



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

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这些会议文结合了会议的材料 – 研究论文和科学工作者的论文报告。它考察了职业化人格的技术和社会学问题。一些文章涉及人格职业化研究问题的理论和方法论方法和原则。

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CONTENTS

ECONOMIC SCIENCES

在国内消费放程序框架内应用有条件放行货物的现代方面 Modern aspects of the application of conditional release of goods in the framework of the release procedure for domestic consumption <i>Pogarskaya Anastaisia Sergeevna, Tonkonog Victoria Vladimirovna, Konfino Kseniya Viacheslavovna</i>	9
形成有效的人员劳动激励体系的特点 Features of the formation of an effective system of labor motivation of personnel <i>Kazaryan Irina Rafaelevna, Yakovleva Svetlana Vyacheslavovna</i>	16
为国家文化机构的的活动提供财政支持, 并监测其有效性 Financial support for the activities of state cultural institutions, monitoring its effectiveness <i>Borisenko Oleg Igorevich</i>	20
实施国家金融管制的主要特点 Key features of the implementation of state financial control <i>Saradzhyan Karen Gaikovich</i>	27
联邦服务的控制活动对象 Objects of control activity of the Federal services <i>Kazatskaia Viktoriia Bogdanovna</i>	33
俄罗斯联邦国家金融监管领域当前趋势分析 Analysis of current trends in the field of state financial control in the Russian Federation <i>Grul Diana Victorovna</i>	38
实现可持续发展目标背景下俄中能源合作项目实施分析 Analysis of the implementation of energy cooperation projects between Russia and China in the context of achieving sustainable development goals <i>Gross Maryana Alexandrovna</i>	43

JURIDICAL SCIENCES

论司法立法区分不动产与动产概念的现代意义 On the modern significance of judicial law-making in distinguishing the concepts of real estate and movable property <i>Zrellov Alexander Pavlovich</i>	50
--	----

PEDAGOGICAL SCIENCES

培养未来技术教师的创意和技术实验室专业发展

Creative and technological laboratory professional development in the preparation of future teachers of technology

Balamirzoev Abdul Gadjibalaevich.....56

五人制足球B1组场上队员协调能力特征

Characteristics of coordination abilities of field players in football five-a-side B1 category

Rumyantseva Elvira Rimovna, Nevmyvaka Anastasiia Igorevna60

学生从属关系中的竞争性游戏英语学习

Competitive gaming English learning in students' affiliation

Baklanov Pavel Alekseevich, Koroleva Natalya Evgenyevna.....68

现代英语广告语篇：形成与发展的起源

Modern English advertising discourse: the origins of formation and development

Grechin Danila Nikolaevich.....75

PHILOLOGICAL SCIENCES

现代英汉文学中的新拟人论：T. S. 艾略特和老舍的猫

New anthropomorphism in modern English and Chinese literature: T.S. Eliot's and Lao She's cats

Andreeva Yana Evgenievna, Marshaniya Kristina Mikhailovna.....82

中国现代语言文化中“仁人”概念层的内容特征

Features of the content of the conceptual layer of the concept 仁人HUMANE PERSON in Chinese modern linguistic culture

Biryulina Ekaterina Andreevna.....89

PHILOSOPHICAL SCIENCES

辩证法与人口学说

Dialectics and the doctrine of populationality

Apartsev Oleg Rolenovich.....94

SOCIOLOGICAL SCIENCES

家庭是公民和爱国主义话语中的希望和支持

Family as hope and support in the discourse of citizenship and patriotism

Lebedeva Lyudmila Gennadyevna.....99

PSYCHOLOGICAL SCIENCES

情境模型与反事实思维的心理机制

Situational model and the psychological mechanisms of counterfactual thinking

Scherbakov Sergey Vitalievich.....103

BIOLOGICAL SCIENCES

使用射线鳍鱼类 (Actinopterygii) 作为海洋水污染的生物指示剂

Using of ray-finned fish species (Actinopterygii) as bioindicators of marine water pollution

Kaurova Zlata Gennadiyevna, Oborina Anastasia Konstantinovna.....109

MEDICAL SCIENCES

锁骨肩峰端脱位的诊断及微创手术治疗方法

Diagnosis and minimally invasive method of surgical treatment of dislocation of the acromial end of the clavicle

Abdurazakov Arman Urazbaevich, Abdurazakov Urazbay Abdurazakovich, Koichumanov Askhat Kuatovich, Ajimov Ardak Kasimovich.....115

医务人员手卫生在预防医院感染中的重要性

The importance of hand hygiene of medical personnel in the prevention of HAI
Smetanin Victor Nikolaevich.....124

跌倒恐惧对社会长期居住机构老年人心理生理状况的影响

The influence of the fear of falling on the psychophysiological status of aged people in a social institution of long-term residence

Maltsev Sergey Borisovich, Medvedev Dmitrii Stanislavovich, Trotsyuk Dina Vitalievna.....132

肺炎患者的生活质量

Quality of life in patients with pneumonia

Ibragimova Kumushbegim Muratzhankyzy, Abdurakhmanova Nodira Asenkyzy, Zhumashbekova Marzhan Seylkhonovna.....137

印度卟啉症的患病率和现代诊断方法

Prevalence and modern diagnostic methods of porphyria in India

Pradeep Gana, Kovalenko Elena Nikolaevna, Romanova Ella Victorovna.....143

TECHNICAL SCIENCES

结构保温泡沫混凝土的隔声性能

Sound insulation properties of structural and thermal insulating foam concrete

Erzhanov Syrymgali Erzhanovich, Nurumov Rashid Bayanovich, Saduakasov Mederbai Seisenbaevich, Meirkhanov Aibek Bauyrzhanovich.....148

保温珍珠岩水泥板

Thermal insulation perlite-cement plates

Ibraimbaeva Gulnaz Bakkadyrkyzy, Auelbekov Seilkhan Shadieievich, Shoibekova Aigul Mederbaevna, Meirkhanov Aibek Bauyrzhanovich.....155

PHYSICAL AND MATHEMATICAL SCIENCES

通过激光雷达系统探测粗气溶胶成分

Probing of coarse aerosol fraction by lidar systems

Potapova Irina Alexandrovna, Dyachenko Natalia Vladimirovna, Yakovleva Tatyana Yurievna.....163

AGRICULTURAL SCIENCES

用动物屠宰行业废水灌溉时黑钙土的植物毒性评估

Assessment of phytotoxicity of chernozems when irrigated with wastewater from animal slaughter industries

Petrova Galina Vasilievna, Filippova Asya Vyacheslavovna, Artamonova Olga Nikolaevna.....170

通过进步质量评估卡尔梅克品种公牛	
Assessment of Kalmyk breed bulls by progress quality	
<i>Ubushieva Altana Vadimovna, Ubushieva Victoria Sanalovna,</i>	
<i>Chimidova Nadezhda Vasilievna, Sangadzhiev Roman Daavaevich.....</i>	<i>178</i>
开发基于科学的椴树开花输送机 (tilia l.) 以提高蜂蜜生产率	
Development of a scientifically-based linden flowering conveyor (tilia l.) to	
increase honey productivity	
<i>Elina Maria Vadimovna, Potanin Dmitry Valerievich,</i>	
<i>Razumnyj Vladimir Viktorovich.....</i>	<i>185</i>
臭氧-空气处理蜂箱的特点	
Features of ozone-air treatment of bee hives	
<i>Loza Andrey Alexandrovich.....</i>	<i>193</i>
腐植酸钾促进剂制剂对奥伦堡乌拉尔地区冬小麦产量的影响	
The effect of the preparation Potassium Humate Prompter on the yield of winter	
wheat in the Orenburg Urals	
<i>Popov Alexey Vladimirovich, Petrova Galina Vasilievna.....</i>	<i>198</i>

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在国内消费放行程序框架中应用货物有条件放行的现代方面
**MODERN ASPECTS OF THE APPLICATION OF CONDITIONAL
RELEASE OF GOODS IN THE FRAMEWORK OF THE RELEASE
PROCEDURE FOR DOMESTIC CONSUMPTION**

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注解。 本文讨论了货物有条件放行机制的现代方面，以及在对受技术监管的货物实施制裁限制的现代条件下应用该机制的实际问题。 对这个问题的研究使我们能够确定一些有问题的方面，需要更详细的考虑和制定切实可行的建议。

关键词：假释、认证、行政责任。

Annotation. *This article discusses modern aspects of the mechanism of conditional release of goods, as well as practical issues of its application in modern conditions of imposed sanctions restrictions on goods subject to technical regulation. The study of this issue allows us to identify a number of problematic aspects that require more detailed consideration and development of practical recommendations.*

Keywords: *conditional release, certification, administrative responsibility.*

Conditionally released goods are products that are declared as part of the customs procedure of release for domestic consumption and are released only if the established conditions are met.

The following situations may be the reasons for placing goods under conditional release:

- benefits for payment of import customs duties have been applied to goods, which limits the possibility of their disposal only within the framework of the intended use;

- provision of documents confirming compliance with prohibitions and restrictions after the release of goods, which implies a ban on the transfer of goods to third parties, in particular their sale, until the provision of a full package of permits;
- application of lower rates of import customs duties than stipulated by the unified customs tariff, which implies territorial restrictions on the right to use goods.

It should be noted that regardless of the reason for placing goods under conditional release, they are under customs control until the stated conditions are fulfilled, and a ban on sale and transfer to third parties is imposed on them.

At the same time, this mechanism provides a number of advantages for the participant of foreign economic activity, namely the possibility of importing goods on preferential terms, reducing the cost of temporary storage, simplified import of multicomponent goods.

The completion of the conditional release of goods involves the provision of documents confirming the fulfillment of the stated conditions, including the following: a document on the payment of payments in full for the subsequent resale of goods; a letter of guarantee from the declarant on the import of goods as a contribution to the authorized capital of the enterprise; a declaration with a note on the actual export of goods from the customs territory of the EEU; A document on the payment of the difference in the amounts of customs duties at the rates of the unified customs tariff; a decision on the recognition of goods as goods of the Union after the transition period period; permission to provide documents after release; declaration of conformity; certificate of conformity, etc.

Let's consider examples of situations when a product can be placed under conditional release. As an example of the situation with the provision of benefits, one can cite a benefit for imported equipment, which is received by a participant in foreign economic activity for the payment of VAT, and assumes that the goods will be used only as a contribution to the authorized capital of the enterprise.

The second example may be the situation when goods are imported into the territory of a newly joined EEU country, and the rates of customs duties have not yet been leveled to the level of a single customs tariff. Then such a product will be considered conditionally released exclusively on the territory of the country where it was placed for release for domestic consumption. For the rest of the Union countries, it will remain in the status of a foreign one until the difference in customs payments is paid.

Another example involves compliance with prohibitions and restrictions after the release of goods, which involves the need to obtain permission from the customs authority to provide documents after. The completion of the conditional release in the form of lifting restrictions on their implementation will come from the moment the declaration or certificate of conformity is provided.[1]

Since the goods in the status of conditionally released remain in the category of foreign and are under customs control, the customs authorities are obliged to check their use and disposal. The criteria for verification in this case will be those conditions that are associated with restrictions on these goods.

Thus, the customs authority has the right to check the availability of conditionally released goods at the place of their storage.

If there are no goods at the time of the inspector’s departure, the declarant is held liable for the illegal use or disposal of conditionally released goods (according to Article 16.20 of the Administrative Code).

In addition, foreign trade participants who have received the right to use conditionally released goods must submit periodic reports to the customs authority, and in case of failure to submit such, the foreign trade participant is held liable under Article 16.15 of the Administrative Code.

Figure 1 illustrates the types of control measures carried out in relation to conditionally released goods.

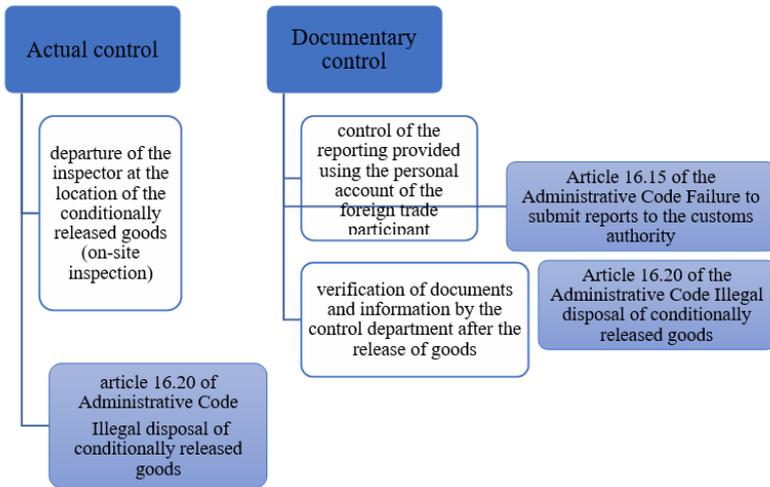


Figure 1. Types of control in relation to conditionally released goods

Conditionally released goods under customs control are subject to accounting, which is carried out by customs authorities. Accounting is carried out by maintaining a document entitled “Accounting log by customs authorities of conditionally released goods under customs control”. Amendments to the Order of the Federal Customs Service of Russia No. 2002, which entered into force on June 17, 2022, introduced by Order of the Federal Customs Service of Russia No. 219 dated April 6, 2022, establish the frequency of reporting by persons owning and (or) using

conditionally released goods placed under the customs procedure of release for domestic consumption with the provision of benefits for the payment of customs duties associated with with restrictions on the use and (or) disposal of these goods (2 times a year – until January 31 and July 31 of each calendar year) (hereinafter - conditionally released goods). From the date of entry into force of the Order of the Federal Customs Service of Russia No. 219 in the case of acquisition of conditionally issued goods of the status of goods of the Eurasian Economic Union, reporting is provided to the Federal Customs Service of Russia no later than 60 calendar days from the date of acquisition of this status.[2]

In order to ensure automated reporting by the Federal Customs Service of Russia, the service “Reporting on conditionally released goods with benefits” (“Benefits Showcase”) has been implemented in the “Personal Account” of a foreign trade participant.

