 9-10 days of treatment was due to mobilization in the process of medical support of the heaviest children already on the verge of complete depletion of resources of the adaptive systems of the body, and the addition of infection. Intergroup differences appeared in the first, third, sixth day of treatment. In the following days, the average daily body temperature of children of group 3 remained at the level of “normal” values, on day 3 it was significantly lower than the data of unoperated children by 0.6°($p < 0.05$). On the sixth day, the average daily temperature in the operated children was higher than the indicators of the 1st group by 0.3°($p < 0.05$).

Thus, in non-operated children, a tendency to hyperthermia was noted for the first four days, 8.10 days. The moderate subfebrile condition observed in the operated children can be regarded as an adequate inflammatory response of the child's body to surgical intervention. The absence of a hyperthermic reaction against the background of the most common severe condition requiring breathing prosthetics and supportive care is a consequence of the complete depletion of adaptive resources with the failure of compensatory mechanisms in children of group 3.

Table 1

Comparative evaluation of the mesor of the circadian rhythm of body temperature in non-traumatic cerebral hemorrhage

Days	1	2	3	4	5	6	7	8	9	10
group 1	37,0±0,2	37,0±0,2	37,0±0,1	37,0±0,2	36,9±0,2	36,9±0,1	36,9±0,2	37,0±0,3	36,9±0,1	37,0±0,1
group 2	37,1±0,1	37,1±0,2	37,0±0,2	37,2±0,1	37,2±0,2	37,2±0,1	37,2±0,1	37,0±0,2	37,1±0,1	37,0±0,2
group 3	36,5±0,1	36,7±0,2	36,4±0,3	36,4±0,4	36,5±0,3	36,6±0,3	36,6±0,3	36,9±0,2	37,1±0,1	37,0±0,3
p<0,05	1-3; 2-3		1-3			1-2				

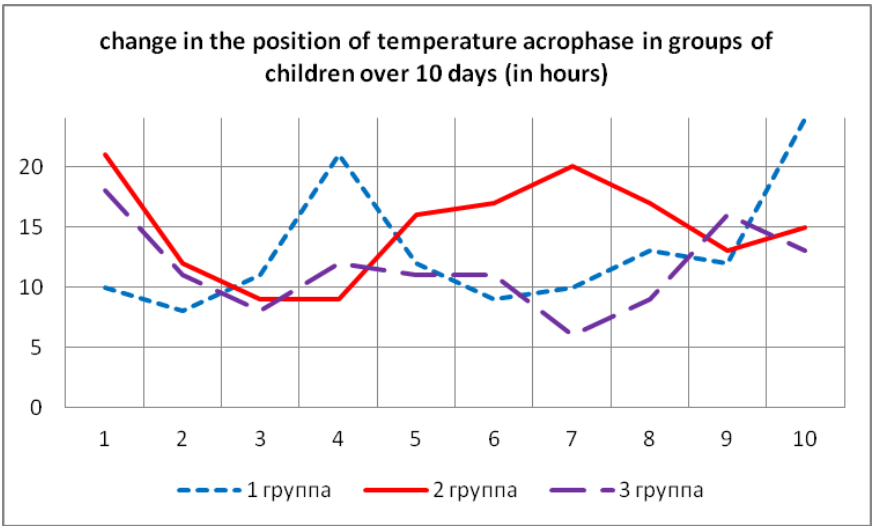


Fig.1

As can be seen from Figure 1 in group 1 (unoperated) patients, the acrophase peak of the circadian fluctuation in body temperature in the first three days, projected for 5–9 days at 8–12 hours (at a rate of 18-19 hours), shifted by 4, 10 days to night hours (21-24 hours). The projection of the acrophase of the circadian rhythm of body temperature in group 1 for 8 days migrated within the morning hours, which indicates the stress state of the functional activity of the thermoregulation center in children of group 1 for 8 out of 10 days of observation. In the 2nd group of the sinusoid, the fluctuations in the acrophase displacement of the circadian rhythm of the body temperature are represented by the peak of the acrophase in the morning-afternoon hours (9-11, 13.15 hours on 2-4.9.10 days) for 5 days, in the evening (21-20 hours for 1, 7 days). Thus, in the operated children, the stress shift of the acrophase in the morning hours decreased, it was observed 3 days less than in the 1st group. In the group of the deceased, the position of acrophase in the morning (6-15 hours) was fixed on 2-10 days. That is, a pathological shift in the

peak acrophase of the circadian rhythm of the temperature reaction was observed in 3 groups of patients for 9 days. That is, the pathological shift of acrophase was most pronounced in group 3, slightly less in group 1 and least pronounced in group 2 - in the operated children. It is noteworthy that fluctuations in the acrophase migration of the circadian rhythm of body temperature occurred during the oscillation period in group 1 for 6 days, in group 2 -7 days and in group 3 4.5 days.

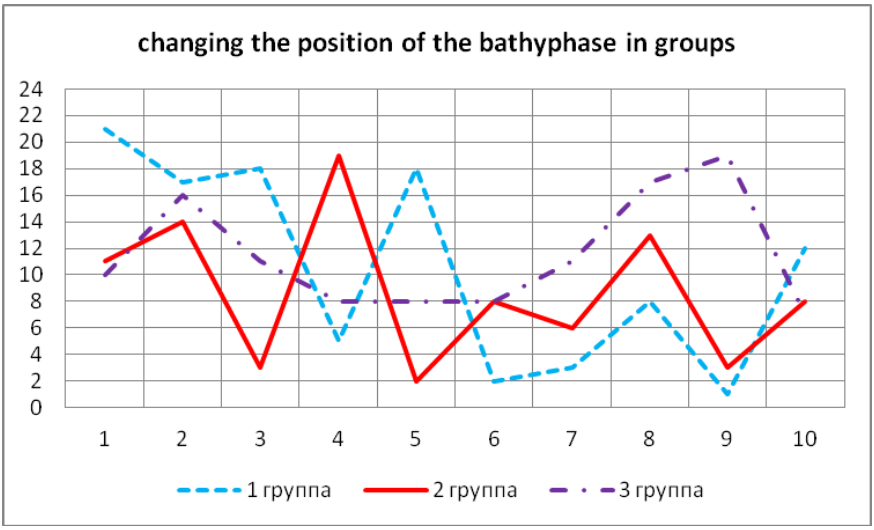


Fig.2

The normal projection of the bathyphase circadian rhythm of body temperature according to some authors is 3 hours [3,4]. In the 1st group of children, migration of the circadian rhythm bathyphase body temperature close to physiological (from 1 to 6 hours) was detected on days 4,6,7,8,9. The pathological shift of the bathyphase to daylight hours was observed on 1-3, 5, 10 days (from 21 to 13 hours). In the second group, the maximum approximate position of the bathyphase to the physiological one was noted on 3.5.9 days (3-4 hours), pathological shift in the light period of the day (from 11 to 18 hours) by 1,2,4,8,10. In children of the 3rd group, there was no physiological projection of the bathyphase; the body temperature circadian rhythm bathyphase migrated between 8 and 19 hours throughout the observation. Thus, the most significant displacement of the bathyphase was observed in the 3rd group of children, in the unoperated (1st group), the bathyphase approached the physiological projection within three days out of 10, and in the 2nd group of children, the body temperature circadian rhythm was also normal for 3 days. The most significant circadian rhythm disturbances, a shift in

the projection of the bathyphase to the light period of the day, were detected in children with an unfavorable prognosis. Thus, the projection of the bathyphase circadian rhythm of body temperature can be used as a sign confirming the effectiveness of treatment.

Researchers have shown that the stress state of the circadian rhythm can be manifested by an increase in the amplitude of fluctuations in the daily rhythm of the indicator. As can be seen from Figure 3, in the 1st group of children the amplitude of the oscillations on the 1st day turned out to be the most pronounced, on the following days the amplitude of the oscillations was in the range of 0.1-0.3 degrees, on the 10th day it increased again. That is, with conservative therapy of cerebral hematoma for 10 days, the stress state of the circadian rhythm of body temperature is maintained. Throughout the entire observation period, in group 2, changes in the amplitude of diurnal temperature fluctuations were in the range 0.2–0.6 degrees. Which, possibly, is associated with the use of a more massive drug correction associated with the anesthetic management of surgical removal of the hematoma.

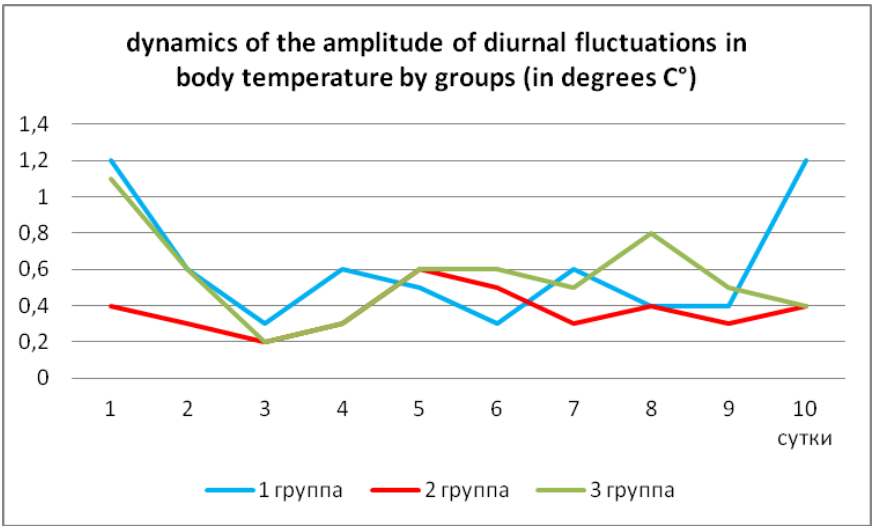


Fig.3

In the 3rd group of children, the largest amplitude was detected at 1 day (1.2 degrees), in the following days, the tendency to decrease the amplitude of diurnal fluctuations in the range of 0.2 - 0.8 degrees is apparently associated with heat production disorders in progressive hypothalamic-pituitary adrenal insufficiency due to the severity of the condition.

Conclusions. Differences in the structure of circadian rhythms of body temperature between groups of unoperated, operated and dead children, which were most manifested on the first, third, sixth day of treatment, were revealed. A sign of a stressful reaction was a shift in the peak of acrophase in the morning (at a norm of 18 hours), and atrophy in the afternoon (at a rate of 3 hours). The bias of the projection of acrophase and bathiphase of the circadian rhythm of body temperature can be used as a control of the effectiveness of treatment for non-traumatic hemorrhage in the brain of children in the first months of life.

References

1. Evtushenko S.K., Strokes in children, j. Modern pediatrics 3(31)/2010 P.175-182.

a. Evtushenko S. K. Etiological factors and their relationship with the types of ischemic stroke in children / S. K. Evtushenko, Yu. M. Perepechaenko // J. of nevrol. and psychiatry n.a. S.S. Korsakov. – 2003. – № 8. – P. 30-36.

2. Tabolin V.A., Neudakhin E.V. Chronopharmacological principles for the treatment of diseases in children, 2009.

3. Thyssen T.P. et al. Acad. NN Burdenko NII NKh. "Diagnosis and endovascular treatment of spinal cord AVM in children" II All-Russian Conference "Pediatric Neurosurgery". Conference proceedings, Yekaterinburg 27 – 29.06.2007. P. 93-94.

4. Chuchin M. Yu. Ischemic stroke in childhood // Stroke. – 2004. – № 11. – P. 27-37.

5. Fullerton H. J. Arterial dissection and stroke in children / H. J. Fullerton,S. C. Johnston, W. S. Smith // Neurology. – 2001. – V. 57. – P. 1155-1160.

各种牙膏治疗牙周疾病并发症的临床评价
CLINICAL EVALUATION OF VARIOUS TOOTHPASTES EFFICIENCY IN TREATMENT OF COMPLICATIONS DUE TO PERIODONTAL DISEASES

Demirchiyeva Mehriban Vidadi
Assistant of the Department of Conservative Dentistry of Azerbaijan Medial University
Kerimli Nurana Kerem
Assistant of the Department of Conservative Dentistry of Azerbaijan Medial University
Alizade Aysel Rafik
Assistant of the Department of Conservative Dentistry of Azerbaijan Medial University

注解。 导致牙齿敏感性增加的各种外源性和内源性原因，在某些国家中，成人的发生频率在15%至70%之间变化[1,2,3,4]。 重要的是要注意牙周疾病，牙齿的龋齿和非龋齿病变，牙齿损伤和一些一般的躯体病理。

关键字：过敏，牙膏，牙周炎，衰退

Annotation. *There are various exogenous and endogenous causes of increased tooth sensitivity, the occurrence frequency of which in some countries varies between 15-70% among the adult population [1,2,3,4]. It is important to note periodontal diseases, caries and non-carious lesions of the teeth, dental injuries and some general somatic pathologies.*

Keywords: *hypersensitivity,toothpastes , periodontitis, recession*

Purpose of investigation: To identify the optimal therapeutic tactics in hyperesthesia , depending on the presence of the inflammatory process in the periodontium.