With the use of this service, a foreign trade participant has the opportunity to provide reports by downloading a file in Excel format or generate it directly in his Personal Account.

However, despite all the advantages of the conditional release mechanism, the innovations of 2022 have made their own adjustments to its practical application. Since January 2022, many customs posts began to refuse conditional release of goods to foreign trade participants without permits, explaining this by changing the order of import of goods with conformity assessment. So, according to the Decision of the EEC Council of 12.11.2021. No. 130 “On the procedure for the import into the Customs territory of the Eurasian Economic Union of products subject to mandatory conformity assessment in the customs territory of the EAEU” the provision of a certificate or declaration of conformity became mandatory when submitting a declaration for goods.[3]

Customs interprets this paragraph from the decision as follows. Importers were denied the opportunity to confirm technical regulation measures after the release of goods under conditional release. Now it is impossible to import goods without permits, they need to be issued in advance.

In our opinion, this measure should be reviewed for the period of a special military operation and the sanctions pressure exerted on our country in this regard. Since importers have to look for alternative sources of supply for some of the goods (the so-called parallel import), and their price is already significantly increasing due to the complication of supply logistics (using intermediate transit countries), it is proposed to legislate the temporary possibility of using the old algorithm for applying conditional release to a commodity batch delivered simultaneously with product samples. Otherwise, the participant of the foreign economic activity bears, firstly, the financial costs associated with the delivery of express delivery of images of goods, and secondly, the time parameter, since the delivery

of the main product batch when issuing a certificate of conformity or declaration of conformity will be made somewhat later.

The participants of the foreign economic activity applied with a similar initiative, describing all the inconveniences from this process in the form of increasing the administrative burden on them to the Department of Trade Restrictions, Currency and Export Control of Russia, to which the following response was received.

The Federal Customs Service of Russia is not endowed by the current legislation with the competence to explain the acts constituting the law of the EAEU in the field of technical regulation.

At the same time, in 2022, in order to support importers and reduce the administrative burden on them, the Government of the Russian Federation introduced a number of measures to simplify technical regulation. So, for example, participants of foreign economic activity have the right to adopt a declaration of conformity on the basis of their own evidence until 01.09.2023, however, this simplification does not apply to all products. For example, automobile spare parts and components, fish and alcohol products, dairy products, products for railway tracks, chemical products and a number of other technical regulations.

Another simplification is related to the possibility of declaring as compliance with technical regulation measures information about previously issued (registered) serial compliance documents without confirming the declarant's authority to use them.

However, in our opinion, although these measures simplify the procedure of technical regulation, in the current conditions this is not enough, and thus it seems appropriate to make the amendments we propose for the period of the sanctions measures in order to maintain the country's economy and eliminate the commodity deficit.

Let's consider another problematic aspect related to the most common administrative offense when using the conditional release procedure, namely the offense under Article 16.20 of the Administrative Code related to the alienation or transfer to third parties of goods under customs control and having the status of foreign.[4]

After analyzing the results of rulings and court decisions in this area, the following data were obtained, presented in the form of table 1.

Table 1
Data on offenses under Article 16.20 of the Administrative Code

Number of the decision (resolution)	Penalty
Decision of October 8, 2022 in case no. A56-63445/2021	A fine of 798,000 rubles. without confiscation of the AP item
Decision of September 28, 2022 in case no. A 63-10220/2022	A fine of 300,850 rubles. without confiscation of the AP item

Decision of September 28, 2022 in case no. A 63-10215/2022	A fine of 466,700 rubles. without confiscation of the AP item
Decision of September 21, 2022 in case no. A 63-954/2022	A fine of 91,500 rubles. without confiscation of the AP item

Thus, based on these data, it can be concluded that the amount of the fine applied to the participants of foreign economic activity is not an effective measure to prevent offenses in this area, which, accordingly, requires tougher penalties. In our opinion, it is advisable in each case of sale (alienation) of goods under conditional release to apply, in addition to a penalty, also mandatory confiscation of the subject of an administrative offense. This measure will become an effective preventive mechanism for offenses under Article 16.20 of the Administrative Code.

Another problem in this area is related to the statute of limitations for bringing participants in foreign economic activity to administrative responsibility. Since most of the offenses related to conditional release are detected at the stage of control after the release of goods as part of on-site and desk customs inspections, the problem lies in the fact that for the articles provided for in Chapter 16 of the Administrative Code, according to Article 4.5. of the Administrative Code, a two-year statute of limitations for bringing to administrative responsibility is provided, while the control itself after the release can be carried out for 3 years. Accordingly, if an offense during the control after the release of goods is revealed later than 2 years after the goods are placed under the customs procedure, then there will be no grounds for initiating an administrative offense case. Thus, we propose for article 16.20 to provide for a limitation period of bringing to administrative responsibility of 3 years.

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形成有效的人员劳动激励体系的特点
**FEATURES OF THE FORMATION OF AN EFFECTIVE SYSTEM
OF LABOR MOTIVATION OF PERSONNEL**

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抽象的。文章考察了劳动集体在生产活动中的激励作用。以ZabGU出版综合体的工作为例，介绍了劳动参与系数、其计算、作用、效果、结论。

关键词：动机、员工激励、激励、员工激励、效率、出版。

Abstract. *The article examines the role of motivation of the labor collective in production activities. On a concrete example of the work of the publishing complex of ZabGU, the introduction of the labor participation coefficient, its calculation, action, effect, conclusions are shown.*

Keywords: *motive, staff motivation, incentive, employee stimulation, efficiency, publishing.*

At the present stage of society's development, the problem of finding effective ways to stimulate and motivate employees is particularly acute. Motivation motivates a person to take action, makes them set goals and strive to achieve them. In order to maintain a high level of motivation, it is important for a manager to create a pleasant working environment and find ways to reward for achieving goals.

The main purpose of the introduction in 2014 of a new system of remuneration and incentives for employees of the publishing complex of ZabGU was to develop motivation and material interest of employees in the results of activities and product quality, increase efficiency and save material costs. On the one hand, the employee's personal contribution to the implementation of the planned task is taken into account – his material interest increases, on the other hand, there is a desire of each member of the team to treat the available resources more carefully and economically, to improve the material and technical support of the complex.

To achieve these goals, a system of annual planning of the publishing activities of the complex for the needs of the university was introduced. Based on the current and future needs of the university in publishing products that meet the requirements of established standards, the university annually approves the volume of publishing and printing services, which it entrusts to the staff of the complex, in kind and value terms, until January 1 of the planned year. When calculating the cost of services, the wage fund is taken into account according to the current staffing table, the incentive fund for employees of the division, the regulatory need for consumables, the estimated costs of maintenance and maintenance of printing equipment. The costs of utilities, maintenance of premises, purchase of equipment are carried out at the expense of the centralized fund of the university. The publication plan is compiled by month and approved by the Rector of the University. The composition of the division's employees is determined by its staffing table and employment contracts with employees.

The salary of each employee of the department (in accordance with the "Collective agreement between the administration and the staff of ZabGU") consists of the basic salary, compensation and incentive payments. The terms of payment and the procedure for calculating incentive payments to employees of the publishing complex are established in accordance with the regulations approved by the rector of the university.

Incentive payments to employees of the division are established according to the calendar principle - the results of work for the reporting month. The management of the publishing complex together with the university economists calculate a monthly incentive fund for the employees of the department. For the payment of incentives from the annual payroll of the structural unit, 30% of the funds are allocated, which are evenly distributed over the months of the current year.

The payment to a specific employee is formed from the total amount of the monthly incentive fund for the employees of the department, taking into account the working time worked by the employee in the reporting period, the level of his qualifications, personal labor contribution, activity, initiative and the quality of his work.

Compensation allowances are accrued for all the above incentive payments to employees: for work in climatic conditions deviating from the norm (payments due to district regulation of wages - 20% and for work in areas with special climatic conditions (for work experience in the Far North, in areas equated to them, and others regions with severe natural and climatic conditions) - from 10 to 30%).

The mechanism for calculating incentive allowances should be known and understood by those concerned. In the publishing complex of ZabSU, it takes place in the following order:

“ 1. The volume of the monthly incentive fund is determined, with the allocation of monetary funds, in proportion to the number of employees working in the reporting period.

2. The following coefficients are applied to calculate monthly incentive payments individually for each employee of the division:

- a coefficient that takes into account the qualifications of the employee – Kkv. (calculated by dividing the official salary of the employee according to the PKG by 1000);

- coefficient that takes into account the time actually worked by the employee for an even month - CT (calculated by dividing the time worked by the employee according to the time sheet by the standard value of working time for the billing month);

- labor participation coefficient – KTU (the size of the coefficient depends on the labor contribution of the employee, his activity, the quality of work performed, compliance with labor discipline; set by the head of the department in the range from 0.3 to 1.7);

3. The coefficients established for each employee are multiplied among themselves ($Kkval. * KT * KTU$), and the total coefficient KN is output.

By adding all the total coefficients of employees, a common coefficient of the division is formed. The approved monthly incentive fund of the subdivision is divided by the total coefficient and the unit cost of the unit of the total coefficient is deduced. The individual incentive payment of an employee is calculated by multiplying the unit cost of the total coefficient by the value of the total coefficient of a particular employee.

4. Employees of the division are paid monthly basic salary in the amount of salary in accordance with the PCG and the employment contract. Additional wages are paid in the form of allowances to the basic salary for work in harmful working conditions.

5. A district coefficient and a percentage allowance for work experience in Transbaikalia are charged for basic and additional wages.

6. At the end of each month, the head of the department fills out the report “Distribution of the monthly incentive fund for the department”.

7. The report is submitted monthly by the head of the department for approval by the university economists. After approval, incentive payments to employees of the department are established by the order of the rector of the University.

8. The head of the department is responsible for the formation and distribution of incentive payments.”

Special attention is paid to the establishment of the KTU when calculating incentive payments. To determine the labor participation rate and assess the quality of specialists’ activities, a commission is created, the quantitative and personal composition of which is coordinated with the vice-rector in charge of the department. The commission includes the chairman of the commission (head of the complex), heads of departments, a representative from the editorial department (also a representative of the trade union cell of the unit) and a representative from the printing department.

Heads of departments collect the necessary data for accounting and calculation of KTU by the 20th of each month. Following the results of the meeting of the commission, a protocol is drawn up, in which information is entered on the number of working days for the reporting period, the actual volume of work of each employee, taking into account the complexity factor for the month. Penalties are prescribed separately (reduction of the KTU score) for errors, marriage in the work or encouragement of employees (increase in the KTU score) for special merits. The standard indicators of the activity of specialists are taken as a unit of measurement of the score, in accordance with job descriptions.

Based on the results of a study of the 9-year activity of the publishing complex on the basis of collective responsibility for the results of work, we can say that the new system of remuneration and incentives for employees has justified itself. The algorithm for calculating the amount of incentive payments, the calculation principle of KTU were taken as the basis for determining incentive payments to other structural units of the university.

Annually, funds are allocated from the fund for saving consumables and deductions from extra-budgetary funds received by the publishing complex for the purchase of printing equipment. We have updated the computer park, purchased several modern printers, and purchased a full-color printing machine.

Thus, the analysis of the work of the publishing complex of ZabGU allows us to confidently state that in order to solve specific tasks and achieve a successful result, the correct motivation of employees involved in this process is important. The key to success is a competently developed incentive system, which is based on a certain base – the normative level of labor activity. Employee motivation serves as an essential element of personnel management and ultimately contributes to improving the efficiency of the entire workforce.

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为国家文化机构的活动提供财政支持，并监测其有效性

FINANCIAL SUPPORT FOR THE ACTIVITIES OF STATE CULTURAL INSTITUTIONS, MONITORING ITS EFFECTIVENESS

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Financing of public institutions is always a very important issue. In the context of cultural institutions, this issue is of particular interest, because culture is not an area in which a lot of money is invested. For example, as of 2019, the national project “Culture” is among the three projects with the smallest funding, exceeding only the national project “Labor Productivity and employment support” in terms of funding. However, it is worth noting that when analyzing financing, it is also necessary to consider the effectiveness of the invested funds. Speaking about this, I mean not only the direct spending of budget funds by cultural institutions, but also the purposefulness and priority of the distribution of funds between cultural institutions.

The purpose of my work is to find out non-deliveries in the process of financing and evaluating the effectiveness of financial investments in cultural institutions.

Objectives of my research:

1. Review and analysis of the process of planning and using federal budget funds for cultural institutions.
2. Analysis of the methodology for assessing the effectiveness of financial investments in cultural institutions.
3. Generalization of the obtained results and development of conclusions and recommendations based on the results of the study.

The relevance of this work is great. In the conditions of sanctions and external pressure, it is especially important to support culture and its development, because in addition to historical and educational usefulness, it also carries moral support for people in difficult times.

First of all, to understand the basics of financing cultural institutions, you need to understand what types of state municipal institutions exist. According to Federal Law No. 7-FZ, there are three types of institutions: “Autonomous, budgetary and state-owned are recognized as types of state and municipal institutions.”¹

¹ About non-profit organizations: Federal Law No. 7-FZ of 12.01.1996

Turning to the analysis of sources of financing, it must be said that autonomous and budgetary institutions have the right to use only certain types of financial support, which can include:

- Income-generating activity.
- Funds are at temporary disposal.
- Subsidies for the performance of state (municipal) tasks.
- Subsidies for other purposes.
- Budget investments.
- Funds for compulsory medical insurance.

Revealing the classification of sources of financial support of a budgetary institution, it would be useful to characterize the types of income:

A subsidy for the performance of a state (municipal) task for the performance of the main type of activity.

- Target subsidy.
- Budget investments
- Income from the main type of activity.
- Income from other independently carried out activities.

However, it is worth noting that not all types of state and municipal institutions can use all sources of funding.