Material and methods of research. 3 medical groups were created. The main group included 11 patients , the comparison group - 12 patients, the control group - 10 patients.

The effectiveness of the treatment of dental hypersensitivity after bleaching in the main group was compared in different groups where various preventive toothpastes were prescribed. Groups of patients with chemical whitening of teeth:

1st group (main) -Sensodyne Total Care; 2nd group (comparison group)- Sensodyne Whitening; 3rd group (control group)- Sensodyne Rapid Action. The examined patients were previously informed about the goals and objectives of the examinations and took part in them voluntarily.

At the same time, general clinical research methods were carried out , histories and special research methods including periodontal and hygienic indices were collected, and the obtained data were written down into the individual patient record. To assess the hygienic state of the oral cavity, the simplified hygiene index OHI-S was used (Greene J., Vermillion J., 1969), and to study the state of soft paradental tissues and the effectiveness of the course of supporting conservative therapy the PMA index was used.

To characterize the group of homogeneous units, their arithmetic average values (M), its standard error (m) and the range of changes (min-max) were determined. For statistical data processing, the nonparametric criterion U (Wilcoxon-Mann-Whitney) and the parametric Student t –criteria as a method for assessing differences in indicators were used. A statistical difference between the groups was considered significant at $p < 0.05$. Statistical processing of the obtained data was carried out on a personal computer by using of the modern software – electronic table editor Microsoft Excel 2007 and application Statistica 7.0 package.

The results of our own research. During a dental examination and assessment of the state of the "environmental situation" in patients' oral cavities with hyperesthesia of hard tooth tissues, it was found that poor oral hygiene was determined in the rarest cases, while in the maximum cases of clinical observations the examined patients were diagnosed with a satisfactory state of oral hygiene. According to the results of a statistical analysis of the data obtained during the research, the values of the hygiene index according to Green - Vermillion (OHI-S) in the patients of the main group were 2.65 ± 0.040 points, and in patients of the comparison group - 2.57 ± 0.048 points, in the examined patients with hyperesthesia and inflammatory periodontal diseases in the control group - 2.63 ± 0.045 points, while there were no obvious differences of the studied index before the start of the course of basic therapy, and they, in turn, corresponded to satisfactory oral health in all groups studied.

As a result of the studies, the clinical efficiency of desensitizers was studied and evaluated, which included various active components that reduce the increased sensitivity of the teeth, and the effectiveness of the use of toothpastes, which also have trace elements that are important from a medical point of view, and at the same time double action , that is, desensitizing and anti-inflammatory effects, was determined. An important prophylactic effect of the products used is related to their cleaning effect, which will directly improve the hygienic condition of the oral cavity.

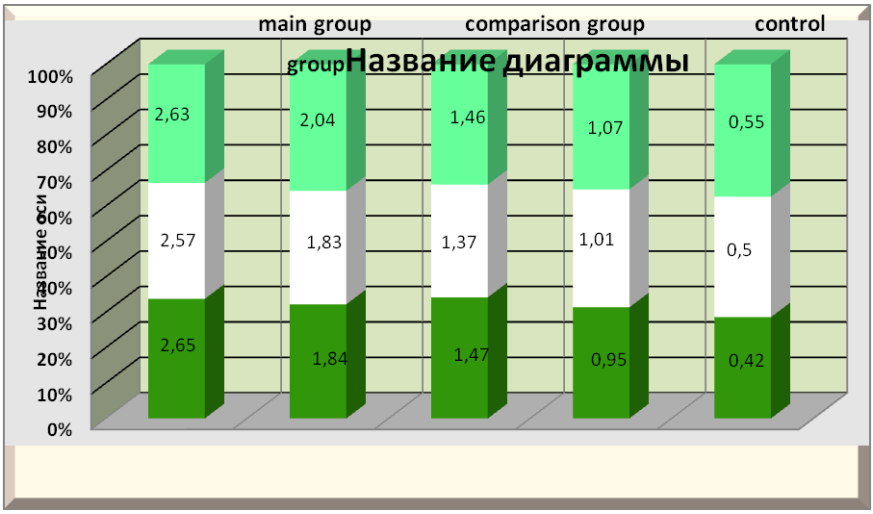
At the same time, it is important to note that timely visits to the dentist and systematic professional monitoring of the oral organs and tissues in patients undoubtedly increase their motivation for proper and regular qualitative care of the oral cavity, but we should not forget about the individual approach in solving any dental problems, particularly relating to knowledge of the qualitative characteristics of therapeutic and hygienic products and their components for optimal selection in the achievement and preservation of full dental hygiene and a satisfactory condition of paradental soft tissues.

The results of clinical studies and an index assessment allow to conclude correspondence of oral condition to its good hygienic state, which certainly indicates a pronounced cleansing ability of all used hygienic and prophylactic medications, which is also confirmed by lower values of the used index in comparison with the initial data in the work of the used hygiene index. In the course of research and in a comparative analysis of statistical data obtained at all stages before and after treatment, there was some different dynamics in all three groups manifested with changes in the hygiene index indicators.

So, at the initial stage of observations immediately after a therapeutic course with teeth brushing by use of a toothpaste specially prescribed for each group individually, the most favorable results were recorded in the first and second groups. The minimal decrease in digital index values was observed in the control group, where, along with a desensitizing agent, the patients were prescribed the usual hygiene products widely used by the population - 2.04 ± 0.035, against 2.63 ± 0.045 points, before treatment and prophylactic measures ($p < 0.05$).

At the next stage of the studies, which were carried out 15 days after the therapeutic course, the maximum decrease in the values of the hygienic index, indicating its further improvement, was revealed in the second group of examined patients, that is, in the comparison group, where the indicator averaged 1.37 ± 0.031 points, while the values for the other groups were higher and practically did not differ from each other. That is, in the second group, the effectiveness by using of the toothpaste prescribed for these patients was higher, which caused a relatively more expressed improvement of the oral hygiene namely in this group. The hygiene index indicators in the above-mentioned terms in the main and control groups were determined within 1.47 ± 0.028 and 1.46 ± 0.029 points, respectively.

But further clinical observations and subsequent analysis of the data obtained in this case showed a more significant improvement in the oral cavity during the process when the patients performed appointments for complex therapy in the main group, where a more expressed decrease in the values of the studied index was found - 0.95 ± 0.023 points, this is an average index in this group in 1 month after treatment.



Before treatment ;after treatment;in 15 days;in 1 month;in 2 month

Diagram 1. *Oral hygiene of patients before and after treatment* (G.Green, I.Vermillion - OHI – S)

At similar times, a slightly different picture was shown in the other two groups of patients with dental hyperesthesia and inflammatory periodontal diseases. So, 30 days after the end of the basic therapy course, the hygiene index in the comparison group averaged 1.01 ± 0.020 points, and their opponents in the control group had higher indicators and were determined in the value of 1.07 ± 0.025 points . Almost similar dynamics in the further improvement of the oral hygiene state was observed both at the final stage of clinical researches and in all groups of patients.

Only the most positive results, which were also confirmed by index data, were recorded in the first main group of patients, where the values of the hygiene index decreased to the lowest level compared to the indicators in other groups .

Conclusions. Thus, a good cleansing and at the same time prophylactic effectiveness of all the proposed means is clearly visible, but a special toothpaste, which was prescribed to patients of the first or main group in the complex treatment of high dental sensitivity and inflammatory periodontal diseases showed the best results for prevention of these diseases.

References

1. Gillam D, Chesters R, Attrill D, Brunton P, Slater M, Strand P, Whelton H, Bartlett D. Dentine hypersensitivity--guidelines for the management of a common oral health problem. Dent Update. 2013 Sep;40(7):514-523

2. Splieth CH1, Tachou A. Epidemiology of dentin hypersensitivity. Clin Oral Investig. 2013 Mar;17 Suppl 1:S3-8.

3. Que, K., Guo B., Jia Z. A cross-sectional study: non-carious cervical lesions, cervical dentine hypersensitivity and related risk factors //J Oral Rehabil.- 2013.-№40.-P.24–32.

4. West N. J., Seong, M. Davies D. Dentine hypersensitivity //Monogr. Oral Sci. -2014.-№25.-P.108-122.

牙周病预防剂有效性的比较评估
COMPARATIVE EVALUATION OF PROPHYLACTIC AGENTS EFFECTIVENESS IN PERIODONTOLOGY

Demirchiyeva Mehriban Vidadi
Assistant of the Department of Conservative Dentistry
Azerbaijan Medial University
Kerimli Nurana Kerem
Assistant of the Department of Conservative Dentistry
Azerbaijan Medial University
Huseynova Rena Nadir
Assistant of the Department of Conservative Dentistry
Azerbaijan Medial University

注解。 牙齿过敏的发生和发展有多种原因，其中应注意牙齿硬组织中的缺陷。 指出炎症性和破坏性牙周疾病也很重要，这些疾病也可能伴随着牙龈退缩而引起牙齿感觉过高。 [1,2,3,4]。

关键词：口腔，超敏反应，牙周疾病，美感觉，牙膏

Annotation. *There are various causes of the occurrence and development of dental hypersensitivity, among which the defects in the hard dental tissues should be noted. It is also important to point the inflammatory and destructive periodontal diseases, which also may be accompanied with gingival recession causing hyperesthesia of teeth. [1,2,3,4].*

Keywords: *oral cavity, hypersensitivity, periodontal disease, hyperesthesia, toothpastes*

Purpose of research: To identify the effectiveness of different toothpastes for dental hyperesthesia occurred after bleaching of teeth and the optimal therapeutic tactics in depending on the presence of the inflammatory process in the periodontal tissues.

Material and methods of the research. After completing all necessary procedures, patients were advised to refrain from eating and drinking for one hour. The main group included 11 people, the comparison group - 12 patients, the control group - 10 patients. In main group after bleaching and using of one of traditional remineralizing medication and toothpaste Sensodyne Total Care

while in other groups after the same procedures and medications and toothpastes appropriately Sensodyne Whitening and Sensodyne Rapid Action were prescribed. Treatment effectiveness of dental hyperesthesia after bleaching and the use of Sensodyne Total Care –in the main group was compared in different groups where various preventive toothpastes were prescribed. Groups of patients with chemical tooth whitening and appointed toothpastes were: 1st group (main) -Sensodyne Total Care; 2nd group (comparison group)- Sensodyne Whitening; 3rd group (control group) -Sensodyne Rapid Action. The examined patients were previously informed about the purposes and objectives of the studies and took part in them voluntarily.

At the same time, general clinical research methods were carried out, histories and special research methods were collected, which included periodontal and hygienic indices and the obtained data were written down into an individual patient record. To study the state of soft paradental tissues and the effectiveness of the supporting course of conservative therapy- the PMA index.

To characterize the group of homogeneous units, their arithmetic average values (M), its standard error (m) and the range of changes (min-max) were determined. For statistical data processing, the nonparametric criterion U (Wilcoxon-Mann-Whitney) and the parametric Student t –criteria were used as a method for assessing the differences in indicators. A statistical difference between the groups was considered significant at $p < 0.05$. Statistical processing of the obtained data was carried out on a personal computer by using of modern software – electronic tables editor of Microsoft Excel 2007 and application package Statistica 7.0.

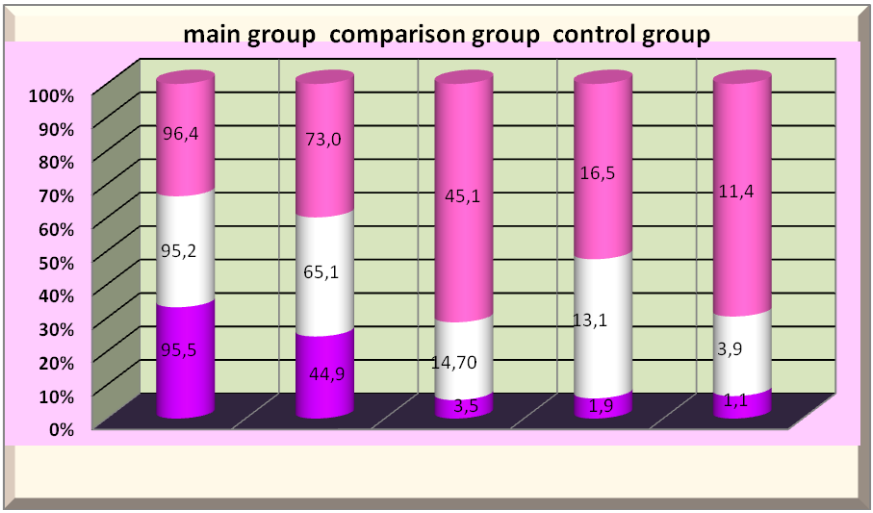
The results of our own research. While studying the anti-inflammatory effectiveness of the used toothpastes and assessing the dynamics of negative and positive changes occurring in the periodontal soft tissues before and at certain times after completing the treatment course. Clinical and instrumental studies of the patients' oral cavity includes visually examination of the marginal and attached gingivae in each tooth, and the intensity of redness and the intensity of gingival staining after applying the Shiller-Pisarev solution was determined. It is important to note a significant decrease in the indicators of the papillary-marginal-alveolar index immediately after the completion of therapeutic measures.

Moreover, more expressed and significant changes were diagnosed in the main group of examined patients, where the values of the PMA index in the above –mentioned terms sharply decreased from $95.5 \pm 0.46\%$ to $44.9 \pm 0.37\%$, which indicated a significant improvement in the condition of paradental soft tissues ($p < 0.05$). Whereas in the control group, indicators decreased much less and amounted to $73.0 \pm 0.35\%$ at the same time. Slightly better results were achieved in the comparison group.

According to the tabular data presented below, one can judge a further and more expressed positive tendency in improving the condition of periodontal soft tissues, which was more often recorded in the first and second groups of patients. It was namely in these groups that the lowest possible values of the studied index were recorded at almost all stages of observation, especially at the final stage.

According to the results of a statistical analysis of the obtained digital data, the values of the PMA index in the main group of patients 2 months after completion the treatment and prophylactic measures significantly decreased and reached the mark of 1.1 ± 0.07% by this time.

Almost a similar picture by the above-mentioned date was also observed in the comparison group — 3.9 ± 0.19%, what is much lower than in the control group, where the maximum index data for this stage were recorded.



Before treatment;after treatment; in 15 days;in 1 month;in 2 month.

Diagram 1. *The intensity of inflammation in periodontal tissues*

Thus, all the recommended hygienic and preventive hygienic means had a significant anti-inflammatory efficacy in the treatment and prevention of periodontal diseases, as well as increased dental sensitivity, but the best anti-inflammatory and cleansing effect was recorded in the main group of examined patients.

According to our research , all desensitized toothpastes that were prescribed to the patients were highly effective both in the elimination of increased sensitivity of hard dental tissues and in the treatment and prevention of various forms of inflammatory and destructive periodontal diseases, which should be taken into account during targeted comprehensive measures aimed at to improve the overall

dental status of patients seeking help. The data obtained allow us to recommend the means, the effect of which was evaluated in the first and second groups of patients, to reduce the inflammatory response in periodontal tissues and pain related to dental hyperesthesia. An integrated approach has been developed in the treatment and prevention of dental hypersensitivity developing due to the development of inflammatory and destructive periodontal diseases, which is based on the combined use of agents with a expressed desensitizing property, as well as dual, that is, desensitizing and anti-inflammatory effects.

Conclusions . Evaluation of the clinical effectiveness of various means used for the treatment of high sensitivity of teeth , which develops against inflammatory periodontal diseases and gingival recession, showed a significant decrease in the prevalence of dental hyperesthesia index, the index of dental hyperesthesia intensity, and the sensitivity index at the initial stages of research.

Combined treatment of dental hypersensitivity led to a more significant decrease in the values of the above-mentioned indices and the electrical conductivity of hard dental tissues in the main group of patients.

References

1. Bekes K, Hirsch C. What is known about the influence of dentine hypersensitivity on oral health-related quality of life? Clin Oral Investig. 2013 Mar;17 Suppl 1:S45-51

2. Danielle Clark, Liran Levin. Non-surgical management of tooth hypersensitivity. // International Dental Journal. – 2016. – 6. P.259-256

3. Hamlin, D. Williams K.P., Delgado E. Clinical evaluation of the efficacy of a desensitizing paste containing 8% arginine and calcium carbonate for the in-office relief of dentin hypersensitivity associated with dental prophylaxis / D. Hamlin, // Am. J. Dent. – 2009. – № 22, (Sp Is A). – P. 16A-20A.

4. Ye, W., Feng X.P., Li R. The prevalence of dentine hypersensitivity in Chinese adults// J. Oral Rehabil.-2012.-№ 39.-P.182–187.

以堪察加半岛上活跃的平流层火山贝济米尼为例，形成了类铁辉沉积物

FORMATION OF TEFROID DEPOSITS ON THE EXAMPLE OF AN ACTIVE STRATOVOLKANO BEZYMIANNY ON KAMCHATKA

Skuf'in Petr Konstantinovich
Doctor of Geological and Mineralogical Sciences,
Leading Researcher, Full Professor
Geological Institute, Kola Science Centre, RAS

注解。这篇文章考虑了类固形物-一种火山沉积的构造，由于火山碎屑材料的移位和冲洗而在喷发过程中发生。在堪察加半岛和千岛群岛进行的现代研究不仅证明了特氟罗物质与火山的同步性，而且证明了其广泛的分布，通常在火山致震作用中占主导地位。例如，考虑了现代大型堪察加半岛平流火山贝兹米尼中火山碎屑岩的形成过程。 Tefroid沉积物的形成涉及其喷出物质减压过程中最多种形式的挤压结构。在火山的山坡上和干water的河道发展地区，碎屑不断向火山脚移动。这种不同的材料按大小分类，滚动并形成调味得当的类铁氟龙中间层。

关键字。堪察加半岛，Stratovolcano Bezymianny，特非龙，挤压，减压，火山碎屑，喷发。

Annotation. *The article considers tefroids – a kind of volcanio-sedimentary formations that occur during the eruption as a result of displacement and washing of the erupted volcano-clastic material. Modern studies in Kamchatka and the Kuril Islands have made it possible to prove not only the synchronism of tefroid material with volcanism, but also its vast distribution, often predominating over volcano-terrigenic. As an example, the processes of formation of volcano-clastic formations in modern large Kamchatka stratovolcano Bezymianny are considered. The most diverse forms of extrusive structures in the process of decompression of their eruptions material are involved in the formation of tefroid deposits. On the slopes of volcano and in the area of development of dry watercourses, there is a constant movement of clastic material to the foot of volcano. This diverse material is sorted by size, rolled around and forms well-seasoned tefroid interlayers.*

Keywords. *Kamchatka, stratovolcano Bezymianny, tefroids, extrusion, decompression, pyroclastic, eruption.*

Introduction. During the eruption of volcanoes in modern and ancient volcanic regions, among the deposits of volcano-sedimentary rocks, a special place is occupied by the so-called tefroid rocks (tefroids), which are synchronous to the eruption formations, consisting of partially rounded and sorted pyroclastics, often mixed with terrigenous material. Tefroid deposits differ from the volcano-terrigenous rocks, which also consist of rounded and sorted volcanic fragments, but formed due to the destruction of volcanic rocks that are not synchronous with the eruption. In tefroids, volcano-clastic material is partially represented by rounded and semi-rounded fragments of volcanic glass, while in tuffit deposits volcanic glass undergoes decomposition [4]. Fragments of volcanic glass fall into the composition of tefroid deposits during synvolcanic emissions of pyroclastic material and during the destruction of extrusive volcanic structures. Before tefroids, they did not stand out from the group of volcano-sedimentary rocks, since there was no data on the conditions and speed of their formation. It was believed that they are not synchronous with the manifestation of volcanism and are formed after the termination of eruptions due to lithified volcanics. Initially, tefroids included rocks formed only by rounded and sorted tefra. Subsequently, any rounded and sorted volcano-clastic material began to be referred to as tefroids: block boulders of lava flows, clastic material of extrusive massifs and individual extrusive obelisks, tefra of pyroclastic flows and other products of eruptions. Modern studies in Kamchatka and the Kuril Islands have made it possible to prove not only the synchronism of tefroid material with volcanism, but also its vast distribution, often predominating over volcano-terrigenic [3]. Currently, in all the formations studied in detail in the Far East, Siberia, the Urals, the Caucasus and other volcanic regions, the wide development of tefroids has been established. In terms of age, they are developed from the Early Precambrian and are formed in our time.

Tefroids, like all volcano-sedimentary rocks, are subdivided according to the degree of rounding of the fragments, by the size of the clastic material, and also by the degree of lithification, when loose varieties (from block tefroids to pelites) and lithified (from tefroid-conglomerates to mudstones) are distinguished [4]. When studying these rocks, loose pyroclast-tefroid rocks are isolated (admixture of pyroclastic material – up to 50%); accordingly, when determining, according to the size of the debris, a name is given with a defining adjective: pyroclast-tefroid boulder rock, pyroclast-tefroid gravel, pyroclast-tefroid sand, etc., and for lithified varieties – pyroclast-tefroid conglomerate, pyroclast-tefroid gravelite, pyroclast-tefroid sandstone. Terrigenous-tefroid loose sediments (admixture of terrigenous material - up to 50%) is given the name: terrigenous-tefroid boulder rock, terrigenous-tefroid gravel, terrigenous-tefroid sand, etc. Accordingly, lithified species are called: terrigenous-tefroid conglomerate, terrigenous tefroid gravel, terrigenous tefroid sandstone. Pelitic tefroids are usually not investigated by volcanologists, since pyroclastic fragments smaller than 0.01 mm are not amenable to diagnosis.

Due to the fact that tefroids belong to volcano-sedimentary rocks, their textures and structures are more comparable with purely sedimentary counterparts. The textures of tephroids are predominantly layered, the lamination can be thin, from centimeters, and coarse, measured by meters, and the high formation rates of tefroids contribute to the formation of coarser layering. Within powerful layers, the tefroids texture is massive, dense. The structure is often uniformly granular, less often porphyritic. The latter, as a rule, is formed in volcanoclastic tefroids. For the pyro- and vucanoclastic tefroids, the vitrophyric structure of the clastic material is characteristic. This is due to the rapid cooling of the ashes during the eruption and is one of the hallmarks of tefroids from volcanoterrigenous rocks. Tefroids cement is formed by the decomposition of fine ash material and is usually represented by aqueous aluminosilicates (montmorillonite, beidellite, etc.), with a large amount of opal, due to which durable cements are formed. Tefroids are characterized by the absence of clay interlayers. In volcanoterrigenous rocks, on the contrary, there is a large amount of clay material.

A typical example of the formation of pyroclastic tefroids is their formation during the eruption of the Japanese volcano Taketomi in 1972 [3]. A side eruption within 1 month yielded 100 million m^3 of pyroclastic, which partially fell on the shore of the Ochotskoye Sea, forming a 5-meter thick layer of tefroid near the cone, gradually thinning along as removed. As a result of the destruction of the slag cone of this eruption over 40 years, about 30% of the original loose material remained in place. The washed-out volcaniclastic formed a tefroid horizon with a thickness of 70 m along the shore. It is characteristic that the degree of rounding of tephroids is approximately the same both in terms of thickness of the tephroid horizons and in the area of their development. At the same time, rolling around of moving tephroids occurs throughout the year. In the formed tefroids, the pyroclastic material is sorted by size and rounded, the fragments are semi-angular and semi-rounded, less often well rounded. The dimension of loose tefroid is gravel and psammite, aleuritic material is small, and the pelitic is completely washed.

Volcanoclastic tefroids are also significantly developed in large stratovolcanoes Klyuchi and Avacha, far from the coastline. Various volcano-clastic material lies on the slopes of these volcanoes: deposits of pyroclastic flows, block material of lava flows and extrusive eruptions and other genetic types of volcanics. On the slopes of volcanoes and in the area of development of dry rivers and watercourses, there is a constant movement of clastic material to the foot of volcanoes. This diverse material is sorted by size, rolled around and forms well-seasoned tefroid interlayers. The young volcanoes Klyuchi and Avacha are 10,000 years old. During this time, on the periphery of volcanoes in the form of a plume of 10-15 km wide, tefroid strata with a thickness of more than 100 m were formed.

The real creation of nature such as a master class is the active Bezymianny volcano in the Klyuchi group of volcanoes, which presents the researcher with a collection of forms of volcanic eruptions creating unique volcanic structures, upon destruction of which the thickness of tefroid deposits is formed.

Bezymianny volcano is an active stratovolcano on the East Mountain Range, near the Klyuchi volcano [1,2]. The time of formation is Holocene. The last eruption is 2017. The absolute height is 2882 m (before 1956 - 3075 m), the volcanic structure includes a young active stratovolcano and the remains of an old volcano destroyed by the 1956 eruption, on the site of which a crater measuring 1.3x2.8 km formed. At the foot of the volcano there are 16 large extrusive structures (extrusive domes, large obelisks, etc.).

In the extrusive type of eruption, lava, which is in a viscous or already solidified state, is extruded to the surface [4]. Volcanic rocks of extrusive facies are usually located in the upper parts of volcanic apparatus, filling the vents of volcanoes, as well as ring and conical dikes. They are usually represented by lavas of a rhyolite-andesite composition with a massive, and sometimes well-defined fluid or banded texture, oriented in the direction of lava movement. The shape of the extrusive bodies depends on the shape of the volcanic channel through which they are extruded. They form domes, obelisks, an irregular body shape. Lava extrusion has a loose texture and crumbles with a light impact of a geological hammer. Therefore, extrusive eruptions are usually accompanied by geologically instantaneous formation of fields and covers of lavoclastic rocks, which, when moving down the slopes of volcanoes, turn into lavo-clastic flows and later into tefroid deposits.