For example, state-owned institutions have the right to use only the following sources of financing: “1-budgetary activities, 3-funds at temporary disposal.”²

As noted above, subsidies are one of the main ways to obtain funding for institutions. So what are subsidies? These are funds in the form of inter-budgetary transfers transferred from budget to budget. The economic essence of subsidies consists in co-financing of expenditure obligations that are formed when exercising the powers of state authorities of the subjects of the Russian Federation.

The use of the subsidy funds for the performance of the state task is carried out in accordance with the directions established in the financial and economic activity plan drawn up and approved by the budgetary and autonomous institution in accordance with the procedure established by the founding body, in accordance with the Requirements for the preparation and approval of the financial and economic activity plan approved by the Order of the Ministry of Finance of the Russian Federation dated 31.08.2018 No. 186n.

It is also worth adding about the relationship between the authorized body and cultural institutions. The duties of the first one include communicating to cultural organizations data on the amounts of allocations allocated from the federal budget. Institutions, in turn, after analyzing this information and comparing it with the

² Fedchenko, E. A. Formation of a source of financial support for state (municipal) institutions / E. A. Fedchenko // Accounting in budgetary and non-profit organizations. – 2011. – № 4(268). – Pp. 4-9. – ED no. TWUSR.

amounts of creative and economic resources at their disposal, make up a plan for the future activities of the institution. It usually includes:

- activities aimed at the implementation of creative production and independent economic activities, strengthening of the material and technical base and social development of the cultural organization;
- the scope of the main activity determined by the specifics of the organization of culture and regional conditions;
- the amount of financial resources and the directions of their use in accordance with the charter (regulations).³

There is a state program “Development of culture” in order to receive a subsidy for the fulfillment of a state task. Within the framework of this national program, funding is provided for cultural heritage objects included in the unified State register of cultural heritage objects of the People’s Commissars of the Russian Federation, and identified objects of cultural heritage of religious purpose that are federally owned or owned by a religious organization.⁴

Approaches to financing cultural institutions are rich and diverse, with their pros and cons. And it is especially important to adopt foreign experience, cutting off its shortcomings and not only adopting, but also refining and improving its positive features. Naturally, it is necessary to take into account regional specifics, for example, the UK is much smaller than Russia, so it is easier for them to redistribute resources. Or, if compared with the United States, they have a better developed business, which allows them to use such a financing system. Therefore, in order to more accurately identify the shortcomings of the system of financing cultural institutions, it is necessary to conduct a more in-depth analytical study.

State support for culture is not too great. However, it is important not only to have a sufficient amount of financial resources, but also to be able to manage them competently so that this very order is as effective as possible. One of the most important links in the chain of managing the effectiveness of financial investments is monitoring the effectiveness of financial security.

The size and quality of financial support is directly proportional to the effectiveness of the institution itself, because the more financial resources an organization has, the better it can perform its direct duties.

The question of evaluating the effectiveness of a cultural institution may seem extremely philosophical, because, for example, it is not a factory where the more parts are produced and the better they are, the more efficiently the plant works. In

³ On approval of the Regulations on the Basics of economic activity and financing of cultural and art organizations: Resolution of the Government of the Russian Federation No. 609 of June 26, 1995

⁴ Methodological recommendations for the preparation of applications for financing activities for the preservation of cultural heritage objects within the framework of the state program of the Russian Federation “Development of Culture”

other words, it may seem that the number of objective and measurable indicators is less here and the “space” for comparison is much lower here.

However, there are several ways to evaluate the effectiveness. The first is the fulfillment of the state task and the achievement of its key indicators.

At the forefront of this approach is such a concept as a “Road map”. This concept, in general application, means a plan for the development of something, be it an application, be it a company. This plan sets goals and deadlines for the implementation of a particular stage of development.

If we consider this concept from the point of view of the sphere of culture, then the roadmap indicates measures to achieve key indicators in the field of culture. Among other things, measures were mentioned to increase the remuneration of employees, increase and update the qualification requirements for employees, as well as the reorganization and elimination of inefficient organizations.

Taking into account the peculiarities of the sphere of culture, organizations are obliged to develop:

- Actions to ensure an increase in wages.
- Actions to increase the funds received from income-generating activities.
- Actions to differentiate staff remuneration.

If all of the above is performed by the institution at the proper level, then it can be recognized as effective. However, this efficiency does not affect the actual improvement of the quality of services provided and does not provide socio-economic consequences from the activities of the institution.

The second is the achievement of key indicators of the national project. These indicators are aimed at the systematic improvement of the socio-economic situation in the country. If we talk more specifically about the sphere of culture, then their essence here is to increase the general characteristics of the sphere of culture in the Russian Federation.

If an institution achieves the set indicators of a national project, then we can say that the funds invested in it have been spent effectively, and therefore the necessary social and economic effects will be achieved. If an institution does not achieve these indicators in a significant amount, for example, the indicator is reached only by 50%, then it is impossible to accurately call the costs of this institution effective in terms of economic and social returns. However, it is worth noting that it is always necessary to take into account the probability of insufficient performance due to external factors. In particular, this applies to indicators related to attendance, and the percentage of non-fulfillment of 10% of the maximum amount is not fatal and in general, we can say that the necessary effect has been achieved.

Well, the third option is performance indicators for various types of institutions, which are listed in the document entitled “Methodological guidelines for ex-

ecutive authorities of the subjects of the Russian Federation and local self-government bodies on classifying cultural organizations as effective (ineffective) in terms of quality and availability of services, taking into account functional specifics.”

The system of such indicators reflects three areas of the institution’s effectiveness.

1. Indicators of the volume of work.
2. Indicators of the quality of work.
3. Performance indicators (score in points or percentage).

The essence of this system of indicators is a comprehensive assessment of the organization’s activities in order to determine its effectiveness, which implies an analysis of the effectiveness of the use of funds provided to the institution. These guidelines reflect the performance indicators in the context of cultural activities by sector, and also reflect the effectiveness of the staff of the institution.

Each indicator is reflected in two states, first the plan, then the fact, which is often reflected as a percentage of the plan. In turn, the planned indicators are determined by the founder annually. The compiled indicators should reflect the evaluation of the institution’s performance in terms of efficiency and be unique for each type of institution.

There is an important problem that complicates both the process of financing cultural institutions and the process of financial control over the effectiveness of financing -performance indicators.

The Accounting Chamber has previously drawn attention to this problem: “The State Program of the Russian Federation “Development of Culture” (hereinafter referred to as the State Program) does not contain qualitative indicators that allow assessing the satisfaction of the population with the availability and quality of services in the field of culture, as well as indicators of the provision of the subjects of the Russian Federation with cultural institutions that characterize the equalization of the level of availability of services in the field of culture.

The methodology for calculating the indicator of the national development goal “An increase in the number of visits to cultural events by three times compared to the indicator of 2019”, which does not take into account the specifics of cultural institutions and their activities, prevents an objective assessment of the achievement of national development goals.”⁵

In 2020, an indicator was introduced showing an increase in the number of visits to cultural events taking place directly. In cultural institutions. It was calculated according to the following formula:

$$\sum \text{indicators of visits to cultural organizations}$$

⁵ Report on the results of the expert-analytical event “Assessment of accessibility of cultural services for the population”. -Access mode: <https://ach.gov.ru/upload/iblock/1fa/24gq7ws9u2toxdl2e5sqpy7lptstlil7.pdf> (accessed: 04/22/2023). -Text: electronic

This variant of calculating the indicator leads to potential risks of unreliability of information, since the indicator includes a variety of properties of the units of the aggregate, which can be attributed to a special case. Falling out of the pattern, which leads to an overestimation of the indicator, without reflecting the real development of the situation.

It is also worth noting that during the expert-analytical event, a detailed analysis of the correlation and consistency of the development strategy and the state program was carried out. As a result, after checking 32 indicators, the following conclusion was made:

- 8 indicators do not correspond to the strategy
- 5 indicators advise, but not relevant documents

There were also a number of indicators that were present in the strategy, but, for unknown reasons, were not included in the indicators of the State Program or were excluded from it earlier. At the same time, there are no indicators in the State Program, with the help of which it is possible to establish satisfaction with the recipients of cultural services, directly, with the services of cultural institutions, as well as the provision of cultural institutions of the subjects of the Russian Federation.

Another disadvantage can be considered that in most reports there is a combination of indicators for cultural institutions of federal and local jurisdiction. It is important to note that regional organizations are also included in the local introduction. This leads to a distortion of information and the inability to accurately determine the number of cultural institutions that belong to local self-government, and therefore it becomes extremely problematic to give them any assessment.

Based on all of the above, it can be concluded that the existing system of indicators is not consistent and it must be redone. An interesting aspect here seems to me that the existence of these problems has been known for a long time, since claims are repeated from report to report, and therefore, the solution of problems does not move from a dead point.

All of the above leads to a complication of the analysis of reporting information, which leads to difficulties in analyzing the effectiveness and effectiveness of financing cultural institutions. When upgrading the performance indicators system, the following aspects should be taken into account ⁶:

- 1) The relationship of indicators must be present at all levels of management.
- 2) Changing the classification of indicators, including financial indicators, indicators of the result of funded activities, as well as the result of the provision of state and municipal services of cultural institutions.

⁶ Seryaeva Maria Gennadijevna Financing of the sphere of culture of the Russian Federation and indicators of the effectiveness of its development // ANI: economics and Management. 2019. №2 (27).

The development of a new system of interrelated performance indicators will ensure universal requirements for reporting information, which will lead to an improvement in the transparency of the financial support mechanism, which will radically simplify control and audit in the field of culture.

Changing the existing system of indicators will consist not only in adding new indicators, but also in excluding a certain number of old indicators that can be considered outdated and irrelevant. By their presence in the evaluation system, they only underestimate the documentary effectiveness of the institution, hiding its actual effectiveness for an external observer.

Improving the efficiency assessment system will greatly improve the quality of control, allowing more competent and correct identification of institutions with a low level of efficiency, which, in turn, will improve the sphere of culture to achieve social and economic effect. And when using a risk-based approach to performance control, it will reduce the burden on the inspection bodies, which will potentially lead to an even greater improvement in the quality of control.

So, as we were able to see from practical examples, the sphere of culture, for all its importance, has a lot of shortcomings in the sphere of state support.

And state support can be understood not only as direct financing, but also as direct control over the effectiveness of financial investments.

The process of financing cultural institutions was studied. If we consider this process in comparison with the process of financing other state institutions, we can see that for cultural institutions this process does not differ in any way at all. It is only worth noting that in comparison with other economic spheres, the financing of the cultural sphere is significantly less than other spheres. Including the share of extra-budgetary funding, which can not but upset.

Summarizing everything described in this paper, we can conclude that there are the following problems:

Low amounts of financing, which leads to poor-quality execution of services.

The system of performance indicators developed in insufficient quality, which does not allow to correctly assess the effectiveness of the institution and identify shortcomings.

A high level of corruption, which reduces the already low levels of funding and worsens the quality of the institution's work

- Non-functioning or poorly functioning information services that do not allow you to correctly and correctly assess the key indicators of this industry.
- Non-fulfillment of obligations, which affects the overall image of the cultural sphere and the quality of service provision.

Our country consists of a huge number of regions, each of which, thanks to its historical heritage, has a huge cultural potential that needs to be unlocked. But without the proper amount of funding, high quality financial management and no less proper control, it is impossible to do this.

实施国家金融管制的主要特点
**KEY FEATURES OF THE IMPLEMENTATION OF STATE
FINANCIAL CONTROL**

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注解。 在本出版物的框架内，研究了实现国家金融控制的理论特性。 作者认为，财务控制与财务管理直接相关，在这方面，本文考虑了计划和预测等过程。可以说，财务控制概括了财务管理的过程。 本文介绍了财务控制的类型，以及财务控制定义的研究方法，使我们能够更深入地思考其本质。 根据给定的类型和方法，作者制定了国家金融管制的最终定义。 国家金融控制，就像任何复杂的现象一样，可以用几种不同的方式进行分类。 文章中以图形方式展示了分类。 作者认为，初步控制发挥着特殊作用。 在此过程中，预算草案、财务计划和概算以及其他此类文件均需接受核查。 因此，必须进行初步控制，以抑制违规行为，防止其发生。 但需要强调的是，各类管制都极为重要，因为在公共财政资源形成、支出和使用过程的不同阶段，对管制对象的合法合规性要求采取不同的管制方式。 此外，文章还考虑了国家金融监管的任务。

关键词：国家金融管制； 金融； 规划； 预测； 财务管理； 性能指标； 资源； 经济。

***Annotation.** Within the framework of the presented publication the theoretical peculiarities of realization of state financial control are studied. According to the author, financial control is directly related to financial management, in this regard, the article considered such processes as planning and forecasting. Financial control, we can say, summarizes the process of financial management. The article presents the types of financial control, as well as studied approaches to the definition of financial control, which allows us to consider its essence in more depth. Based on the given types and approaches, the author formulates the final definition of state financial control. State financial control, like any complex phenomenon, can be classified in several different ways. The classifications are graphically presented in the article. A special role, in the author's opinion, is played by preliminary control. In the course of it, draft budgets, financial plans and estimates and other documents of this kind are subject to verification. Thus,*

preliminary control is necessary in order to suppress violations, preventing them from occurring. However, it should be emphasized that all types of control are extremely important, because at different stages of the process of formation, expenditure and use of public financial resources require different methods of control over compliance with the law by the objects of control. In addition, the article considers the tasks of state financial control.

Keywords: *state financial control; finance; planning; forecasting; financial management; performance indicators; resources; economy.*

During the study of any topic, first of all, it is logical to define the phenomenon under study and understand its essence. To understand the essence of state financial control it is necessary to consider it within the framework of a larger system, of which it is a part. We are talking about the system of financial management. Functional elements of financial management are financial planning and forecasting, operational management and financial control [1].

The purpose of the work is to analyze the theoretical features of the implementation of state financial control.

The object of the study is the state financial control.

Subject - theoretical foundations of state financial control.