Eruption 1955-1956 was the first in the area since 1697 and, according to tephrochronological studies, occurred after a 1000-year rest period [1,2]. Before the eruption, the volcano had the shape of a regular cone 3085 m high (andesitic stratovolcano complicated by secondary extrusive domes). The eruption began on October 22, 1955 after a 23-day swarm of earthquakes. Until March 30, 1956, the eruption was moderate,"volcanic" in nature (*pre-culminating stage*).

At the top of the volcano, a crater with a diameter of 800 m formed, from which frequent ash emissions occurred up to a height of 7 km. In November, the squeezing of a powerful dome of viscous lava began in the crater. This caused a strong (more than 100 m) "protrusion" of the eastern slope of the volcano. The slope finally collapsed, and on March 30, 1956, a world-wide event began – a catastrophic eruption (*culmination stage).* Immediately after the collapse, a colossal "directed explosion" followed, caused by the huge pressure of the extruding lava penetrating.

The material ejected by the explosion caused a "pyroclastic wave" (a turbulent flow of a hot mixture of gas and pyroclastics). Its speed exceeded 60 m/s, the

temperature was about 300°C. After a directed explosion, pyroclastic streams up to 30 km long descended along the slope. The height of the eruptive eruption cloud reached a height of about 35 km. The explosion at the volcano resulted in a horseshoe-shaped crater with a diameter of ~ 1.3 km. A cover of specific pyroclastic deposits (deposits of "directed explosion") arose on the eastern slope. After paroxysm (*the post-culminating stage*), the dome of viscous lava (Volcanic dome Novy (New)) continued to be squeezed in the crater, the formation of which continues to this day (Fig. 1).

Fig. 1. *Volcano Bezymianny (1990).*

In the early years, the Novy Dome was continuously squeezed out of hard obelisks. In the future, the growth of the dome became intermittent, and along with rigid blocks since 1977, viscous extrusions began to be squeezed. Currently, extrusions cover the entire surface of the dome, which almost filled the crater of 1956. The dome formation is accompanied by weak and moderate explosive eruptions (1-2 per year), with the deposition of small blocky-ash pyroclastic flows up to 12 km long and associated pyroclastic clouds ashes. In recent years, during the eruptions, large collapses of the old parts of the dome began to occur. The catastrophic eruption of the volcano on March 30, 1956 became famous and was singled out by volcanologists as an independent type of eruption – "directed

explosion" or "Bezymianny type", which is recognized by world volcanology ("directed blast", "lateral blast", "type Bezymianny"). In 1977, as part of the Kamchatka volcanological detachment, I managed to work out the entire summer expedition season at Volcano Bezymianny. The volcano was in an active phase of activity. The Volcanic dome Novy formation continued, powerful pyroclastic flows constantly rolled along its slopes, often small-scale eruption occurred up to 0.5 km from the extrusive dome of block material and large blocks several m^3 in size (Fig. 2.3).

Fig. 2. *Volcano Bezymianny – eastern slope (1977). Above the emerging Volcanic dome Novy, rising clouds of gas are visible. The foot of this dome is covered with the latest deposits of volcano-clastic materia*

Fig. 3. *Large blocks of extrusive lava and coarse-clastic material ejected during local explosions at Volcanic dome Novy (1977).*

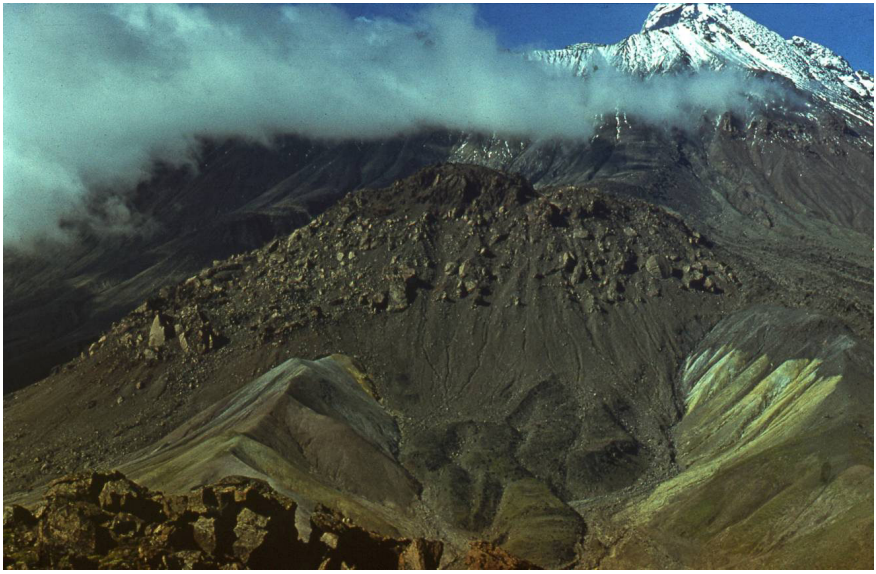


Figure 4. *The young extrusive dome of Lohmaty on the eastern slope of the Volcano Bezymianny (1977).*

Smaller extrusion domes constantly formed at the foot of the volcano. At the same time, rather large domes after their appearance periodically continued active volcanic activity, up to the final formation of their morphological appearance. Observations in the areas of recent volcanism indicate the extreme transience of the processes of formation of volcanic extrusive structures, the discrete nature of their manifestation, and rapid destruction during weathering.

A typical example is the large young extrusive dome of Lohmaty. The uneven surface of the dome, the presence of numerous blocks and obelisks of different sizes gives the impression of a modern eruption with an age of several months (Fig. 4).

It can be stated that continuous (since 1956) eruptions of andesitic extrusive lavas, forming the Volcanic dome Novy, occurred in the form of protrusions of rigid blocks and were accompanied by explosions of different strengths and hot avalanches of andesitic lavas. The seemingly monolithic lumps of crystallized extrusive andesites, supplying material for these avalanches, literally crumbled in their hands into sand and gravel material, similar in size to the grains of minerals composing andesites. The Volcanic dome Novy and Volcano Bezymianny themselves stand as if immersed in this loose tefroid material, which is picked up by temporary streams, washed into deep ravines and is carried away by the river system of the river (Fig.5,6).

Fig. 5. *The formation of sand and gravel tefroid deposits during decompression of clastic material of extrusive emissions (1977).*

Fig. 6. *An extrusive lava block ejected over a distance of about 0.5 km during the formation of Volcanic dome Novy. Traces of decompression are visible (1977).*

Conclusion. Summarizing the factual material cited, I would like to note that when I studied Volcano Bezymianny, I was, first of all, delighted with the magnificent and general panorama, and the individual views of this volcanic area. However, in addition to the beautiful views, any attentive observer will immediately be struck by the amazing variety of forms and features of the manifestation of volcanic activity on this volcano. Numerous examples of this diversity amaze the observer from the first stages of the study. Only a small part of this material, which usually eludes the attention of the venerable authors of monographs on volcanology, is given in the article.

In addition, it, however, only partially affects the most important problem of the formation of modern and fossilized tefroid deposits. Modern studies in Kamchatka, the Kuril Islands and other volcanic regions prove not only the synchronism of tefroid formations with volcanism, but also their huge distribution and frequent prevalence over volcano-terrigenous deposits.

References

1. Belousov A., Voight B., Belousova M. Directed blasts and blast-currents: a comparison of the Bezymianny 1956, Mount St Helens 1980, and Soufriere Hills, Montserrat 1997 eruptions and deposits // Bulletin of Volcanology. - 2007. - No. 69. - p. 801-840.

2. Bogoyavlenskaya G.E., Kirsanov I.T. Twenty-Five Years of Volcanic Activity Volcano Bezymianny // Vulcanologiya i seismologiya. - 1981. - No. 2. - p. 3-13.

3. Girina O.A. Pyroclastic deposits of andesitic volcanoes and the diagnosis of their genetic types. In the book "Geodynamika i vulkanism Kurilo-Kamchatskoy ostrovoduznoy sistemi". IVG i DVO RAN, Petropavlovsk-Kamchatsky, 2001, p. 70-78.

4. Maleev Ye.F. Volcanics (Reference). - M.: Nedra. 1980. 270 p.

稳定地下采矿矿石成分的计划和组织方法

PLANNING AND ORGANIZATIONAL METHODS FOR STABILIZING THE MATERIAL COMPOSITION OF ORES IN UNDERGROUND MINING

Tyrtigina Nataly Alekcandrovna
Candidate of Technical Sciences, Associate Professor
Norilsk State Industrial Institute

抽象。这项工作的相关性是由诺里尔斯克（Norilsk）采矿企业的矿石原料基础的严重退化所决定的，这导致开采矿石质量的下降。在从富矿发展到散布矿的过渡期间，矿石质量的波动给矿石加工带来了巨大困难，使浓缩技术指标恶化，并降低了PJSC“ MMC Norilsk”整个采矿和冶金综合体的经济效率镍”。

本文致力于解决矿山信息系统的一系列现代化问题，以解决地下采矿过程中稳定矿石成分的问题，从而确保降低质量变异性。在工作中，以“ Zapolyarny”矿山条件下的“ Norilsk-1”矿床为例，研究了改善贫铜-镍矿石组成稳定性的条件和方法。

解决稳定矿石质量问题最重要的方法是组织和技术，在采矿过程中以及在准备用于浓缩的矿石矿物原料的阶段进行。这项工作的想法是，将地下矿井视为一种生产系统，它可以减少采矿作业期间频谱的高振幅部分中提取矿石中有用成分含量的变化程度。

在工作中，稳定化过程被认为是旨在实现矿石质量质量的平均绝对值的计划和组织方法的综合体。

用于稳定采矿质量的信息运营采矿系统包括计划，（十年定期计划（DDS），即十年过渡期的短期计划工具； Micromine； MineSched； AutoCAD）的组织和管理。采矿，并使用辐射和电子技术手段。组织组成部分的目标是及时准备采矿计划，控制和协调矿山主要生产领域，以提高采矿效率。

稳定贫铜镍矿物质组成的采矿系统中的规划和组织方法可以显着降低地下矿产品的质量变化，并为提高地下土壤储量的完整性提供条件。

关键词：组织和计划方法，矿山，质量稳定，信息系统，铜镍矿，采矿现代化，采矿计划，控制和效率。

Abstract. *The relevance of the work is determined by the intensive deterioration of the ore-raw material base of the mining enterprises of Norilsk, which leads to a deterioration in the quality of the extracted ores. During the transition from the development of rich ores to disseminated ores, fluctuations in the quality of ore create significant difficulties in ore processing, worsening the technological indicators of enrichment and reducing the economic efficiency of the entire mining and metallurgical complex of the PJSC “MMC Norilsk Nickel”.*

The article is devoted to solving the problem of stabilizing the material composition of ores during underground mining for a set of modernization of the mine information system, which ensures a decrease in quality variability. In the work, the conditions and ways to improve the stability of the composition of poor copper-nickel ores were studied using the example of the "Norilsk-1" deposit in the conditions of the "Zapolyarny" mine.

The most significant way to solve the problem of stabilizing the quality of mined ores is organizational and technological, performed in the process of mining and at the stage of preparing ore-mineral raw materials for enrichment. The idea of the work is that an underground mine is considered as a production system that can reduce the level of variability of the content of useful components in the extracted ore in the high-amplitude part of the spectrum during mining operations.

In the work, the stabilization process is considered as a complex of planning and organizational methods aimed at achieving the average absolute value of the quality of the ore mass.

The information-operational mining system for stabilizing the quality of ores during mining includes planning, (decade-daily schedule (DDS) i.e., a short-term planning tool for the decade-shift period; Micromine; MineSched; AutoCAD) organization and management of mining, with using radiometric and electronic technical means. The goals and objectives underlying the organizational component are the timely preparation of mining plans, control and coordination of the main areas of the mine's production aimed at improving the efficiency of mining.

Planning and organizational methods in the mining system of stabilization of the material composition of poor copper-nickel ores can significantly reduce the variability of the quality of underground mine products and provide conditions for increasing the completeness of extracting subsoil reserves.

Keywords: *organizational and planning methods, mine, quality stabilization, information system, copper-nickel ores, mining modernization, mining planning, control and efficiency.*

PJSC "MMC Norilsk Nickel" is one of the largest metal companies in the world. The existing structure of the Norilsk deposits is represented by poor disseminated ores, the proportion of which increases with the extraction of rich ores. As a result, to date, there has been a general significant decrease in the quality of copper-nickel ore reserves, which requires the search for new technological solutions in the field of ore mining and concentration. Under these conditions, the company identified a set of urgent scientific and technical problems that require a priority solution, the first of which is the creation of ore production quality control systems in mines [1].

The deposits of polymetallic ores are characterized by a relatively high variability of quality indicators, which largely determines the instability of the material and mineral composition of production. The high variability of the quality indi-

cators of ore mined, in turn, negatively affects the enrichment indicators - metal extraction, concentrate output, enrichment cost, etc. The validity and reliability of the conclusions are confirmed by the reliability and representativeness of the initial data, a high degree of correlation of the obtained dependencies.

With a decrease in the average metal content in the ore, the manifestation of the instability factor of the ore composition is even more aggravated. For Norilsk deposits, where relatively poor copper-nickel disseminated ores will be the main source of mining and metallurgical production in the future, the problem of increasing its efficiency becomes very important. In this regard, work aimed at solving the problem of stabilizing the quality of poor copper-nickel ores in underground mining seems very relevant both scientifically and in practical terms.

The main research work was carried out in relation to the "Zapolyarny" mine - the oldest mining production in the Norilsk region. The "Zapolyarny" mine develops reserves of poor copper-nickel ores of the "Norilsk-1" deposit by underground mining. The production capacity of the mine is 1 million 200 thousand tons per year with an average nickel and copper content in ore mined, respectively, of 0.34 and 0.47%.

The most significant way to solve the problem of stabilizing the quality of mined ores is organizational and technological, performed in the process of mining and at the stage of preparing ore-mineral raw materials for enrichment. In the work, the stabilization process is considered as a complex of planning and organizational methods aimed at achieving the average absolute value of the quality of the ore mass. Planning and organizational methods for stabilizing the material composition of poor copper-nickel ores can significantly reduce the variability of the quality of underground mine products and provide conditions for increasing the completeness of extracting subsoil reserves.

The final mining product is a multicomponent complex ore, in its quality corresponding to the organization standard STP 49156713.14.111-2-1-2015 [7], which defines the following requirements for the quality of mined minerals: disseminated ore of the Zapolyarny mine is mined in three grades : (easily enrichable (gabbro-dolerite taxitic, contact $G_{t,k}$); ordinary (gabbro-dolerite picrite G_p); refractory (gabbro-dolerite picrite, olivine $G_{p,o}$), and the maximum piece size of all types of ore in two dimensions should be no more than 300 mm. Quality control of extracted and shipped products is achieved by conducting operational exploration, as well as regular testing of the ore warehouse. In addition to drilling, core and furrow testing, the range of operational exploration includes sampling to clarify the physical and mechanical properties of minerals and rocks, their material composition. The data of advanced operational exploration are used in the development of mining plans for the medium term and operational estimates of reserves for the field [4]. "Mining planning is a necessary and initial part of the actions to form the required ore quality at a mining enterprise" [9, p. 152].

The “Norilsk-1” intrusion is confined to the contact between the terigenic-coal-bearing sedimentary rocks of Permocarbon (Tunguska series) and the effusive traps of the Triassic and is a shallow-lying stratified reservoir (Fig. 1) with blows and pinches. The main ore minerals of the deposit are pyrrhotite, pentlandite, chalcopyrite, cubanite, bornite, magnetite, and others. In terms of metal content, taxitic gabbro dolerites located in the lower part of the ore body are “rich”, and the picrite gabbro dolerites located above are poor, with concentrations metals gradually decrease from the bottom up. Different sections and rocks of the field are characterized by varying degrees of stability, which is interconnected with strength and quality characteristics. The tectonic situation in the mine field is quite calm.

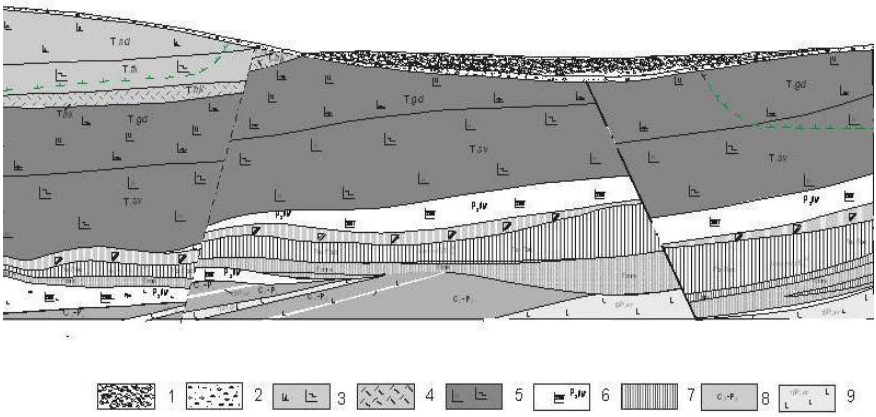


Fig. 1. *Geological structure of the “Norilsk-1” field: 1 - man-made dumps; 2 - Quaternary deposits; 3 - basalts glomeroporphyry, porphyry, tholeiitic, poikilite; 4 - tuffites, tuffs, tuff breccias; 5 - basalts picrite, porphyry, glomeroporphyry, tholeiitic, poikilophytic; 6 - double-feldspar basalts, labradorite, titanium-augite Ivakinskaya formations; 7 - differentiated intrusion of gabbro-dolerites, including deposits of low-sulfide and disseminated ores; 8 - coal-bearing rocks of the Tunguska series of Middle Carboniferous - Upper Perm; 9 - Ergalakh intrusive complex of Perm: dolerites and diabases*

The “Norilsk-1” field is highly complex in terms of geological variability. The nature of the variability, the complexity index of the occurrence of the deposit is more manifested in the fall and in depth than in strike. The initial data and calculated indicators of natural variability of ore quality in the field of the “Zapolyarny” mine as a result of well testing are shown in Table. 1. According to operational testing, the metal content in the process of mining varies from 0.29 to 1.28%, that is, the relative change in the content is 2.2 and 3.5 times.

As part of the production modernization project, the "Zapolyarny" mine has created a Planning Center, whose task is to plan mining operations using information systems. Micromine is an information system in which information from geological and surveying services flows for wireframing i.e. for planning future mining units, local and global projects. Micromine software allows you to visually evaluate the ore body and present mining development options (Fig. 3). "The framework is a three-dimensional model of mining and is used to calculate the volumes and contents of non-ferrous metals" [8, p. 6].

The production problem of stabilization of the material composition of poor copper-nickel ores cannot be fundamentally resolved through separate rationalizations of the technology. Constantly updated geological and surveying data put forward special requirements for the tool for evaluating and calculating these data. In this regard, the existing system for obtaining information on the characteristics of the ore should be reorganized in the direction of a significant increase in its efficiency.

Table 1.

Geological characteristics of the ore massif along the well line

Depth	Rocks	Geological column	Power, m	Content, %		Standard deviation,%		Variation, coefficient, %	
				Ni	Cu	Ni	Cu	Ni	Cu
0	gabbro-dolerite olivine	Go	2	0,08	0,07	0,19	0,32	28,0	30,33
		Gp							
4,5	gabbro dolerite picrite	Gp	1,1	0,21	0,21				
			2,6	0,61	0,91				
18	gabbro-dolerite taxitic	Gt	2	0,7	1,26				
			2	0,61	0,97				
			2	0,55	0,64				
		Gt	2	0,44	0,57				
			2	1,04	1,5				
		Gt	2	0,9	1,2				
			1,5	0,66	1,3				
19,5	gabbro dolerite contact	Gc	1,5	0,7	1,39				
22,6	basalt labrador	Ll	2	<0,05	<0,05				
			1,1						

In general, the information mining system should be differentiated, when along with the traditional method of chemical testing, it is necessary to create a subsystem of the current quality control of ore at all stages of the mining process [13]. The ore quality control subsystem should include the following components of organizational methods: methods and technical means of obtaining quality information; general functional and organizational structure of the system; the methodology for obtaining and processing information, depending on the purpose of its receipt; methodology for substantiating recommendations to mining management links. The system provides for a radical modernization, first of all, of the

information block, in terms of developing monthly and ten-day daily mining plans based on the approved mining development plan for the current year using the decade-daily schedule (DDS) short-term planning tool for the decade-shift period, Micromine, MineSched, AutoCAD and other software [6]. In this case, the system should be built using radiometric and electronic technical means (tablets) (Fig. 4), linked functionally and constructively with the technological scheme of the mine [2]. The structure of the information-operational mining system for stabilizing the composition of ores is shown in the figure below.

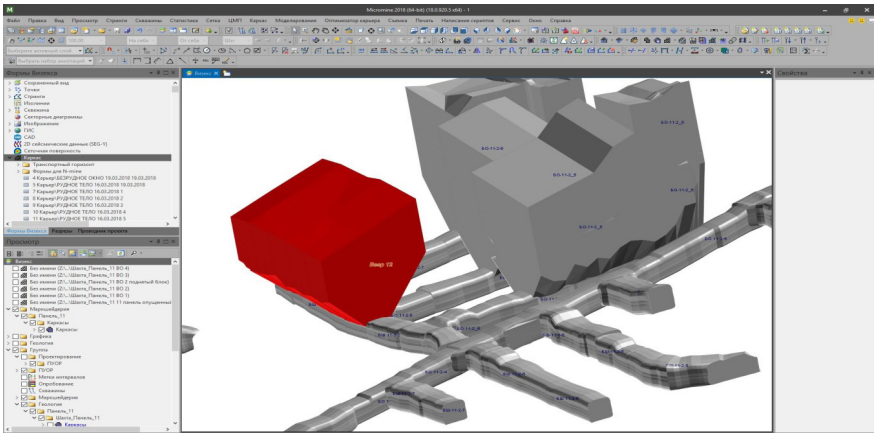
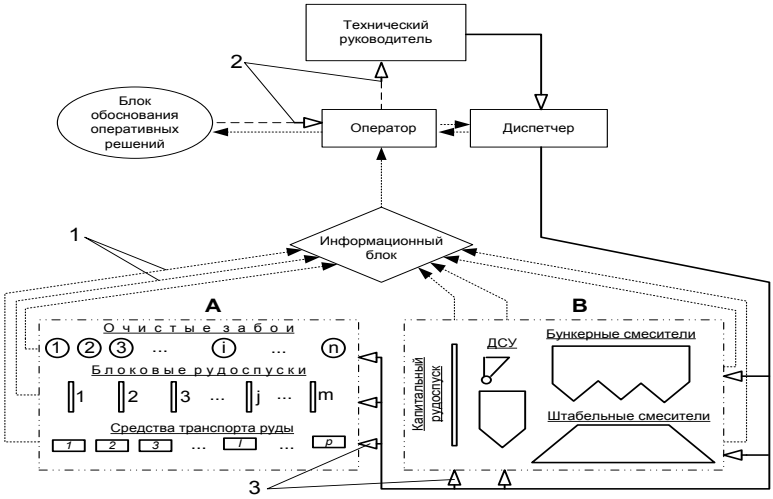


Fig. 3. *General view of the frame model for mining the ore deposit of poor copper - nickel ores in the Micromine software window*



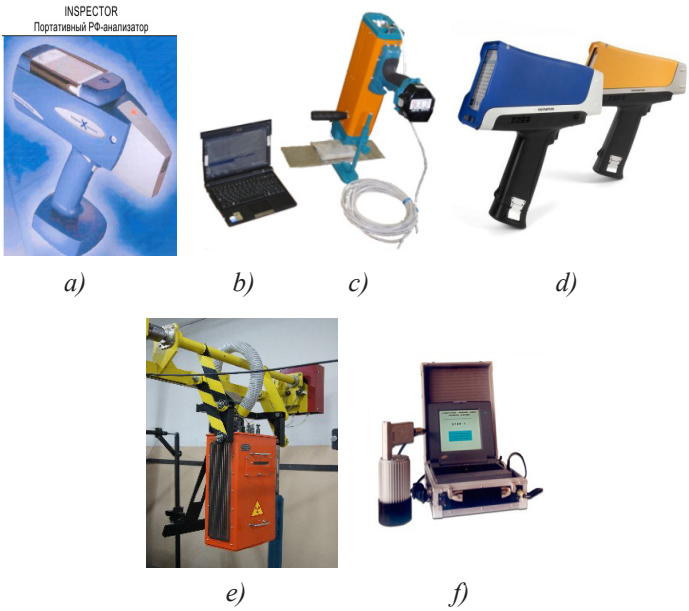


Fig. 4. *The structure of the information-operational mining system for stabilizing the quality of ores in underground mining using radiometric and electronic technical means: a) Inspector portable x-ray fluorescence analyzer; b) portable x-ray complex PRK-2; c) Olympus portable X-ray analyzer; d) ore control station RKS; e) portable X-ray radiometric analyzer PRIM-1. A and B - information-planning and organizational-mixing parts of the system; 1 - information flows; 2 - recommended technological and organizational solutions; 3 - control teams*

Operational information about the quality and quantity of ore in the process stream must be received in the appropriate line services in a timely manner, preceding organizational and technological control actions. To do this, the sensors, ore quality control analyzers should be installed at all nodal points of the technological scheme of the mine, at which the ore composition changes, as well as the ore cargo flows are mixed. Among these nodal points are: faces, ore passages, ore loading points at transport horizons, the confluence of individual ore flows and ore depots. Such an arrangement of radiometric and electronic technical means will allow timely receiving information on the composition of the ore mass and its properties, which means that it will create more favorable conditions for changing the operating mode of points of formation of ore quality. Organizational and planning activities should be carried out mainly on the basis of well-known techniques, after adapting them to the specific conditions of the “Zapolyarny” mine.