When writing a scientific publication, the authors used the following methods: comparative, statistical, analysis of scientific studies and articles, tabular and graphical ways of visualizing statistical data.

To achieve this goal, the following tasks were set in the work:

- to disclose the essence of state financial control;
- to consider types of financial control;
- identify the principles of state financial control;
- to determine the role of financial control in stabilizing the economy. The

study is based on theoretical and methodological provisions, developed by domestic authors, normative-legal documents of strategic planning.

Variou aspects of state financial control were considered in the works of Volkov A.Yu. [1], Kutuyev Yu. [2], Balashova I.V. [3], Samsonov A.G. [4], Simko N.N. [5] and others.

Federal laws of the Russian Federation, resolutions and orders of the Government of the Russian Federation, scientific works of domestic scientists, Internet resources (official sites) and foreign sources on the subject of the work served as the information base of the study.

Planning and forecasting in the framework of financial management is used for scientific substantiation of the current state of financial relations and corresponding financial resources, as well as for justification of their changes, movement in the future. In the process of financial planning and forecasting subjects of financial

management make financial plans and forecasts, on the basis of which decisions are made about how the process of formation and use of financial resources will be carried out.

Operational management implies taking measures to manage finances in accordance with the current situation. Of course, it is impossible to avoid errors and inaccuracies in the process of financial planning and forecasting, and operational management allows to carry out certain adjustments in the process of financial management in accordance with the changing conjuncture, taking into account unforeseen circumstances.

Financial control, we can say, summarizes the process of financial management. In many cases, the actual values of the indicators of a particular activity diverge from the values that were originally planned. In the process of financial control compares current and planned indicators of financial activity, identifies the reasons for the deviation of actual results from the planned. Also in the process of financial control as a whole analyzes data on management decisions of subjects of financial relations arising in the course of formation and use of financial resources, on the basis of this analysis conclusions are drawn about the legality and effectiveness of the activities of the subject under study in the field of financial management, as well as reveals the violations and deviations committed by him [6].

State financial control is the activity of state authorities and local self-government bodies to supervise compliance with the principles of legality and efficiency in the process of formation, distribution and expenditure of state financial resources in order to prevent, detect and eliminate violations.

Let us consider the proposed classification in more detail. First, on the basis of the form, on the basis of the form in which control is exercised, external and internal state financial control are distinguished. In this case, as a rule, different bodies of state power are responsible for the implementation of external and internal control. For example, in Russia, external control is exercised by the Accounts Chamber, and internal control is exercised by the Federal Treasury.

On the basis of the time period in which the state financial control is carried out, there are preliminary, current and subsequent control.

Preliminary control is carried out prior to operations on formation and expenditure of financial resources, thus, it is carried out with the purpose of prevention, prevention of violations that may arise in the course of execution of budgets. In the course of preliminary control, draft budgets, financial plans and estimates and other documents of this kind are subject to verification. Thus, the preliminary control is necessary in order to prevent irregularities, preventing them from occurring.

Current financial control is carried out simultaneously with the performance of certain operations and involves operational control measures as financial legal relations are performed.

Subsequent financial control is carried out at the end of financial transactions. Subsequent control reveals violations that occurred in the course of budget execution and spending of public funds, as well as generally assesses the legality of actions of participants in the budget process.

All three of these types of control are extremely important, as different stages of the process of formation, expenditure and use of public financial resources require different methods of control over compliance with the law by the objects of control.

State financial control can also be divided into national and departmental financial control. National control, as is clear from the name, applies to the entire state and ensures the lawful fulfillment of its interests in the course of formation and use of financial resources.

Departmental control is carried out within the framework of individual departments, in its process control is exercised over territorial bodies and institutions of departments: ministries and federal services.

National control in its turn is subdivided into control exercised by the president, parliamentary control and control by the executive authorities.

Finally, it is also possible to classify the state financial control on the basis of the object of control. In this case, the following types of control are distinguished: tax, budgetary, customs, credit (banking), currency and others. Thus, budgetary control implies control over budgetary financial legal relations, credit control is necessary for supervision over the banking sphere and so on.

Thus, we can summarize the preliminary conclusion of this chapter: the tasks of the state financial control are to identify violations in the process of formation and expenditure of public financial resources, as well as to eliminate the identified violations. Fulfillment of these tasks fully requires compliance with a number of important principles. It is natural to ask what specific methods the control bodies use to achieve their objectives.

We can speak about the existence of three methods of state financial control: inspections, audits and surveys. Let us study in detail each of the presented methods.

Inspection within the framework of financial control implies control over the observance of legality in the performance of specific economic and financial transactions made by the object of control for a certain period, as well as verification of the reliability of its budget reporting and budget accounting.

Audit implies a more comprehensive control over the activities of the object of control. All financial and economic operations of the object in their totality are subject to audit. In other words, in the course of an audit, control is exercised over individual aspects of the activities of economic entities, while the audit covers all activities.

Legality - Controls are carried out on the basis of civil and financial law, strictly in accordance with the legal and regulatory framework adopted by the state.

Objectivity - Control bodies shall avoid bias in exercising control and shall base their conclusions on factual and documentary basis, as well as provide justification for the conclusions they have drawn.

Publicity - Control results should be open and publicly available to users and the activities of control bodies should be transparent. The quality, objectivity and reliability of the data provided is required.

Responsibility - Responsibility of controlled entities for violations revealed in the course of control, as well as responsibility of the controller for decisions made in the course of control activities.

Independence - Functional, organizational and financial independence of bodies exercising control, including independence of its members and employees. Control subjects, among other things, should not be subject to any influence from the entities they inspect.

Competence - Professionalism of bodies conducting control.

Systemic - The object under investigation should be subject to control from all sides, control actions should extend to the entire system of interrelations of the object.

Separation of functions and powers - Inadmissibility of duplication of functions of different control bodies.

Efficiency - Timeliness of detection of deviations and violations in the activities of the controlled object and prompt correction of errors and violations.

It is obvious that each of the listed methods can be successfully used by bodies of state financial control in the course of their activities. Depending on the situation and the purpose facing the subject of control, it can use one or another method or combine them with each other.

So, the state financial control implies the activity of the authorities to control the course of formation and expenditure of financial resources of the state. At the same time, there are several types of state control, for the normal implementation of each of which it is necessary for control bodies to observe a number of important principles: efficiency, transparency, independence and so on. In this article the theoretical foundations of the phenomenon under study were considered.

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联邦服务的控制活动对象

OBJECTS OF CONTROL ACTIVITY OF THE FEDERAL SERVICES

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注解。在不同的活动领域确定国家控制的内容和范围是非常困难的。这就需要控制对象、控制方式的选择以及控制主体的行为进行严格的指导。另一些情况下，存在许多错误，这些错误与不使用或过度控制权有关，法人或个人的错误行为受到检查。

关键词：国家金融管制；金融；规划；预测；财务管理；性能指标；资源；经济。

Annotation. It is very difficult to establish the content and scope of state control in different areas of activity. This requires a strict direction in the choice of objects and methods of control, as well as in the actions of subjects who have control powers. In other case there are many mistakes, which are connected with non-use or excess of control powers, with wrong behavior of legal entities or individuals being checked.

Keywords: state financial control; finance; planning; forecasting; financial management; performance indicators; resources; economy.

Although state financial control covers only the public sector of the economy, it extends to private entrepreneurial activity and all forms of ownership, by checking the correctness of tax calculations and declarations, the fulfillment of state laws by enterprises financed from the budget, which is evident from the list of tasks of the SFC. It means that the object of SFC is considered not only the budget and tax sphere and the budget process, but also the whole process of financial and economic activity of subjects of market relations. This is the weighty role and great importance of financial control as one of the most important elements of state control and management.

The object of state control is the relations that arise between the state, on the one hand, and legal entities and individuals, on the other hand, concerning the production and distribution of national income in territorial and sectoral sections and its effective use.

The largest number of financial control bodies operate within the executive branch:

1. Ministry of Finance of Russia;
2. Federal Tax Service of Russia;
3. Rosfinnadzor;
4. Rosfinmonitoring;
5. Federal Treasury.

The Ministry of Finance of Russia - if we speak about the central apparatus of the agency - generally does not carry out activities related to financial control. However, it may be involved in it by issuing a special presidential decree or a resolution of the Government of the Russian Federation.

The Ministry of Finance is accountable to a number of federal services, which, in their turn, are most actively involved in financial control.

Due to the fact that the regions have debts to the center, the Ministry of Finance of the Russian Federation has taken a number of measures to strengthen control over the use of budgetary funds. In order to control the targeted use of budget funds it is necessary to expand the powers of the Control and Revision Department of the Ministry of Finance both by territories and by departments. The Ministry of Finance is switching over to execution of the federal budget through the federal treasury bodies, thus tightening settlement discipline.

Among them is the Federal Tax Service of Russia. The main competence of this agency in terms of financial control is to ensure compliance of taxpayers' activities with the provisions of tax and budget legislation. In the course of control, the Federal Tax Service makes sure that taxes and fees are paid on time and confirmed by correctly drawn up documents.

The Central Bank of the Russian Federation exercises financial control in the sphere of monetary relations, settlements, turnover of the Russian ruble and foreign currencies. The main functions of the Bank of Russia are:

1. protecting the ruble from currency fluctuations, ensuring its sufficient purchasing power;
2. improving the efficiency of Russian banks;
3. ensuring efficient operation of payment systems functioning in the Russian Federation;
4. granting loans to private credit and financial organizations;
5. registration of new banks, issuance and revocation of banking licenses;
6. implementation of regulations for banking operations.

Key tasks solved by the Central Bank of the Russian Federation within the framework of financial control and related activities:

1. development of effective monetary policy algorithms;
2. ensuring sufficient issue of cash, organization of their correct circulation;

3. development of a balanced policy in terms of determining the value of the key rate;
4. development of norms aimed at improving the efficiency of settlements within the framework of various payment systems;
5. modeling of economic processes that are a factor of the state monetary policy.

By exercising financial control, the Bank of Russia stimulates the participants of monetary relations to comply with the prescriptions contained in the provisions of federal laws, as well as regulations issued by specific agencies and the Central Bank of the Russian Federation itself.

The SFC also includes customs and currency control, which is carried out by customs authorities in accordance with the Customs Code of the Russian Federation (Sections V and VI).

Another financial control body reporting to the Ministry of Finance is Rosfinnadzor. The main object of inspections of this structure is financial and budgetary processes, as well as currency transactions. The agency controls how correctly the RF budget funds, subsidies, subventions, loans are used, identifies violations in the sphere of financial and budgetary legislation and suppresses them.

The Federal Service for Financial and Budgetary Oversight (Rosfinnadzor) is a Russian federal executive body under the jurisdiction of the Ministry of Finance. It performs the following functions:

1. Control and supervision in the financial and budgetary sphere;
2. currency control authority;
3. External quality control of audit organizations, which are defined by the law “On Audit Activity”.

The Service itself exercises control over compliance of currency operations conducted by residents and non-residents, not counting credit organizations, for compliance with the legislation, license and permit conditions, as well as their compliance with the requirements of acts of currency regulation and control bodies. The Law on Currency Regulation lists inspection as one of the powers of currency control bodies, but does not specify the procedure for conducting inspections, except for a seven working day deadline for submitting documents requested by the inspectors.

In its turn, Rosfinmonitoring is subordinate not to the Ministry of Finance, but to the President of the Russian Federation. This financial control body monitors operations related to various transactions of individuals and legal entities in order to identify channels of terrorism financing and other illegal activities. Rosfinmonitoring is also in charge of prosecuting persons who carry out actions prohibited by law in terms of money circulation.

The Federal Treasury, which reports to the Ministry of Finance, in terms of financial control solves tasks related to ensuring the execution of the state budget, state programs, effective spending of funds belonging to the state. The authority of the agency includes application of measures to eliminate violations of laws regulating the use of budgetary funds, as well as taking preventive measures against persons who may violate the legislation in the field of budgetary funds management.

As a result, it can be seen that a number of state structures are responsible for financial control in the Russian Federation - each within a certain financial sphere and certain powers. The leading role among them is assigned to the control and accounting and audit structures, as well as the Central Bank. Control and audit structures include, among others, the Ministry of Finance, the Federal Tax Service and the Federal Treasury. Most controlling structures at the federal level have analogs at the regional and municipal levels.

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俄罗斯联邦国家金融监管领域当前趋势分析
**ANALYSIS OF CURRENT TRENDS IN THE FIELD OF STATE
FINANCIAL CONTROL IN THE RUSSIAN FEDERATION**

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注解。本出版物专门讨论与实施国家金融控制相关的问题。重点是与国家控制领域当前形势的特殊性有关的问题。作者重点指出,国家金融领域和经济的发展取决于国家金融调控的实施方式。内部和外部控制机构都可以公开获取许多文件,根据这些文件,人们可以判断其活动的有效性,从而判断该国实施的国家金融控制的有效性。整个。此外,文章还对联邦财政部和审计院的绩效进行了分析。根据研究结果,作者得出这样的结论:每年,国家最高外部控制机构需要越来越多的控制措施来识别越来越多的违法行为。这可以被视为这些机构有效性的标志之一。此外,文章还指出了国家金融控制领域典型的主要问题。作者认为,关键在于,当今的俄罗斯没有充分遵守职能和权力划分的原则。国内专家谈到,国家各金融监管机构工作存在平行、职能重复、互动不力等问题。同时,作者重点指出,不遵守国家金融监管的任何原则都有可能降低监管的有效性,而金融监管机构同时履行相同职能无疑会干扰国家金融监管的有效工作。状态。

关键词: 国家监管; 国家金融控制; 金融和经济体系; 财务管理; 经济安全; 当局。

Annotation. *This publication is devoted to the problem associated with the implementation of state financial control. The focus is on issues related to the peculiarities of the current situation in the field of state control. The author focuses on the fact that the development of the sphere of finance and the economy of the country depends on how the state financial control is carried out. Bodies of both internal and external control provide open access to many documents, on the basis of which one can, among other things, judge the effectiveness of their activities, and, consequently, the effectiveness of the state financial control carried out in the country as a whole. In addition, the article provides an analysis of the performance of the Federal Treasury and the Accounts Chamber. As a result of the study, the author formulates the conclusion that every year the country's supreme body of external control needs less and less control measures to identify*

an increasing number of violations. This can be considered as one of the signs of the effectiveness of these bodies. In addition, the article identifies the main problems that are typical for the sphere of state financial control. The key problem, according to the author, is that in Russia today the principle of delimitation of functions and powers is not fully observed. Domestic experts talk about the existence of parallelism in the work of various state financial control bodies, their duplication of each other's functions and weak interaction between them. At the same time, the author focuses on the fact that non-compliance with any principles of state financial control threatens to reduce the effectiveness of control, and the simultaneous performance of the same functions by financial control bodies undoubtedly interferes with the effective work of the state.