Thus, the main stage in the creation of ore quality management systems in mines is the creation of the Center for planning and organizational methods for stabilizing the material composition of ores in underground mining at the "Zapolyarny" mine based on previously created Planning Centers. The center is created for effective planning of mining operations and monitoring their implementation, starting with long-term three-year plans, ending with the hourly distribution of work on each individual underground section using information systems and tools. The introduction of advanced planning and organizational methods for stabilizing the material composition of poor copper-nickel ores and controlling the performance of mining is an important link for achieving the strategic goals of the Company in optimizing and modernizing mining.

References

1. State report "On the state and use of mineral resources of the Russian Federation in 2016 and 2017": [website] URL: http://www.mnr.gov.ru/ (appeal date: 15.05.2019);

2. Kuzin V.F. Methods and systems of operational control for ore quality management

// Monograph: Publishing House of MSU, Mountain Book, 2014. — 374 P.;

3. Laptev V.V. Analysis of studies in the field of computer modeling of the ore production process for mining systems with collapse of ore and host rocks // Problems of Subsoil Use. – 2018. - № 2. - P. 107 - 112. DOI: 10.25635/2313-1586.2018.02.107;

4. Guidelines for the monthly planning of mining operations at the mines of the PJSC "MMC Norilsk Nickel" M ZF 00.00 95-03-2016, Norilsk Publishing House, 2016;

5. Pavlishina D.N., Shumilov P.A., Tereshchenko S.V. Development of the software module "Ore Quality Management" // Collection of scientific papers of CF Petr GU. — Apatite: Publishing House CF Petr GU, 2015. — P.27-30;

6. Mining planning regulations at the SMI MineSched "Komsomolsky" Mine: Norilsk Publishing House, 2017;

7. STP 49156713.14.111-2-1-2015 "Enterprise standard. Technological preparation of production. Ore interspersed and cuprous. Technical conditions;

8. Turtygina N. A, Okhrimenko A.V., Mining planning as an organizational way of managing the quality of minerals in the mine system // Mining Information and Analytical Bulletin. 2018.№ 5 (Special Issue 17). P. 3–11. DOI: 10.25018/0236—1493—2018—5-17—3-11;

9. Turtygina N. A, Okhrimenko A.V. A quantitative assessment of the natural variability in the quality of copper ores occurring in the roof of an intrusion // Mountain Information and Analytical Bulletin. – 2019. – № 8. – P. 146–156. MBD: Scopus DOI: 10.25018/0236-1493-2019-08-0-146-156;

10. Oggeri C., Oreste P. Underground Quarrying for Marble: Stability Assessment through Modelling and Monitoring // International Journal of Mining Science (IJMS), 2015, V. 1, № 1, P. 35–42;

11. Rayo J.D., Mercado J.M., Encina V. Simulation of block caving operation using a discrete element method (DEM) // Conference Paper of Minin 2016 – 6th International Conference on Innovation in Mine Operations, Santiago, Chile;

12. Matthews T. Dilution and ore loss projections: Strategies and considerations // Mining: Navigating the Global Waters: 2015 SME Annual Conference and Expo and CMA 117th National Western Mining Conference. – Denver, United States, 15–18 February 2015. – P. 529–532;

13. Tyrtigina N. A., Sharov S. A.Technological substantiation on the mine quality management system of copper-nickel ores in the underground mining// Topical Issues of Rational Use of Natural Resources 2019 – Litvinenko (Ed) © 2020 Taylor & Francis Group, London, ISBN 978-0-367-85719-6 Proceedings of the xvth forum-contest of students and young researchers under the auspi-ces of unesco, Saint- peters-burg, V. 1, P. 109-114;

14. Mine Surveying and Subsoil Use http://geomar.ru/;

15. Mountain magazine http://www.rudmet.ru/catalog/journals/1/

物联网发展问题
THE INTERNET OF THINGS DEVELOPMENT PROBLEMS

Polegenko Anastasiya Mihailovna
postgraduate
ITMO National Research University
St.-Petersburg, Russia

抽象。 本文分析了物联网的实际问题。 首先，这些问题与该领域的标准化复杂性有关。 另一个因素是缺乏对网络原理及其相互作用的理解。 由于不安全，许多消费者对新产品（例如智能灯泡，智能插座和智能冰箱）表示怀疑。 使用户了解网络构建的基础非常重要，例如，在“事物”的交互和协议可能的漏洞级别上的“智能家庭”。

关键字：物联网，网络通信，网络协议，网络漏洞。

Abstract. T*he article analyzes actual problems of IoT. First of all, these problems are connected with the standardization complexity in this sector. The another factor is the lack of understanding the networking principles and their interaction. Many consumers are very skeptical of new products such as smart light bulbs, smart sockets and smart refrigerators, because of their insecurity. It is important to make users understand the basics of networks building, for example, a "smart home" at the level of interaction of "things" and possible vulnerabilities of protocols.*

Keywords: *Internet of Things, network communication, network protocols, network vulnerability.*

Despite the rapid development of “Internet of things”, this concept in many countries, particularly in Russia, raises many questions and misunderstandings, especially among ordinary users. Often, users of fitness trackers, navigators or electrical appliances counters don’t even know that their devices are part of the Internet of things, much less think about ensuring their safety.

Analysis of the Internet of Things market in Russia shows insufficient growth rates compared to expected. This is manifested in the number of SIM cards used for the Internet of things - an expected figure of 23.5 million decreased to 19 million pcs. by the end of 2019 [1]. First of all, such indicators are explained by insufficient funding, as well as a lack of applications and their imperfection.

The slow pace of development is also due to the complexity of standardization in this sector. The application of existing standards and punctures is not always possible for devices of the Internet of things, which have such limitations as sizes, productive and computing power, memory resources, etc.

The scale of the Internet of things can be divided into the following levels:

1) the level of individual “things” (for example, sensors installed independently from each other to collect information about the environment and telemetry);

2) the level of "things", interconnected within a small network (for example, a "smart home" with a set of gadgets that interact with each other within the same home network);

3) the level of “things” united in a large network (for example, the concept of “smart city”);

4) the level of the global Internet of things, the purpose of which is to unite countries.

It is not required to perform many different functions related from devices of the first level, for example, with an independent analysis of the data obtained, with the coordination of different sensors or switching the interaction between them. From this we can conclude that such devices may not have a large set of interaction protocols, such as devices at the level of the “smart city”.

The another factor of the slow development of the Internet of things is the lack of understanding of the principles of networking and their interaction. In open sources of information very often at the request of the protocols used on the Internet of things, one article may contain information about the protocols, standards, and technologies used at the same time. In this connection, there is a complete misunderstanding of the implementation of the concept of the Internet of things, especially for those who are just beginning to search and analyze information.

The purpose of this article was not to outline the basics of a textbook on network theory, but the problem is that finding information on this topic is difficult, and this, among other things, is a factor in slowing down the development of the Internet of things in our country as a whole.

Depending on the level of devices of the Internet of things, wireless networks of different levels are used: personal networks, local networks, urban wireless networks and global. At each of these levels, it is customary to use its own technologies that satisfy the needs of the interaction of devices at this level without compromising, for example, their speed, power consumption and security.

Based on the scale of existing networks, the general structure of the use of wireless technologies can be represented as follows (Table 1).

Table 1. *The use of wireless technology at different levels of the Internet of things*

The level of individual "things"	The level of "Smart home"	The level of "Smart city"	Global Internet of Things
Personal wireless networks (WPAN)	**Local wireless networks (WLAN)**	**Wireless Networks (WMAN)**	**Wide area wireless networks (WWAN)**
• ***Bluetooth*** • ***Zigbee*** • ***Wireless*** • ***USB***	• ***WiFi***	• ***WiMAX*** • ***WiBro*** • ***HiperMan***	• ***GPRS*** • ***LTE*** • ***HSPA***

Personal wireless networks are characterized by low power consumption and short range, which determines their applicability to the Internet of things. Many of these technologies do not support IP internetwork protocols, and either special gateways are required to interact with them, or protocols with add-ons designed to provide interoperability are used.

Thus, we can talk about the compliance of the IoT device levels with wireless technology standards, depending on the scale and range of devices.

Depending on the network level, the architecture of the Internet of things may include different elements, but the classical representation of the architecture includes the "things" (devices) themselves, gateways, servers, and the client part — applications.

The most used protocols of the Internet of things are HTTP, MQTT, CoAP. According to the IoT Developer Survey 2018 conducted by the Eclipse IoT Working Group (a division of the Eclipse Foundation) in conjunction with the AGILE IoT, IEEE and the Open Mobile Alliance [2], the MQTT protocol is used in 62.61% of devices, HTTP in 54.1% , and CoAP - in 22.49%.

The MQTT protocol (Message Queuing telemetry transport) is optimal for use on the Internet of things. In fact, it was developed for such networks in order to collect telemetry from various sensors, it is characterized by a low load on the network, ease of installation and use.

Exchange under the MQTT protocol is carried out on the basis of the "publisher-subscriber" principle (Publisher-Subscriber), while, unlike the client-server architecture, the publisher and the subscriber are usually separated, they do not have to know each other, they do not have to be included in one time. The publisher and the subscriber do not send messages to each other directly, but the broker standing between them controls the transfer. For example, the publisher transmits information about the ambient temperature, while putting the heading "Temperature". The broker, receiving such messages, analyzes which of the subscribers is subscribed to this heading, and sends a message from the publisher - the temperature sensor, only to them.

CoAP (Eng. Constrained Application Protocol) - a binary protocol of machine-to-machine interaction, working on top of UDP, which differs from HTTP, in the image of which it was developed.

The structure of the CoAP protocol is based on the REST architecture, i.e. allows you to build applications based on a group of methods - GET, PUT, POST, DELETE. CoAP integrates seamlessly with HTTP for future networking with a CoAP proxy. For example, light sensors installed in a room, upon request, receive a GET message from an HTTP client through CoAP proxies and transmit CoAP protocol data on the degree of illumination of the room.

The well-known HTTP protocol is also one of the leaders in the use of the Internet of things devices, as one of the most popular network communication protocols, integration with which is not difficult.

To ensure the security of the devices of the Internet of things, including, it is necessary to take into account the vulnerabilities of the network protocols used. For example, a critical vulnerability (CVE-2019-5635) [3] was discovered in the Hickory Smart Ethernet Bridge device manufactured by Belwith Products, LLC in July 2019 [3] related to the transmission of clear data via the MQTT protocol. Smart Ethernet Bridge is a smart bridge between sensors and a client application for monitoring and control. This vulnerability allowed obtaining the username and password of the user of the MQTT broker.

Another vulnerability was discovered in the MQTT subsystem in the Gobot Hybrid Group prior to version 1.13.0 (CVE-2019-12496) [3]. The Gobot Hybrid Group is an IoT framework for robotics and physical computing that offers adapters and controllers for controlling various devices. The vulnerability is related to the default skipping of CA root certificate verification.

Vulnerability CVE-2019-9750, discovered in IoTivity, an open platform providing uninterrupted communication between IoT devices, consists in spoofing an IP address and implementing denial of service attacks.

These are just a few examples of protocol vulnerabilities used in IoT devices.

Today, the development of the concept of the Internet of things has been slowed down for a number of reasons. First of all, the standardization procedure in the field of the Internet of things in our country goes a long way from the moment of adoption of standards to their application in real life. Relatively recently, the “Concepts for the construction and development of narrow-band wireless networks of the Internet of Things in the Russian Federation” was adopted in March 2019, and the process of its implementation in the development and operation of Internet of things devices is just beginning. The lack of awareness of all parties involved in this market segment is closely related to this problem. Many consumers are very skeptical of new products such as smart light bulbs, smart sockets and smart refrigerators. It is possible that there really is a reason for this - the security issues

of the Internet of things remain, for the most part, open. The discovery of network protocol vulnerabilities associated with smart devices is faster than standards are being adopted and secure solutions are being developed. The approach to ensuring the security of network interaction should be comprehensive and systemic and, first of all, aimed at implementing protocols and using services that allow timely updates and maintenance of current versions with possible security add-ons.