Keywords: *state regulation; state financial control; financial and economic system; financial management; economic security; authorities.*

The state financial control is necessary for the normal functioning of the financial and economic system of the state. The development of finance and economy of the country depends on how the state financial control is exercised.

In the current difficult financial and economic conditions prevailing in the Russian Federation, increasing the effectiveness of state financial control is one of the factors that can affect the solution of existing problems. Such significance of the state financial control substantiates the need to understand its essence, trends of its development. This fact determines the relevance of the topic selected for the article.

The purpose of the study is to consider the present situation in the sphere of state financial control.

The object is the state financial control.

The subject is the situation in the sphere of state financial control.

When writing a scientific publication the authors used the following methods: comparative, statistical, mathematical analysis, analysis and generalization of normative-legal acts and documents, scientific studies and articles, tabular and graphical ways of visualization of statistical data.

To achieve this goal, the following tasks were set in the work:

- to consider the performance indicators of the Federal Treasury;
- analyze the performance indicators of the Accounting Chamber;
- to identify problems in the sphere of state financial control;
- to identify the main trends in the sphere of state financial control.

The study is based on the works devoted to the peculiarities of state control. In particular, separate attention was paid to such authors as Simko N.N. [1], Karepina O.I. [2], Knyazeva E.Yu. [3], Balashova I.V. [4], Dik E.P. [5] and others.

Federal laws of the Russian Federation, resolutions and orders of the Government of the Russian Federation, regulatory legal documents, scientific works of domestic scientists, Internet resources (official sites) and foreign sources on the subject of the work served as the information base of the study.

The Budget Code of the Russian Federation defines the state bodies responsible for both internal and external financial control. Thus, external financial control is carried out by the Accounts Chamber of the Russian Federation (as well as control and accounting bodies at the regional level of government and control and accounting bodies of municipalities at the local level), and internal control is the competence of the Federal Treasury of the Russian Federation (financial bodies of constituent entities and municipalities at the regional and local levels).

Both internal and external control bodies make available to the public a large number of documents, on the basis of which it is possible, among other things, to judge the effectiveness of their activities and, consequently, the effectiveness of the state financial control in the country as a whole.

It can be seen that in 2022 as compared to 2021 the number of control activities carried out by the Treasury has increased. At the same time, the number of detected violations and the amount of funds that managed to return to the budget as a result of control increased accordingly. We can say that in the last year the Federal Treasury has significantly increased the volume of its activities. What is important is the fact that simultaneously with the increase in the number of inspections and the number of detected violations, the total volume of audited funds has decreased. In other words, in order to detect more violations, the body needed to check a much smaller amount of funds. This fact may speak about the increased efficiency of the Federal Treasury.

It is foolish to claim that everything is cloudless and there are no problems in the system of state financial control in the Russian Federation. If we give a comprehensive assessment of the system of state financial control in the Russian Federation, we can note a certain “incompleteness”, incompleteness of this system. Firstly, there is no single concept on the basis of which control would be exercised, including there is no separate federal law that would control this sphere. It is also relevant to note that there is no unified methodological basis for financial control.

We can also say that in Russia today the principle of delimitation of functions and powers is not fully observed. Domestic experts speak about the existence of parallelism in the work of various bodies of state financial control, duplication of each other’s functions and weak interaction between them.

Non-observance of any principles of state financial control threatens to reduce the effectiveness of control, and simultaneous performance by financial control bodies of the same functions undoubtedly hinders the effective work of the state to prevent and detect violations in the process of public finance management [8].

It can be concluded that there are definitely problems in the system of state financial control in the Russian Federation that hinder the adequate functioning of financial control bodies. However, the analyzed indicators have demonstrated that there are still successes in improving the effectiveness of control.

Let us consider in what directions the state financial control in the Russian Federation will develop in the near future, and what innovations can be expected in this sphere.

After considering the current state of affairs in the sphere of state financial control in Russia, it makes sense to analyze the trends according to which the phenomenon under study may develop in the future.

If we talk about the prospects of the system of state financial control in Russia, we can quite confidently say that in the near future the government will take measures to change the legal framework regulating this sphere. Specifically, these measures will be manifested in the adoption of a single federal law regulating the entire system of financial control in the state as a whole.

In Russia, sometimes there is a duplication of functions of some bodies of state financial control. It can be stated that the government of the country is aware of the existence of this problem and in the coming years we should expect more specific delimitation of powers between financial control bodies and fight against duplication of functions performed by them. The adoption of a single federal law, which would clearly define the functions of all bodies exercising state financial control, could also contribute to the solution of this problem [9].

The final paragraph of the paper characterized the current trends, according to which the state financial control in Russia will develop in the future. It was concluded that in the next years in the sphere under consideration will be carried out enhanced informatization, as well as international cooperation will be increased. In addition, the creation and development of a unified and comprehensive concept of state financial control is expected.

As the main conclusion of the work we can say that the state financial control as a phenomenon has a very serious significance. Understanding of the nature of this concept, knowledge of its types and principles is simply necessary in the implementation of practical activities in the field of public finance management.

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实现可持续发展目标背景下俄中能源合作项目实施分析
**ANALYSIS OF THE IMPLEMENTATION OF ENERGY
COOPERATION PROJECTS BETWEEN RUSSIA AND CHINA IN
THE CONTEXT OF ACHIEVING SUSTAINABLE DEVELOPMENT
GOALS**

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抽象的。文章在综合分析俄罗斯和中国共同实施的项目的基础上，探讨了俄罗斯和中国在实现可持续发展目标的背景下的能源合作。确定了俄罗斯和中国能源行业环境友好型发展的主要趋势，并编制了俄罗斯联邦和中国正在进行的项目符合可持续发展目标的矩阵。

关键词：可持续发展目标、中俄能源合作、低碳能源、可持续发展项目、环境影响。

Abstract. *The article examines energy cooperation between Russia and China in the context of achieving sustainable development goals based on a comprehensive analysis of projects implemented by these countries jointly. The main trends in environmentally friendly development of the Russian and Chinese energy industries have been identified, and a matrix of compliance of ongoing projects in the Russian Federation and China with the goals of sustainable development has been compiled.*

Keywords: *sustainable development goals, energy cooperation between Russia and China, low-carbon energy, sustainable development projects, environmental effect.*

According to a study on progress towards the Sustainable Development Goals (SDGs) from 2015 to date [1] only 12% of the UN SDG targets can be achieved by 2030, about 50% are moderately or severely behind schedule, and approximately 30% have not made progress or have fallen below 2015 levels. This justifies the need to implement projects in the field of sustainable development.

The transition to an economy with zero net carbon dioxide emissions (hereinafter referred to as CO₂) for any country is possible with the fundamental implementation of a basic set of solutions: an increase in energy efficiency, a sharp reduction in fossil fuel consumption and an increase in the share of renewable and

nuclear energy, as well as the improvement of Carbon Capture, Use and Storage (hereinafter referred to as CCUS) and natural resources solutions for CO₂ absorption. At the same time, it should be taken into account that there are country-specific features of achieving carbon neutrality.

The Russian Federation develops and implements solutions in the field of “smart power plants” on the basis of the laboratory “PROSTOR” within the framework of the strategy for digitalization of the fuel and energy complex and import substitution. One of the crucial activities of the laboratory is the “development of domestic software for monitoring and analyzing the actual participation of generating equipment in the general primary frequency regulation” [2], which allows increasing control over the operation of energy systems and the efficiency of their functioning. One of the first facilities to implement this data analysis system was the Huadian-Teninskaya Thermal Power Plant, a controlling stake in which belongs to the Chinese energy corporation Huadian. Despite the availability of similar Russian data analysis technology to Chinese partners, the implementation of foreign software at a Russian thermal power plant may encounter a number of difficulties associated with differences in the legal framework and market requirements.

As a result of the analysis of the state of the sanitary protection zone for Huadian-Teninskaya Thermal Power Plant LLC, a negative dynamics of the increase in sulfur dioxide and carbon monoxide emissions in 2021 by 27% and 41%, respectively, was tracked, but these values are within normal limits. A positive trend was also revealed to reduce emissions of nitrogen oxide by 18%, VOCs by 25%, solids by 95% and hydrocarbons without VOCs by 99% (see Table 1).

Table 1.

Information on emissions of pollutants that have a negative impact on the environment Huadian-Teninskaya Thermal Power Plant LLC [3]

Environmental indicators, t/year	2017	2018	2019	2020	2021
	Volume of emissions, actual year-end				
1.1. Solids	0,138	0,236	0,236	0,236	0,012
1.2. Nitric oxide	347,134	656,127	265,965	431,055	354,563
1.3. Sulfur dioxide	0,007	0,011	0,011	0,011	13,995
1.4.C monoxide	298,000	579,040	135,077	354,157	497,437
1.5. Volatile organic compounds (VOCs)	0,606	1,040	1,040	1,040	0,781
1.6. Hydrocarbons (no VOCs)	1,359	2,329	2,329	2,329	0,032
1.7 other	0,032	0,066	0,066	0,066	0,006
Total:	647,276	1 238,849	404,724	788,894	866,826

Thus, statistical data indicate that the implementation of the project in the context of achieving the SDGs has a positive environmental effect.

At the same time, one of the main areas of Russian-Chinese cooperation in the field of sustainable development is nuclear energy, recognized by the Taxonomy of the Russian Federation as a “green” activity and an effective tool for reducing greenhouse gas emissions and producing cheaper energy to meet the high demand for electricity caused by the rapid economic growth in China. The largest project of technological cooperation between Russia and China in this industry is the Tianwan NPP, located on the shores of the Yellow Sea. The Rosatom State Corporation is constructing power units for it with VVER-1200 generation “3+” reactors. The two Tianwan reactors use about 50 tons of nuclear fuel per year, while coal-fired power plants with the same installed capacity would require 6 million tons of coal. Consequently, the Tianwan Project will increase the total capacity of the plant to 70 kWh per year, which is enough to power 100 million households for three months - this is equivalent to reducing carbon dioxide emissions by 15 million tons per year, which is almost half of the total annual CO₂ emissions in Hong Kong. In addition, the environmental effect of the project is complemented by a reduction in the amount of waste by 400 thousand tons per year, as well as a significant reduction in emissions of sulfur dioxide and nitrogen oxide [4]. In that way the implementation of this project contributes to the achievement of SDG №7.

Currently, the operation of the Tianwan NPP is one of the safest in the world, however, the problem of thermal water pollution remains relevant (after the start of operation of the NPP, the thermal pollution zone has expanded) and requires continuous monitoring and control. From 2001 to 2020 the area increased by 67 km² with increasing temperature. According to Fig. 1 in 2020, the maximum increase in area was observed when the temperature increased above 2 °C, and the minimum at – 4 °C. The extent of areas experiencing increased temperatures also varies depending on the season. The largest thermally polluted area is recorded in spring, followed by summer, winter and autumn (see Fig. 2) [5].

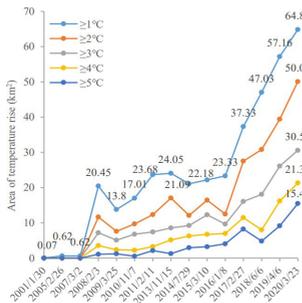


Figure 1. Statistics of the thermal discharge area depending on the temperature level

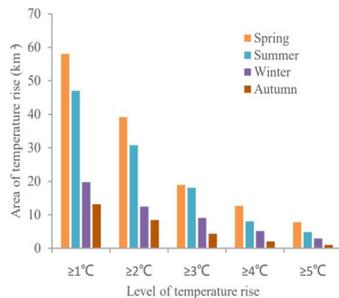


Figure 2. Statistics of the temperature increase area depending on the season

Based on the results of the study, it was revealed that the increase in sea surface temperature as a result of the operation of the Tianwan NPP meets national quality standards for the marine environment and does not pollute the environment, therefore, cooperation between Russia and China in the construction of new power units is promising.

Another priority area of the energy transition is hydropower, the most sustainable and environmentally friendly source of energy. Unlike nuclear energy, water energy does not produce nuclear waste, which requires special treatment and disposal. The competitive advantage over fossil fuels is that hydroelectric power plants leave a low carbon footprint without emitting greenhouse gases (GHGs) into the atmosphere. Moreover, hydroelectric power plants can be used to regulate water levels in rivers, prevent floods and irrigate agricultural land. Also, the positive environmental effect of hydropower development lies in the preservation of natural ecosystems and biodiversity. At the same time, hydroelectric power plants can operate in a mode of continuous electricity production, which ensures the stability of the energy system (SDG №11). Therefore, hydropower has great potential to achieve sustainable development in both China and Russia, countries rich in water resources.

A significant milestone in Russian-Chinese cooperation is the signing in 2014 of an agreement between the RusHydro Group and the China Three Gorges Corporation (CTG) on the construction of a hydroelectric power station in the Far East of the Russian Federation in order to provide protection from extreme floods of areas along the Amur river, the creation of generating capacities not only for the stable domestic demand of the Amur region, but also for the export of electricity to China, as well as the development of the energy infrastructure and economy of the region. In 2019, a large flood control Nizhne-Bureyskaya hydroelectric power station was built in the Amur River basin. During its construction, a set of measures was implemented to preserve biodiversity, minimize negative impacts on the environment and preserve the region's ecosystems - the "Bureya Compromise" project (SDGs №13, №14 and №15), which provides for the creation of special protected areas, monitoring and restoration of forests and water resources, as well as measures to protect flora and fauna. As a consequence, the Bureysky Nature Reserve was created, which became home to the Amur leopard, tiger, and other rare species of animals, and the Bureysky Biological Station for the study and conservation of the biological resources of the region. Thus, the socio-ecological project "Bureya Compromise" for the protection of nature and biodiversity during the construction of large infrastructure facilities has become an example of the best Russian practice in the field of sustainable development of hydropower.

In addition, Russia and China are cooperating in wind energy. The growing demand for electricity in China requires an active increase in generation volumes.

A striking example is the project to create a large-scale wind farm in Blagoveshchensk by En+ Group and Power China, designed to ensure the export of green electricity to China in the amount of 3.5 billion kWh/year, which is 80% of the record volume of supplies (4.4 billion kW *h) under an agreement signed in 2021 [6]. However, a significant disadvantage of wind energy is frequent interruptions (wind is an intermittent source of energy), therefore, solutions are needed for backup energy storage on a scale comparable to their production capacity.

The use of an energy carrier such as hydrogen (hereinafter referred to as H₂) with a low carbon footprint can compensate for the seasonal discrepancy between energy production and demand. It serves as an important tool in the fight against GHG emissions, decarbonization of transport, industry and energy. In the long term, as technology develops, a steady upward trend in demand for low-carbon hydrogen has been identified (see Fig. 3). Russia and China are actively interacting in this industry: in 2021, the countries signed an agreement on cooperation on the development of hydrogen energy; more than 30 pilot projects for the production of low-carbon hydrogen are planned in Russia, the target markets of which are mainly Asia-Pacific countries.

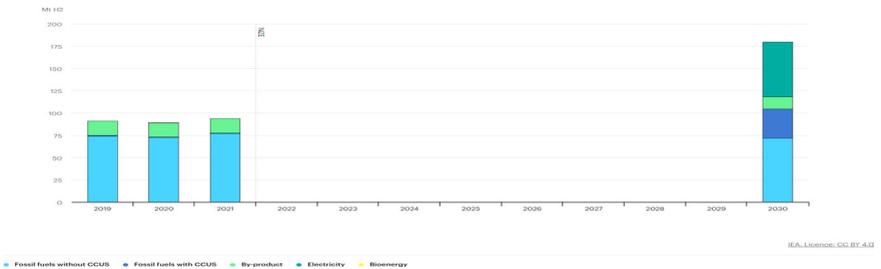


Figure 3. Global hydrogen production using technologies in a net zero scenario, 2019–2030 [6]

From the analysis it follows that cooperation between the Russian Federation and China has great potential in terms of achieving sustainable development goals and can become an important factor for the environmentally friendly development of the energy industry in both countries. Based on the analyzed Russian-Chinese projects, a matrix of their compliance with the SDGs was compiled (see Fig. 4).

№	Projects / Sustainable Development Goals	SDG Icons											
		6	7	8	9	11	13	14	15	17			
1	Electric power industry <i>Huadian-Teninskaya Thermal Power Plant</i>	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
2	Nuclear power <i>Tianwan NPP</i>	White	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
3	Hydropower <i>Nizhne-Bureyskaya HPP</i>	Blue	Blue	White	White	White	Blue						
4	Wind power <i>Wind farm in Blagoveschensk</i>	White	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
5	Hydrogen energy <i>Pilot projects</i>	White	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue

Figure 4. Matrix of compliance of ongoing projects in Russia and China with SDGs

It has been established that the priority sectors of energy cooperation between countries to achieve carbon neutrality are electric power, hydro and wind power, nuclear and hydrogen energy. Russian-Chinese projects in nuclear energy and hydropower have a special environmental effect on the conservation of biodiversity. In general, the implementation of the analyzed projects contributes to the achievement of the following sustainable development goals: 6, 7, 8, 9, 11, 13, 14, 15, 17.

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论司法立法区分不动产与动产概念的现代意义

**ON THE MODERN SIGNIFICANCE OF JUDICIAL LAW-MAKING
IN DISTINGUISHING THE CONCEPTS OF REAL ESTATE AND
MOVABLE PROPERTY**

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抽象的。俄罗斯联邦利用司法立法的可能性来解决不动产和动产的类别划分问题，是由于现行法律机制不够明确。“房地产对象”的概念被认为是由一系列特征决定的法律类别，这些特征都不具有预先决定力。俄罗斯现行立法没有赋予任何行政机关或专家组织区分动产和不动产的权力。在这种情况下，“房地产”的概念实际上成为一种评估类别，这增加了法院在考虑本质上相似的争议时判决的可变性。

关键词：房地产、房地产标的、快速房地产、民事立法、法律术语、法律定义。

Abstract. *The use of the possibilities of judicial law-making in resolving issues of delimiting the categories of real estate and movable property in the Russian Federation is due to the insufficiently clear current legal mechanism. The concept of “real estate object” is recognized as a legal category determined by a set of characteristics, none of which has predetermining force. The current Russian legislation does not vest any executive authorities or expert organizations with the authority to distinguish between movable and immovable things. In such conditions, the concept of “real estate” becomes, in fact, an evaluation category, which increases the variability of court decisions when considering essentially similar disputes.*

Keywords: *real estate, real estate object, fast estate, civil legislation, terms of law, legal definitions.*

The normative basis for distinguishing objects of civil rights into movable and immovable in Russia is established by Article 130 of the Civil Code of the Russian Federation. In its text, by exclusion, it is indicated that all other objects not directly indicated in paragraph 1 of this article as real estate, or not falling under the criteria established therein, on the basis of paragraph 2 of Article 130 of the Civil Code of the Russian Federation belong to the category of movable things.

At the same time, Russian law enforcement practice shows that the existing rules for delimiting movable and immovable property with a fairly high frequency become the cause of disputes that reach court proceedings. Such disputes cannot be excluded in relation to buildings, structures and structures, structurally, as required by Article 130 of the Civil Code of the Russian Federation, “firmly connected with the land” and registered with the state precisely as real estate objects.

In modern legal understanding, the concept of “real estate” is recognized as a legal category determined by a set of characteristics. This means that when classifying a specific object as real estate, Russian courts take into account, first of all, legal rather than technical categories. At the same time, Article 130 of the Civil Code of the Russian Federation does not clearly identify any characteristics as paramount for classifying an object as real estate.

In such conditions, the concept of “real estate” becomes actually an assessment category.

The current Russian legislation also does not vest any executive authorities or organizations with the authority to distinguish between movable and immovable things.

In some cases, an unambiguous solution to this issue is impossible even based on the results of expert research. For example, as noted in the Resolution of the Ninth Arbitration Court of Appeal dated August 15, 2012 No. 09AP-30432/2011-GK in case No. A40-131251/10, expert opinions presented to the court will not have predetermining significance, since the question of classifying a thing as objects of movable or immovable property, requires special knowledge in the field not of construction, but of jurisprudence, which the court itself possesses.

In the current situation, it can be stated that the mechanism that has been formed so far in Russia at the legislative level for distinguishing objects of civil rights into movable and immovable does not fully solve the tasks assigned to it, leaving the solution of a number of issues to the judicial discretion.

As is known, the exercise of the right to judicial discretion often results in cases of judicial lawmaking.

Another reason that determines the objective need for judicial law-making is the use of the same terms with different meanings.

The lack of uniform approaches in understanding the content of the term “real estate” is currently characteristic not only at the doctrinal level, but also in the sphere of regulation of interstate relations. The need to harmonize and document the approaches used by the parties in understanding the concept of “real estate” is currently characteristic, first of all, of Conventions and Agreements for the Avoidance of Double Taxation concluded by the Russian Federation with other states. In this case, the parties to the agreement often recognize that the term “real estate” has the meaning established in the legislation of the contracting state in which the

property is located. Cases of disparity in the understanding of the concept under consideration in such Agreements are rare and, as a rule, are explained by the fact that the legislation of a foreign state has not yet developed clear legal structures that would make it possible to distinguish between movable and immovable property.

Thus, the issue of specifying, including through judicial law-making, the rules for determining the categories of movable and immovable property is relevant not only for the purposes of regulating property relations. This issue is also important for solving the problems of harmonization of civil and tax legislation, including international tax law.

It is now generally accepted that in the Russian legal system the judicial law-making function is actually exercised at the level of the Constitutional Court, the Supreme Court and (formerly) the Supreme Arbitration Court of the Russian Federation.

The reason for the law-making activity of the courts is the need to eliminate gaps, conflicts, clarify the evaluative norms of the law, and implement normative control.

Thus, it should be recognized that the analysis of modern features and cases of judicial law-making is also relevant for legal regulation in the field of movable and immovable property, including for resolving issues of delimitation of various objects of these categories.

Of course, we should not forget that not every case of a higher court deviating in its decision or generalization of judicial practice from citing existing rules and their interpretation is an embodied case of judicial law-making.

Quite often, mandatory clarifications on issues of judicial practice prepared as part of the implementation of the function of judicial supervision over the activities of lower courts, both in full and for the most part, are rather explanatory in nature. They allow us to more accurately understand the modern system of legal regulation in a particular issue.

For example, in the Resolution of the Plenum of the Supreme Court of the Russian Federation dated June 23, 2015, it was noted that a thing is immovable either due to its natural properties (paragraph one of paragraph 1 of Article 130 of the Civil Code of the Russian Federation), or due to the direct indication of the law that such the object is subject to the regime of immovable things (paragraph two, clause 1, article 130 of the Civil Code of the Russian Federation). It was also stated that, as a general rule, state registration of the right to a thing is not a prerequisite for recognizing it as real estate (clause 1 of Article 130 of the Civil Code of the Russian Federation).

Similar explanations can be found in the Resolutions and Determinations of the Supreme Arbitration Court of the Russian Federation. The mere fact of regis-

tering an object as real estate, in isolation from its physical characteristics, in the unified state register of rights does not mean that the object is an immovable thing and is not an obstacle to filing a claim to recognize the right to the object as absent.

State registration of the right to a thing, as a general rule, is not a prerequisite for recognizing it as an object of real estate (clause 1 of Article 130 of the Civil Code of the Russian Federation). The presence or absence of state registration of a right, the presence or absence of a construction permit in itself does not predetermine the recognition of the disputed object as real estate.

Undoubtedly, based on the general principles of regulating the legal status of objects of civil rights and the comprehensive application of civil legislation, but still already having certain signs of judicial law-making, in our opinion, we can recognize the clarification that objects that do not have an independent economic purpose and perform only a service function for in relation to the corresponding land plot and the buildings located on it cannot be recognized as real estate, regardless of their physical characteristics and the presence of individual elements that ensure a strong connection of these structures with such a land plot.

Objects that, although firmly connected to the land, do not have an independent functional (economic) purpose, are not recognized as real estate. The corresponding structures are considered as an improvement (an improvement element) of the land plot for which they were erected, and therefore, according to the rules of Article 135 of the Civil Code of the Russian Federation, they follow its legal fate. So, for example, the paving of a land plot that does not meet the characteristics of a structure is part of it and cannot be recognized as an independent immovable thing (Clause 1 of Article 133 of the Civil Code of the Russian Federation).

Cases of judicial lawmaking can be aimed not only at filling gaps in substantive, but also in procedural regulation. Thus, in the decisions of the Supreme and Supreme Arbitration Courts of the Russian Federation one can find instructions that in order to recognize a construction project as an immovable thing:

1) the issue of whether a particular structure belongs to the category of real estate is decided in each specific case based on objective technical characteristics that affect the possibility (impossibility) of moving such structures without disproportionate damage to their purpose. The question of whether a particular property is immovable must be resolved taking into account all available documents;

2) it is necessary not only to identify the presence of signs that can classify an object due to natural (physical) properties or on the basis of the law as an immovable object, but also to establish that the specified thing was originally created as a real estate object in the manner prescribed by law and other regulations on a land plot provided for the construction of a real estate property, with the receipt of permits in compliance with urban planning norms and rules.

Summarizing this study, it seems possible to focus on the conclusion that the modern system of legal distinction between real and movable property in both Russian and international legislation has the potential for further improvement.

At the legislative level, it seems necessary to make a conceptual distinction between the terms “immovable things”, “real estate” and “real estate” used in the text of the Civil Code of the Russian Federation. The currently valid norm, clause 1, article 130 of the Civil Code of the Russian Federation, considers these terms to be equivalent. According to the author of this article, the main difference in the use of the concept of “real estate” in comparison with the concepts of “real estate” and “immovable things” is that the category “real estate” can include not only specific material objects, but also those associated with them property rights. For example, the transfer of real estate can be understood not only as a change in ownership of a specific object, but also as a transfer of rights to associated auxiliary property and equipment, as well as other real rights inextricably linked with such an object (for example, an established easement, usufruct, right lifelong use, option or other similar right to acquire real estate, the right to explore or develop natural resources on a land plot).

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培养未来技术教师的创意和技术实验室专业发展
**CREATIVE AND TECHNOLOGICAL LABORATORY
PROFESSIONAL DEVELOPMENT IN THE PREPARATION OF
FUTURE TEACHERS OF TECHNOLOGY**

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From the first days of professional training at the university, future teachers of technology and entrepreneurship have the opportunity to participate in the work of the creative technology laboratory (CTL). CTL is an association of like-minded people with certain interests in one or another area of a student's creative activity within the framework of the specialty "technology and entrepreneurship".

The creative and technological laboratory is an additional link in the development of professional competencies in the educational and professional activities of students. Participation in the work of the creative technology laboratory (CTL) is not obligatory for students. Students have the opportunity to attend one or more sections, depending on their own desires, the degree of preparedness for creative work in a given section, the level of knowledge, skills and abilities. Students are given the opportunity to improve their technological practice in a circle of like-minded people.