References

1. *http://www.tadviser.ru/index.php/Article:Internet_veshei,_IoT,_M2M_(rinok_Rossii).*
2. *https://iotas.ru/files/documents/wg/RAEK_Ecosystema_industrialnog.pdf.*
3. *https://cve.mitre.org/*.

表面纳米结构中的相变
金属层

PHASE TRANSITION IN THE SURFACE NANOSTRUCTURE METAL LAYER

Yurov Viktor Mikhailovich
Candidate of Phys. and Math. Sciences, Associate Professor
Guchenko Sergey Alekseevich
student PhD
Makhanov Kanat Metovich
Candidate of Phys. and Math. Sciences, Associate Professor
Karaganda State University named after E.A. Buketov
Karaganda, Kazakhstan

抽象。与电子和光子学的纳米结构的合成方法的发展有关的固体原子光滑表面的研究是基础和实际的兴趣。
当前，有几种方法可以产生具有非常低的粗糙度的表面，与原子间距离相当。在这种情况下，出现了固体表层厚度的问题。当前，在大多数情况下，滑动入射模式下的X射线用于识别表面层并确定其线性尺寸。在本文中，提出了一种简单的实验方法来测定诸如卤化物，硫化物和氧化物之类的金属化合物表面层的尺寸。实验的实质是研究这些金属化合物的X射线发光对磷光体晶粒尺寸的依赖性。根据经验，近表面层的大小，在特定情况下，是由相应金属化合物的原子体积的大小确定的。在提出的工作中，表面层分为两层：层h = d(I)和层h≈10d(II)。在h≈10d(II)时，固体物理性质的尺寸依赖性开始。对于h = d(I)，在表面层中发生相变。在纯金属中，表面层的厚度远小于其化合物中的厚度。在某些化合物中，表面层的厚度可以达到微米值。在这样的层尺寸下，仍然观察到物理性质的尺寸依赖性。
关键词：表面层厚度，纳米结构，尺寸效应，X射线发光，原子量。

Abstract. *The study of atomically smooth surfaces of solids is of fundamental and practical interest in connection with the development of methods for the synthesis of nanostructures for electronics and photonics.*

Currently, there are several methods for producing surfaces with very low roughness, comparable to the interatomic distance. In this case, the question arises of the thickness of the surface layer of solids. Currently, for the most part, X-rays in the sliding incidence mode are used to identify the surface layers and determine their linear dimensions. In this paper, simple methods for the experimental determination of the size of the surface layers of metal compounds such as

halides, sulfides, and oxides are proposed. The essence of the experiments was to study the dependence of the X-ray luminescence of these metal compounds on the grain size of the phosphor. Empirically, the size of the near-surface, in particular cases, layer was determined by the size of the atomic volume of the corresponding metal compound.

In the proposed work, the surface layer is divided into two layers — the layer h = d (I) and the layer h≈10d (II). At h≈10d (II), the size dependence of the physical properties of solids begins. For h = d (I), a phase transition occurs in the surface layer. In pure metals, the thickness of the surface layer is much less than in their compounds. In some compounds, the thickness of the surface layer can reach micron values. At such layer sizes, a dimensional dependence of physical properties is still observed.

Keywords: *surface layer thickness, nanostructure, size effect, X-ray luminescence, atomic volume.*

Introduction

An important property of nanoparticles, nanostructures, and nanomaterials is the specific heat [1, 2]. In [3, 4] and a number of others, the analysis of the heat capacity behavior of metallic palladium and titanium oxide was carried out on the basis of surface thermodynamics and on the basis of computer simulation (molecular dynamics method). Experimental and theoretical studies of the heat capacity of nanostructures, to date, remain more controversial. In [5], we proposed a model of the surface layer of atomically smooth metals. This model is shown in fig. 1.

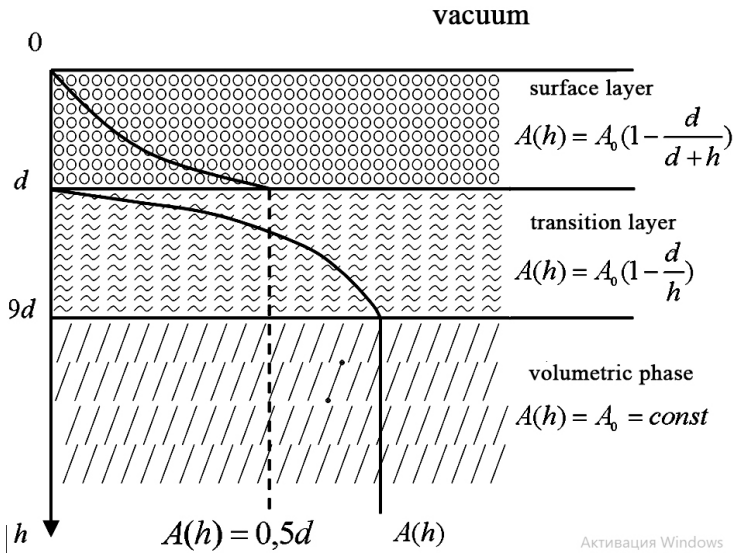


Figure 1 - *Schematic representation of the surface layer [5]*

A layer of thickness h = d was called layer (I), and a layer at h≈10 d was called layer (II) of an atomically smooth crystal. At h≈10 d, the dimensional dependence of the physical properties of the material begins to appear, and such a structure is a nanostructure.

The thickness of the layer (I) was experimentally determined by us in [6] and is presented in table 1. Table 1 shows that the thickness of the surface layer (II) is less than 100 nm. This means both layer (I) and layer (II) are a nanostructure.

From fig. Figure 1 shows that at h = d, a structural phase transition occurs in the surface layer. For h <d, the structure changes sharply. The processes of reconstruction and relaxation of the surface layer are underway [7]. As a rule, these processes are observed on atomically smooth chips of crystals in high vacuum. Moreover, the relaxed surface is characterized only by a change in interplanar spacings, and the reconstructed surface may have a difference in the arrangement of near-surface atoms.

From fig. 1 it can be seen that the II → I phase transition has the features of a λ - transition and can be described in terms of the Landau mean field theory [8]. We will use the Landau mean field theory with one significant change: we will replace the temperature T with the size h. For nanosizes (see Table 1), this assumption was put forward in [9].

Table 1 - *The thickness of the surface layer d(I) of some metals Me [6]*

Me	d(I), nm	Me	d(I), nm	Me	d(I), nm	Me	d(I), nm
Li	2,2	Sr	5,9	Sn	2,8	Cd	3,4
Na	4,5	Ba	6,6	Pb	3,1	Hg	1,8
K	7,7	Al	1,6	Se	2,8	Cr	1,2
Rb	10,0	Ga	2,0	Te	3,5	Mo	1,8
Cs	12,1	In	2,7	Cu	1,2	W	1,6
Be	0,8	Tl	2,0	Ag	1,7	Mn	1,1
Mg	2,4	Si	2,0	Au	1,7	Tc	1,4
Ca	4,4	Ge	2,4	Zn	1,6	Re	1,5

Structural phase transition II → I

For the dimensional behavior of a certain property of the metal A(r) (including heat capacity), we theoretically obtained the following equations [10]:

$$A(r) = A_0 \cdot \left(1 - \frac{d}{r}\right), \qquad r >> d$$
$$A(r) = A_0 \cdot \left(1 - \frac{d}{d+r}\right), \quad r \le d. \qquad (1)$$

where A_0 is the property of a volumetric body, the parameter d is determined by the formula [10]:

$$d = \frac{2\sigma\upsilon}{RT}, \quad (2)$$

where σ is the surface energy (surface tension) of the metal, υ is the volume of one mole, R is the gas constant, and T is the temperature.

According to the Landau theory [8] in phase II, the crystalline structure of the metal is disordered and the order parameter is m=0. In phase I, which is ordered, the order parameter is m≠0. Under such circumstances, the potential F(h, m) can be expanded in the order parameter m in the following series:

$$F(h,m) = F_0(h) + Am + Bm^2 + Cm^3 + Dm^4 + Em^5 + \cdots, \quad (3$$

where F0(h) (T=h) is the part of the free energy depending on m, and the coefficients A, B, ... can depend on the characteristic size h. Here, as we have already indicated above, the role of temperature T is played by size h.

The phase equilibrium is achieved under the condition of minimum free energy, i.e. when ∂F/∂m = 0. In this case, the coefficient for the first degree of the order parameter m necessarily becomes zero: ∂F/∂m = *A* = 0. In phase II and all the components ∂F/∂m following the first term of the expansion will be equal to zero, since in this phase m = 0.

The following remark reduces to the fact that, in the vicinity of the minimum of free energy, due to its symmetry, the expansion ∂^2F/∂^2m will be a polynomial with even degrees of expansion:

$$F(h,m) = F_0(h) + (1/2\alpha)m^2 + (1/4\beta)m^4 + (1/6\gamma)m^6 + \cdots, \quad (4)$$

where α, β, and γ are the expansion coefficients of the system potential with respect to the order parameter: F(m).

Equation (4) implies a sharp dependence of the quantity α on the size h, while the coefficients β and γ do not depend on h.

Expanding the quantity α(h) in the small parameter (h-Θ) and leaving only the first term of this expansion, we obtain:

$$\alpha = \alpha_0(h - \theta) \quad (5)$$

where α_0 is a coefficient independent of h.

In the Landau theory [8], the nature of the phase transition is determined by the sign of the coefficient for the fourth power of the order parameter: m4. Provided that □ > 0, we have a second-order phase transition when a jump in heat capacity is observed. Moreover, the coefficients at degrees m6 and higher are discarded, since the state of the thermodynamic state of the system has already been reached.

Then, in phase II, the expansion of the thermodynamic potential takes the form:

$$F(h,m) = F_0(h) + (1/2\alpha)m^2 + (1/4\beta)m^4, \quad (6)$$

where $\alpha = \alpha_0(h–\theta)$ and β > 0.

The specific form of function (6) depends on the physical meaning of the order parameter.

In order-disorder phase transitions (Figure 1), the atomic concentrations C_1 and C_2, which determine the number of atoms in phase I and phase II, can be selected as the order parameter.

For h = d, the quantity becomes nonzero:

$$\mathrm{m} = (\mathrm{C}_1 - \mathrm{C}_2)/(\mathrm{C}_1 + \mathrm{C}_2). \tag{7}$$

The stability of the point at h = d is ensured by the conditions:

$$\frac{\partial F}{\partial m} = 2A_0 m + 4C_0 m^3 = 0,$$
$$\frac{\partial^2 F}{\partial m^2} = 2A_0 + 12C_0 m^2 > 0. \tag{8}$$

It follows from (8) that:

$$\mathrm{h} > \mathrm{d} \qquad \mathrm{m} = 0 \qquad \mathrm{A}_0 > 0,$$
$$\mathrm{h} < \mathrm{d} \qquad \mathrm{m} = \sqrt{-\frac{\mathrm{A}_0}{2\mathrm{C}_0}}. \tag{9}$$

From the second Landau postulate follows the proportional dependence of A0 on h:

$$A_0(h) = \alpha_0(h - d), \tag{10}$$

where $\alpha_0 = (\partial \mathrm{A}_0/\partial \mathrm{h})_{\mathrm{h=d}}$ – const.

It is assumed that C_0 is independent of h. Thus, the value of the order parameter m for h < d has the form:

$$\mathrm{m} = \sqrt{\frac{\alpha_0(\mathrm{d} - \mathrm{h})}{2\mathrm{C}_0}}, \tag{11}$$

Near the point h = d, the entropy:

$$\mathrm{S} = -\frac{\partial \mathrm{F}}{\partial \mathrm{h}} = -\mathrm{S}_0 - \frac{\partial \mathrm{A}_0}{\partial \mathrm{h}} \cdot \mathrm{m}^2, \tag{12}$$

In phase I m = 0, S = S_0; for h <d

$$\mathrm{S} = \mathrm{S}_0 + \frac{\mathrm{A}_0}{2\mathrm{C}_0}\frac{\partial \mathrm{A}_0}{\partial \mathrm{h}} = \mathrm{S}_0 + \frac{\alpha_0^2}{2\mathrm{C}_0}(\mathrm{h} - \mathrm{d}), \tag{13}$$

The entropy function S(h) is continuous, which allows one to find the specific heat $\mathrm{C}_\mathrm{p} = \mathrm{h}\left(\frac{\partial \mathrm{S}}{\partial \mathrm{h}}\right)_\mathrm{p}$ in both phases at h = d. In phase I - $C_p = C_{p_0} + \frac{\alpha_0^2 d}{2C_0}$, in phase II - $C_p = C_{p_0}$, where $\mathrm{C}_{\mathrm{p}_0} = \mathrm{h}\frac{\partial \mathrm{S}_0}{\partial \mathrm{h}}$. Heat capacity jump during phase transition

(14)

In the case of λ-type structural phase transitions, a final jump in the specific heat Cp, compressibility coefficients χ, and thermal expansion a_T occurs:

$$C_p = T(\partial S/\partial T) = -T(\partial^2 G/\partial T^2);$$
$$\chi = -(1/V)(\partial V/\partial p) = -(1/V)(\partial^2 G/\partial p^2); \quad (15)$$
$$a_T = (1/V)(\partial V/\partial T) = (1/V)(\partial^2 G/\partial p \partial T).$$

We calculate Cp for gold using formulas (1) and (2):

$$C_{p_1} = C_{p_0}\left(1 - \frac{1{,}7}{h}\right).$$
$$C_{p_2} = C_{p_0}\left(1 - \frac{1{,}7}{h+1{,}7}\right) \quad (16)$$

For a massive gold sample, C_{p0} = 128.7 J/kg K.