According to the State Educational Standard of Higher Professional Education [1], 900 hours are allocated for the study of specialization disciplines. At the same time, it is important that a student of the specialty "Technology and Entrepreneurship" masters the basic knowledge, skills and abilities necessary to study scientific disciplines that form a qualified future teacher of technology and entrepreneurship.

As part of the technological workshop, students become familiar with the basics of all other specializations, which allows them to expand their competencies in other areas of knowledge. We try not to separate all aspects of the preparation of a future technology teacher from each other during his professional training and fully implement continuous connections between them.

Junior year students enjoy visiting the sections "Information technologies in the educational field "Technology". The "student design bureau" section is in high demand among 2nd–4th year students. The methodological basis of each section is

the corresponding specializations, elective courses and disciplines of the regional component.

As work experience has shown, CTL ensures that future teachers of technology and entrepreneurship develop a holistic understanding of the correctness of the chosen teaching profession, the correspondence of their own personal qualities with the required professional qualities, and awareness of the difficulties that can be encountered in the process of preparing for professional teaching activities.

In the process of this work, the skills of reflexive analysis of the upcoming pedagogical activity of a technology teacher are mastered and students develop clear ideas about the prospects for professional growth, understanding the significance of this activity for other people, responsibility for the results of their activities, self-knowledge and self-realization in teaching activities.

The core of CTL activities is the formation of a professional orientation in the future teacher of technology and entrepreneurship, which develops and is simultaneously reinforced by the mastery of professional skills based on them.

Currently, the creative and technological laboratory at the Dagestan State Pedagogical University is a dynamically developing environment for the creative self-realization of students and has two sections.

Section “Information technologies in the educational field “Technology”.

In the section special attention is paid to students’ awareness that information technologies and computer teaching aids are an integral part of the quality professional activity of future teachers of technology and entrepreneurship.

Taking into account the peculiarities of the pedagogical activity of the future technology teacher, the section draws students’ attention to: processing information about technological processes and equipment; the use of computer tools and their introduction into the educational field of “Technology”; development of educational information tools aimed at students of educational institutions.

Electronic teaching aids developed by students within the laboratory in various disciplines are collected into a single database. The database was built taking into account the possibility of adjustment and improvement, is open for free use by full-time and part-time students, and can also be used by our graduates - teachers of technology and entrepreneurship.

Presentation of information on specialization disciplines contributes to the further development of each student’s abilities and allows for better organization of students’ independent work. This has a positive role in the future professional activities of the specialist.

Section “Student Design Bureau”.

Creative associations of students are a high form of organization of technical creativity of students, contribute to the development of sustainable interest in creative activity, independence and consolidation of acquired competencies.

The most effective way to develop the creative abilities of students, in our opinion, is the student design bureau (SDB), which successfully operates on the basis of CTL.

Junior year students within the SDB begin their initial acquaintance with technical creativity in aircraft and ship modeling clubs, during technological workshops and during practical training.

In such sections and classes, methods are used that promote the development of cognitive interests and the formation of practical work skills in students. The following types of work are used: abstract; reproductive work on the manufacture and repair of educational and laboratory equipment for classrooms and laboratories; conducting experiments and research within the framework of educational programs; preparation and publication of newsletters on the topics of the laboratory's work; holding olympiads in the subjects; holding competitions and exhibitions of creative works; holding theme evenings and debates; technical creativity.

As a rule, senior students work in subject clubs in special disciplines. They are offered a wider field of activity: experimental design (development and research of individual functional units, execution of design documents, development of technological maps); scientific research; economic; technical creativity; work as circle leaders; implementation of complex projects.

Within the framework of the SDB, the following tasks are implemented: to teach students to see the advantages and disadvantages of the design of the tools, mechanisms, technological devices they use, the machines around them and other technical devices and to find ways to improve them in the process of creating models, layouts, and prototypes of technical objects; help in independently determining the optimal ways and means of performing various technological operations; to form in students a conscious desire to use the experience of technical creativity in solving everyday practical problems.

At SDB much attention is paid to the issues of improving the culture of technical speech of students and familiarization with technical terms. When solving technical problems, in the process of developing and manufacturing finished samples, managers introduce students to the theory of solving inventive problems, exchange experience and focus on finding their own algorithms for solving technical tasks.

The results of the work of the SDB are working models and layouts used in the educational process in almost all training disciplines. Our university is fully equipped by SDB participants with training laboratories "Car Construction", "Road Rules", "Machine Parts", etc.

Many original creative ideas were generated in the creative technology laboratory. In addition, in the process of CTL activities, classes grew into scientific creativity, and pedagogical management was carried out in unity with student self-government.

Experimental work showed that students by regulating their professionally oriented actions, starting with goal-setting of their activities and ending with self-correction, were able to develop the ability to self-government, by transferring management functions into personal and semantic ones. Using the example of a creative and technological laboratory, we have shown the possibility of psychological and pedagogical support for the transition of management to self-management by the process of the teacher's own personality formation as a subject of activity.

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足球五人制B1级场上球员协调能力特点

CHARACTERISTICS OF COORDINATION ABILITIES OF FIELD PLAYERS IN FOOTBALL FIVE-A-SIDE B1 CATEGORY

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抽象的。目前,盲人足球是深受视障人士喜爱且发展迅速的运动项目之一。许多专家认为,包括足球运动员在内的盲人运动员的体能训练应重点培养特定的协调能力。迄今为止,旨在研究这个问题的研究还很零散。我们的工作致力于确定俄罗斯国家队盲人 5x5 迷你足球 (B1) 运动员的协调能力水平。通过所做的工作,我们发现盲人足球运动员的协调能力还没有得到充分的发展,因此有必要在训练过程中加入大量有助于提高协调能力最重要组成部分的专项练习。:空间和时间的定向,保持静态和动态平衡,保持运动动作的节奏,肌内和肌间的协调。

关键词:盲人足球、盲人运动员、身体素质、协调能力。

Abstract. *Currently, blind football is one of the popular and rapidly developing sports for the visually impaired. According to many experts, the physical training of blind athletes, including football players, should be built with an emphasis on specific coordination abilities. To date, research aimed at studying this problem is only fragmentary. Our work is devoted to determining the level of coordination abilities of blind 5x5 mini-football (B1) players who are part of the Russian national team. As a result of the work done, we found that the coordination abilities of blind football players are not sufficiently developed, and therefore it is necessary to include in the training process a larger number of special exercises that help improve the most significant components of coordination abilities: orientation in space and time, maintaining static and dynamic balance, maintaining the rhythm of motor actions, intramuscular and intermuscular coordination.*

Keywords: *blind football, blind athletes, physical fitness, coordination abilities.*

According to Paralympic experts, sports are becoming increasingly popular and rapidly developing throughout the world [7, 9]. Today, “sport for the blind” is represented by many sports and their disciplines, including those included in the program of the Paralympic Games. One of the most accessible and popular among them for the blind and visually impaired is football for the blind (mini-football 5x5), which has the official name of the discipline “football five-a-side B1 category” or in Russian “football - mini-football 5x5 (B1) – sport for the blind [9].

The game of football is characterized by high motor activity of players, manifested in various forms of movement such as jumping, running, acceleration and jerking with changes in direction. Also, the specifics of football are determined by actions with the ball (hitting, dribbling, stopping, dribbling, etc.). The actions of field players during the game are predominantly dynamic in nature, and the intensity of the work performed constantly fluctuates from moderate to maximum. All this places very high demands on the physical fitness of football players.

Football for the blind has many features associated with the functional state of blind athletes, which include: a slowdown in the level of natural physical development; diseases of the cardiovascular system, disorders of the respiratory system and others [13].

Studies by many specialists have noted that blind athletes have significant deviations in psychophysical development, cognitive activity, as well as physical development, which is largely associated with the manifestation of coordination abilities [1, 4, 9, 12].

A generalized analysis of scientific and methodological literature and practical experience allowed us to conclude that it is necessary to develop coordination abilities in blind 5x5 mini-football (B1) players as the leading physical abilities that influence the degree of mastery of the necessary technical and tactical techniques for conducting competitive struggle in blind football .

According to Yu.V. Verkhoshansky (1988) coordination abilities allow an athlete to effectively solve motor problems through the rational organization of muscle efforts [3].

Based on the results of special studies, the following relatively independent types of coordination abilities can be distinguished: assessment and regulation of dynamic and spatio-temporal parameters of movements, maintaining stability, sense of rhythm, orientation in space, voluntary muscle relaxation, coordination of movements [6].

Coordination abilities, based on the manifestations of motor reactions and spatio-temporal anticipations, underlie the activities of athletes in unexpected and rapidly changing situations.

In the studies of V.I. Lyakh (2006) says that coordination abilities are a complex system consisting of several levels. In his opinion, five main coordination

manifestations of a person can be distinguished, such as: the ability to navigate in space, the ability to differentiate movement parameters, the ability to balance, the ability to rhythm, and the ability to vestibular stability [5].

P.S. Gorulev and E.R. Rumyantseva (2018) in her research distinguishes three groups of coordination abilities:

- precise measurement and regulation of temporal, spatial and dynamic parameters, which are determined by the level of development of the “sense of time”, “sense of space” and “muscular sense”;
- maintaining static and dynamic balance, which consists of the ability to maintain a stable body position in a static position and balancing while moving;
- performing movements and motor actions without unnecessary muscle tension [13].

In his scientific works T.A. Selitrennikova (2016) says that the coordination abilities of an athlete with visual impairments have a significant impact on the result and require him to develop certain components of coordination abilities as much as possible. In this connection, the condition for the correct dosage of physical activity in the training process is the assessment of the state of coordination abilities [12].

According to the rules of the sport “blind football,” a team consists of four field players and one goalkeeper. Field players are 100% deprived of the ability to visually perceive (category B1 - totally blind). Goalkeepers may be partially sighted or fully sighted.

Since there are no comprehensive studies in the specialized literature aimed at studying the issues of sports training of blind football players and assessing their coordination abilities, we believe that in our study it is advisable to compare the indicators of coordination abilities of two groups of athletes who are part of the Russian Federation national blind football team 5x5 (B1): blind field players and sighted goalkeepers.

Field players and sighted goalkeepers did not differ in terms of experience in sports and level of sports qualifications. The assessment was carried out according to two groups of indicators: postural balance and the functional state of the perceptual-motor complex and temporal orientation (Table 1).

Table 1
Indicators of coordination abilities of players in blind football

Test	Field players (n=13)		Goalkeepers (n=5)	
	Xavg	σ	Yavg	σ
Postural balance and functional state of the perceptual-motor complex				
Romberg Heel-Toe Test (c)	30,75	17,51	40,86	14,33

Turns on a gymnastic bench in 20 seconds (number)	6,50	3,71	6,40	2,04
Long jump 50% of maximum, error (cm)	48,60	26,54	21,20	19,18
Discrimination threshold mid-palm (mm)	10,60	4,91	11,30	3,78
Discrimination threshold shoulder (mm)	29,60	10,39	31,40	9,96
Discrimination threshold hip (mm)	30,50	4,49	31,20	17,44
«Sticks» (c)	24,93	9,31	43,72	15,70
Temporal orientation				
Sense of time 3 s (s)	2,54	0,77	2,51	0,35
Sense of time 7 s (s)	6,68	0,95	6,99	0,39
Sense of time 10 s (s)	10,59	1,34	10,94	0,93
Sense of time 60 s (s)	62,63	5,06	58,84	1,85

Note: Xavg, Yavg – group average values; σ – standard square deviation.

When assessing the ability to maintain static balance using the Romberg Heel-toe Test, it was revealed that the performance of blind players was significantly lower than that of healthy athletes by 24.72%.

«Turns on a gymnastic bench» were used to assess dynamic balance. The subject, standing on a narrow surface of a gymnastic bench, was asked to perform as many turns to the right or left as possible in 20 seconds. The number of turns performed was recorded with an accuracy of half a turn.

This test did not reveal any significant differences between blind players and goalkeepers. However, I would like to note that for blind football players, performing tasks to maintain balance on a limited support without eye contact is less difficult than for sighted goalkeepers, who performed this test wearing special masks. Lack of eye contact negatively affects the ability to maintain balance, which is also confirmed by studies by many authors [13, 14, 15, 16].

The ability to differentiate muscle efforts was determined by the “Long jump 50% of maximum” test. The athlete performed a standing long jump twice, taking off with both legs. Moreover, the first time he performed a standing long jump with maximum effort, and the second time he had to perform a jump equal to half the jump in the first attempt. The smaller the difference between the results of two attempts, the greater the accuracy of differentiation of muscle efforts.

A comparative analysis of the results of this test showed that in blind athletes, the ability to differentiate muscle efforts is not sufficiently developed, since the difference between the required value and the result shown by the athletes is more than 25.57%, while for sighted goalkeepers this difference is only 13.86 %. We hypothesize that such differences are primarily related to the individual’s ability to differentiate muscle efforts based on information received from the visual sensory system and its analysis in the cerebral cortex.

To assess the spatial discriminative ability of the skin, we conducted the “Discrimination threshold of the middle of the palm, shoulder and thigh” test, which consisted of determining the smallest distance between two irritated points on the skin surface, at which the irritations were perceived as separate. The smaller this distance, the greater the sensitivity. In a sitting position, using a Weber compass or a compass with blunt needles with the legs as compressed as possible, they touched the skin of the subject, while asking how many touches he felt. If the subject felt one touch, then the legs were moved apart by another 1 mm, and so on until the subject felt two touches. This distance was considered the discrimination threshold for a given skin area (mm).

A comparative analysis of the results shown by athletes in this test showed that blind athletes have more developed tactile sensitivity than goalkeepers. However, the results obtained for the discrimination threshold of the middle of the palm for all athletes differ from the normative values by an average of 23.12% (Table 2).