Heat capacity jump during phase transition:

$$\Delta C_p = 0{,}01 \cdot C_{p_0}. = 1{,}3 \text{ J/kg K} \quad (17)$$

n [11], computer simulation of the behavior of gold nanoclusters on size was performed. The result is shown in Fig. 2. The difference in heat capacity ΔC_p at h = 5 and 2 nm was $\Delta C_p \approx 1.0$ J/kg•K. This is pretty close to what we got (17).

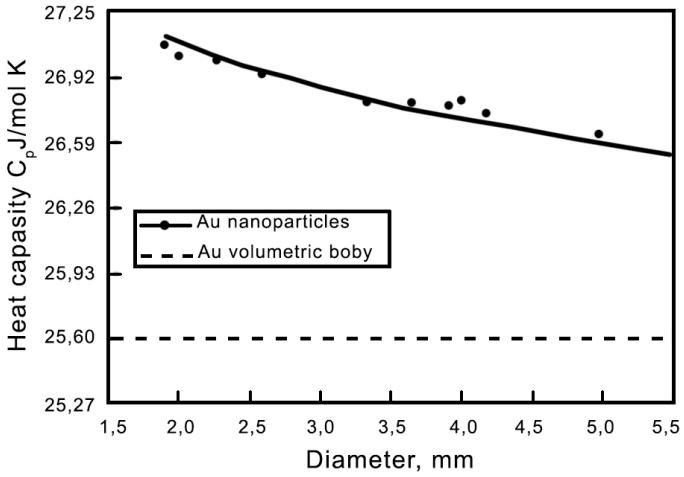


Figure 2 - *Dependence of molar heat capacity on diameter of a gold cluster at T = 300 K [11].*

The absence in Fig. 2 jump in heat capacity, as can be seen from Fig. 1 is apparently related to the features of the program used in [11].

Conclusion

The above results confirm that size can play the role of temperature in nanostructures.

To describe the phase transitions in nanostructures, various models have been proposed, among which the Landau mean field method, in which the order parameter is used, can be noted.

The results obtained can give a significant impetus to studies of atomically smooth metals and other compounds.

Thanks

The work was carried out under the program of the Ministry of Education and Science of the Republic of Kazakhstan. Grants No. 0118PK000063 and No. Ф.0781.

References

1 Dmitriev A.S. Introduction to Nanothermophysics. - M.: BINOM Laboratory of Knowledge, 2015. - 793 p.

2 Fisher T.S. Thermal Energy at the Nanoscale. - World Scient, Singapore, 2013, - 171 p.

3 Gafner Yu.Ya., Gafner S.L., Zamulin I.S., Redel L.V., Samsonov V.M. Possible mechanisms for the growth of heat capacity in nanostructured metals // Solid State Physics, 2013, Vol. 55, no. 10. – P. 2026-2032.

4 Saeedian M., Mahjour-Shafiei M., Shojaee E., and Mohammadizadeh M.R. Specific Heat Capacity of TiO Nanoparticles // J. Comput. Theor. Nanosci. 2012, V. 9, №4. – P. 616-620.

5 Yurov V.M., Laurinas V.Ch., Guchenko S.A., Zavatskaya O.N. The thickness of the surface layer of pure metals // Modern problems of science and education. Electronic Journal, 2012, No. 5.http:// science-education.ru /105-6930/

6 Yurov V.M. Superfecial tension of pure metals // Eurasian Physical Technical journal, 2011.-Vol. 8.-№ 1(15). - P. 10-14.

7 Zaitsev A.L. Surface physics: structure, adsorption. - Minsk, 2011. - 168 p.

8 Chernyshev A.P. Melting of surface layers of nanoparticles: Landau model // Mater. Chem. Phys, 2008, Vol. 112. –P. 226–229.

9 Sergeev G.B. Nanochemistry. - M.: Moscow State University, 2007.- 336 p.

10 Yurov V.M., Laurinas V.Ch., Guchenko S.A., Zavatskaya O.N. Dimensional effects and surface tension of pure metals // Successes in modern science, 2012, No. 7. - P. 88-93.

11 Gafner Yu.Ya., Gafner S.L., Zamulin I.S., Redel L.V., Baidyshev V.S. Analysis of the heat capacity of fcc metal nanoclusters using the example of Al, Ni, Cu, Pd, Au // Physics of Metals and Metallurgy, 2015, Vol. 116, No. 6. - P. 602-609.

电磁辐射与质子，中子和原子核相互作用的过程的工程学观点
AN ENGINEERING VIEW OF THE PROCESSES OF INTERACTION OF ELECTROMAGNETIC RADIATION WITH PROTONS, NEUTRONS AND ATOMIC NUCLEI

Kuznetsov Vasiliy Urevich
Candidate of Technical Sciences
Director
LLC "Printing Center Krasnoyarsk"

抽象。 本文基于接收和发射天线以及电子设备中使用的线性孔径天线和天线阵列的理论，讨论电磁辐射与原子核的相互作用。 提出了康普顿实验的另一种观点，即整个原子上的未移动辐射。 根据提出的事实，得出关于夸克的某些性质的结论。

关键字：原子，夸克，天线，电磁辐射，夸克性质

Abstract. *This article discusses the interaction of electromagnetic radiation with atomic nuclei based on the theory of receiving and transmitting antennas, as well as linear, aperture antennas and antenna arrays used in electronic devices. An alternative view of Compton's experiment in the part of unshifted radiation on the atom as a whole is proposed. Based on the proposed facts, conclusions are made about some properties of quarks.*

Keywords: *Atom, quark, antenna, electromagnetic radiation, quark properties*

As is known, X-ray photons have an energy of 100 eV to 250 keV, which corresponds to radiation with a frequency of $3 \cdot 10^{16}$ to $6 \cdot 10^{19}$ Hz and a wavelength of 0.005-10 nm, i.e., 10^{-14} to 10^{-8} m, which consistent with the linear sizes of atoms: their radii range from 0.3 to 2.6 angstroms (1 angstrom = 10^{-10} m). The radius of the nucleus is about 10^{-5} angstroms, that is, 10^{-15} m. The nucleus of an atom acts as an antenna that absorbs EMP. And as is known, for an antenna to catch EM well, its length should be comparable with the EMP wavelength and the best results are given by quarter-wave (for pin) or 2 quarter-wave segments (for dipole).

In addition, the most energetic gamma rays (i.e., with the smallest wavelength - $\mathbf{10^{-14}}$) are even embedded in the structure of elementary particles, such as protons and neutrons. Let us compare their linear dimensions - $0.8 \cdot 10^{-15}$ protons, which again is consistent with the reception of an EMR antenna, especially if we take

into account that the proton in modern concepts consists of 3 quarks, which makes it possible to operate two of them as a dipole antenna, or as a double triangular antenna paired with another proton. The same goes for the neutron since it also consists of 3 quarks.

I consider this fact extremely important, since it indicates that wave effects work at the level of nuclear particles, so that the constituent neutrons and protons elements form a structure that works like an antenna. In nuclei with a large atomic number, the nucleus will be a three-dimensional (spherical) phased antenna array (Fig. 1), and in nuclei with a small atomic number, neutrons and protons may form zigzag antennas (the simplest zigzag antenna is a double triangular antenna) (Fig. 2)

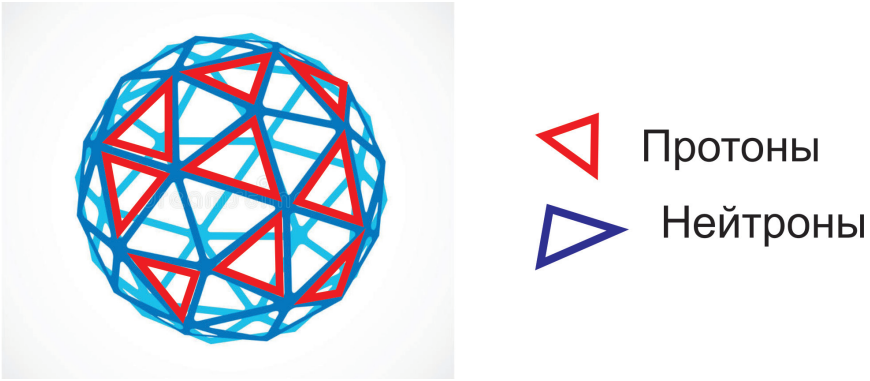


Fig. 1. *Representation of the neutron-proton structure of a nucleus with a large atomic number*

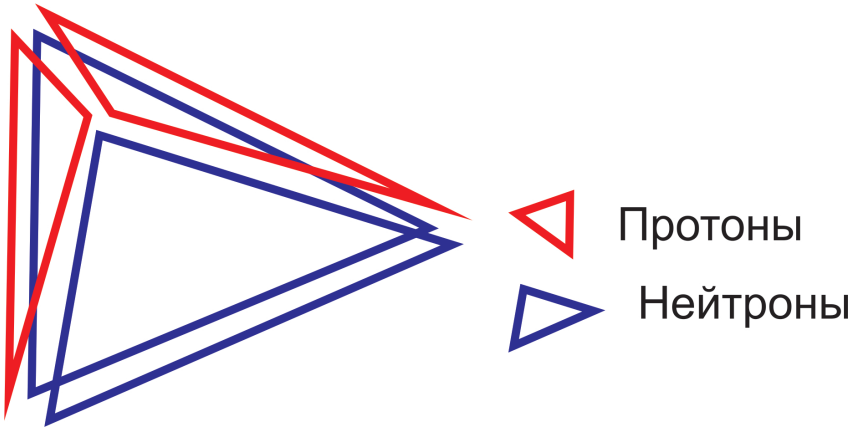


Fig. 2. *Representation of the neutron-proton structure of the helium nucleus 4*

Based on the assumption that neutrons and protons interact with electromagnetic radiation based on the theory of antennas, it should be assumed that quarks have a certain linear structure that ensures their interaction with the electromagnetic field.

Do not forget that one of the tasks of transmitting antennas is the spatial distribution of the electromagnetic field, which makes it possible to look at some experiments from a new position (in particular, Comptnon).

It is worth noting separately that any antenna interacts with any electromagnetic radiation, but with different efficiencies.

It is known that even with perfect matching of the receiving antenna, transmission line and receiver, the energy of the surface currents of the receiving antenna cannot be completely transmitted to the receiver. Part of the energy of these currents is inevitably scattered by re-radiation. In the case of perfect matching and the absence of losses in the receiving antenna, exactly half of the energy of the surface currents is spent on creating a re-emitted field. (1. p. 22) If there is no receiver, then all the received energy will be re-emitted (excluding losses in the antenna of course), as is observed in Compton's experiment. As experience shows, in scattered radiation, along with a displaced line with a wavelength λ, an unbiased line with an initial wavelength λ_0 is also observed. This is usually explained by the interaction of part of the photons with electrons strongly bound to atoms. It is believed that in this case the photon exchanges energy and momentum with the atom as a whole. Due to the large mass of the atom compared to the mass of the electron, only an insignificant part of the photon energy is transferred to the atom, therefore the wavelength λ of the scattered radiation practically does not differ from the wavelength λ_0 of the incident radiation. If we consider that the incident photon interacts not with bound electrons, but directly with the neutrons and protons of the nucleus, which work as antennas without load, then it will be re-emitted with minimal losses, which is observed in the experiment.

As is known, the process of receiving electromagnetic radiation is the conversion of electromagnetic waves that arrive at the location of the receiving antenna into guided electromagnetic waves acting on the input device of the receiver. This conversion is performed by the receiving antenna. Therefore, the elements of the receiving antenna must have the property of electrical conductivity - since in this case the elements of the antenna are quarks, we should assume their electrical conductivity and accordingly assume that they have a composite linear structure.

References

1. A.P. pudovkin, Yu.N. Panasyuk, A.A. Ivankov. The basics of antenna theory. - Tambov: TSTU Publishing House, 2011.

NOTES

科学出版物

上合组织国家的科学研究：协同和一体化

国际科学大会的材料

2020年1月25日。中国北京

编辑A.A.Siliverstova
校正A.I.尼古拉耶夫

2020年1月31日。中国北京。
USL。沸点：98.7。 订单253.流通500份。

在编辑和出版中心印制
无限出版社