Table 2

Standard values of the discrimination threshold for various parts of the body (according to S.V. Moryakina, 2015) [8]

Part of the body	Discrimination threshold
Shoulder and hip	67.6 mm
Middle of the palm	8.9 mm

The athletes assessed tactile perception using the “Sticks” test. The subject was asked to arrange 10 sticks of different lengths in descending or ascending order in the least amount of time. Subjects performed this test wearing opaque masks.

Based on the analysis of the results of this test, it follows that the tactile perception of blind athletes is more developed than that of sighted goalkeepers. Blind players completed this task 57.13% faster and without a single error, while three out of five goalkeepers made 2 errors.

Temporal orientation and the ability to reproduce time intervals were assessed using tests aimed at measuring time intervals of 3 s, 7 s, 10 s, 60 s. The subject, randomly turning the stopwatch on and off by pressing the trigger with his thumb, measured 3, 7, 10 and 60 seconds. The error was calculated by the difference between the given values and the measured athletes: the smaller the difference, the greater the accuracy.

Analyzing the results for all tests, we can conclude that blind athletes have a less developed “sense of time” than sighted goalkeepers, although on average the differences are 9.58%.

It was important for us to determine the level of coordination abilities not only in laboratory tests, but also in the context of the gaming activities of blind athletes. To do this, we used such specific tests as:

- “Kicks on goal with changes in conditions”, in which the subjects took turns performing 10 shots on goal from the six-meter mark. Moreover, before each shot, the goalkeeper “hit” the goal frame at the point where the subject needed to hit. The points were blows in: the lower left and right corners, the upper left and right corners, as well as the center (the center of the crossbar). The number of accurate hits to given points was assessed.

- “Assessment of the game situation.” In this test, the experts, who were the coaches of the Russian national blind football team 5x5 (B1), were asked to evaluate the actions of the players both in defense and in attack in a previously known game situation according to the following criteria: speed of task completion, accuracy of the kick or transmission, versatility of using technical techniques, volume of technical techniques, effectiveness of technical techniques. For each criterion, the subject could receive from 0 to 1 point. The assessment was carried out 5 times, with each expert filling out a special form.

The results shown by blind players in 5x5 mini-football (B1) are presented in Table 3.

Table 3
Assessment of the coordination abilities of blind football players in gaming activities

Test	Xavg	σ	Max
Shots on goal with changing conditions (number)	3,80	2,30	10
Assessment of the game situation (number of points)	2,60	1,40	5

Note: Xav – group average value; σ – standard square deviation, Max – maximum permissible value for this test.

Based on the data presented in Table 3, it follows that in the “Kicks on goal with changing conditions” test, blind players cope with the task only in 38.14% of cases. In our opinion, this suggests that athletes with visual analyzer disorders have certain difficulties when orienting in the surrounding space, including when orienting to a sound signal.

The results of the “Game Situation Assessment” test showed an insufficient level of proficiency and the ability to use certain technical and tactical techniques necessary for effective competition in blind football, since only in 52.13% of cases the experts highly noted the playing skills of field players in 5x5 mini-football (B1). This suggests that there are blind football players at a high technical level who can perform the necessary motor actions 2.5 times out of 5 possible attempts.

Thus, we can conclude that the coordination abilities of blind football players are not sufficiently developed, and therefore it is necessary to include in the training process a larger number of special exercises that help improve the most

significant components of coordination abilities: orientation in space and time, maintaining static and dynamic balance, maintaining the rhythm of motor actions, intramuscular and intermuscular coordination.

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学生从属关系中的竞争性游戏英语学习

COMPETITIVE GAMING ENGLISH LEARNING IN STUDENTS' AFFILIATION

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抽象的。学习的意义在于发展心理活动和思想语言表达的灵活性，提高政治、道德、审美文化知识水平，争取外语学习及其实践所提供的密切的群体相互合作和人际关系。 目标。

现代教育不仅决定语言知识和技能问题，还解决与一起学习的人保持经常接触和友好关系的要求。 工业4.0要求外语培训成为有意义的人文教学过程。

随着信息技术的发展和互联网的介入，青少年日益分裂、瓦解，缺乏真实的交流。 对待学生的老师自然地提供有趣的学习，鼓励学生发展他们的伙伴关系以及建立有效的团体相互关系的愿望。 强化师生交流的外语学习主动游戏形式的特点是：学习中交际认知、情感和实践的融合； 通过“主体-主体、主体-环境、主体-教师”拓展真实联系，实现教育过程人性化； 多种主动训练形式缓解紧张情绪和负面情绪。

这项工作的目标是确定并介绍在外语课堂上达到学生群体归属感最佳水平的方法。

我们认为外语训练中以竞争性原则主动学习加分激励因素营造的环境有助于提高学生的语言技能效率、学习兴趣的增长以及小组沟通互动和伙伴关系中的归属感。

理论分析方法和实证方法（观察、访谈和问卷）构成了KFU一年级青少年实验的方法论基础。

工作表明，基于竞争原则的积极形式有助于团体归属感的增长，满足教学要求，促进团体伙伴关系的需要； 消除课堂上的仇外心理； 让语言训练变得高效、愉快。

关键词：人文教育学、竞争力、归属感、竞技游戏原理、仇外心理、训练过程、加分动机因素。

Abstract. *The relevance of the study lies in the development of mental activities and thought linguistic expression flexibility, in increasing political, moral and aesthetic cultural knowledge levels, in striving for close group mutual cooperation and interpersonal relations that the foreign language learning can provide along with its practical goals.*

Modern education decides on not only the language knowledge and skills problem, but also deals with the demands to stay in constant contact and friendly relationships with people studying together. Industry 4.0 demands to make foreign language training as meaningful humanistic pedagogical process.

With IT development and internet intervention youth are being increasingly disunited and disintegrated, suffering from real live communication lack. The teacher treating students naturally provides interesting learning, encourages students to develop their partnership and the wish for the effective group interrelationships. The active gaming forms of foreign language learning intensifying communication between a teacher and students are characterized by: communicative-cognitive, emotional and practical aspects integration in learning; educational process humanization by means of “subject-subject, subject-environment and subject-teacher” expanding real connections; a variety of active training forms relieving tensions and negative emotions.

The goal of this work is identify and introduce the ways to the students’ group affiliation optimal level in a foreign language class.

We suppose the environment creation on the competitive principle active learning with extra points motivation factor included in foreign language training, contributes to the students’ language skills efficiency, growing interest in learning, as well as the need for affiliation in the group communication interaction and partnership.

Theoretical methods of analysis and empirical methods (observations, interviews and questionnaires) constitute methodological basis of the experiment involving KFU first-year teenagers.

The work showed that active forms on competitive principle has contributed to the group affiliation growth and meets pedagogical requirements, promotes the needs for group partnership; eliminates xenoglossophobia in class; makes language training efficient and enjoyable.

Keywords: *humanistic pedagogy, competitiveness, affiliation, competitive gaming principle, xenoglossophobia, training process, extra points motivation factor.*

I. INTRODUCTION

Students learning a foreign language need a real communicative environment and active training forms. Interest is aroused by the desire to possess the studied

subject matter” [1, p.46-47]. Therefore, there is still a demand to organize training as the creation environment for an enjoyable learning.

With the information technologies invasion, young people communicate less, face-to-face communication gives way to communication in social networks. Emotional relationships as a rule are based on emotional perception, often without taking into account objective information about a person.

In our research work we took in account the activity learning approaches (G. Andreeva, A. Leontiev, A. Petrovsky), personality-oriented pedagogy (E. Bondarevskaya, V. Serikov, I. Yakimanskaya); self-actualization humanistic psychology (K. Rogers, S. Frenet, E. Fromm,); technical education humanization processes (G. Mukhametzyanova, B. Nemensky); works on the foreign language communicative teaching theory and methodology of (E. Galochkina, G. Kitaygorodskaya, E. Passov) represent the theoretical and methodological basis of the study.

Humanistic pedagogy provides meaningful learning and personal development, encourages students to develop partnership and team cooperation. Therefore, it is important to give future specialists the opportunity to acquire positive communicative experience in the process of educational communication in foreign language learning.

The whole learning system is focused on the student’s personality and is to be built around his activities, experience, worldview, educational and extracurricular interests in communication. Students talk about their own deeds and actions, current events, learn to express their attitude to what is happening, justify and defend their own opinion. [2 p.62-64]. According to G.V. Mukhametzyanova the cognitive interest of students is largely stimulated by new, non-traditional forms, the teacher’s professional skill [3].

Higher school requires the teachers who are able to create conditions for harmonious intergroup interactions and cooperation between students in the educational process, for stimulating and initiating productive activities in the class, who can make up an individual program to implement the educational preferences and capabilities of each student.

The representative of humanistic pedagogy K. Rogers thinks that a teacher who accepts the inner world of students, behaves naturally and in accordance with their inner experiences and, finally, treats students kindly, thereby creating the necessary conditions to ensure and support their meaningful learning and personal development in general [4].

As for the humanistic psychology provisions about self-actualization revealed in works of Frenet and Fromm, affiliation is one of the necessary functions of a higher school. A creative outcome to the tasks is filled with personal meaning; it becomes the moving force of speech behavior, increases the student’s self-esteem [5, 14].

The result of dialogical communication is not only the foreign language acquisition, the students' readiness to participate in all forms of real communication, but also the need in group affiliation that is a person's need, which is manifested in the desire to be in constant contact with the fellow-students, as well as to establish and maintain positive relationships with them. How a person satisfies the need for affiliation determines his well-being, harmonious development and the level of the anxiety. Affiliation is the need for communication, for establishing and maintaining good relationships with people. For one who has a highly developed need for affiliation, good human relations with others are often more significant than other human demands, and for the sake of kind and trustful human relations, he is often ready to neglect the satisfaction of his other needs. Students develop this ability and need for partnership, the desire for the most productive and effective relationships. The traditional monologue teaching is being replaced by a developing one, built on the values of spontaneity, activity, and authenticity [6, 9, 13].

II. RESULTS

Learning on the competitive gaming principles with the extra points motivation implies changes in the form of learning: in the training environment, in teaching aids, in the teacher-student relationships. Teaching based on the intensification of communication between a teacher and students makes certain demands on the both sides. The presence of an emotional uplift, a surprise and a spirit of competition greatly enhances interest and consequently the efficiency of language material mastering, stimulates the processes of educational material memorizing (including involuntary). Thus, the level of anxiety, isolation, hostility - factors that negatively affect the mental health of both the individual and the society as a whole - is significantly reduced [7, 15]. The elaborated teaching technique based on the competitive gaming learning activities represents the communication process optimization between a teacher and students providing the way to enjoyable competitive training and creating conditions for close harmonious interactions inside the group. The special emotional atmosphere in class, the aspiration to win and get extra points raises students' motivation in learning.

Learning based on the competitive gaming principles with innovative training ways are combined with the lesson traditional elements. Each task relying on extra points motivation system contains intrigue, represents a part of competition and an excitement. Such an intrigue is:

- group, individual, team blitz tournaments;
- games similar to the popular Russian TV shows ("What, Where, When?", "Weak Link", "Field of Miracles", "Towards the Barrier", "Guess the Tune"; children games: "Tic-Tac-Toe", "Hangman", "Snowball", "Win-win lottery", Music gaming ("Guess the song title", "Music sitting room").

As an example the students take part in the music contest "Guess the song title" is one of the fascinating forms of gaming training activities that cause positive

emotions to control stress in the classroom. Selecting a song category from the presented list (Rock legends 70th, 80th,90th, Disco Hits70th, 80th,90th, the 21st century Hits, World Blues, Rock & Roll legends), the students call the song number from the presented lists, the teacher presents and plays it he also helps with the number of words and letters written on the board. Listening to the hit selected, students write variations of its title. For the right answer they get some extra points. The contest can be held both individually and in teams. The constant desire to win concentrates the students' mental abilities, creates emotional uplift in class. Friendly environment makes the students cope with shyness favorably affecting the learning results: language material is assimilated easily with joy and satisfaction. Training with competitive gaming are contests with doubts, insights and discoveries, with joy from cognition and knowledge lack dissatisfaction. The results are not only the language skills acquisition, but the students' emotional desire to participate in all forms of real group communication. They strive for the most effective relationships significantly reducing the anxiety and isolation rate - factors that negatively affect mentality, health, both of the individual and the society as a whole [7, p.61-69].

Unlike other game practices (role-playing, business games, etc.), competitive gaming keeps the content of educational activities unchanged, radically transforming the way of learning and accompanying the entire educational process. The result of such training is communicative, political, legal socialization of an individual; achievement of success, self-realization of a personality.

We carried out the diagnosis to determine the initial level of need for group communication among the students in the control and experimental groups (CG and EG) to represent the comparative results, using the "the need assessment for affiliation" questionnaire made up by R. S. Nemov [8]. We modified it making up the list of 50 judgments (for example: «I love to go to classes that are fun with games», «When I get extra points in class, I rather try not to show my feelings than try to share my joy with someone», «I would prefer independent work at the lesson», «When a foreign language lesson, I have fun, if even before I was upset» etc.) for the students indicate their agreement or disagreement with each statement using the proposed by us rating scale. Answers on this scale are offered from positive to negative points:

The amount of points is determined, and according to it, the degree of development of the affiliation is judged.

The learning methods were different in the CG and EG groups. Teaching the EG students was carried out on the basis of various competitive gaming active leaning forms and active means of educational activities with an extra points motivation factor, which made it possible to follow the intermediate results of the experiment according to the figures presented in the table.

Table.*The comparative results of need assessment for affiliation in CG and EG groups*

Affiliation\ level	CG		increased (+) or decreased (-)	EG		increased (+)or decreased (-)
	before	after		before	after	
	experiment			experiment		
high	24%	27%	+3%	18%	28%	+10%
average	30%	28%	- 2%	41%	42%	+ 1%
low	46%	45%	- 1%	41%	30%	-11%

The quantitative indicators in the levels of group affiliation in the CG and EG groups before and after the experimental training show significant positive changes for team affiliation in the experimental group and no substantially significant differences are observed in the control group for same period of time.

III. CONCLUSIONS

The competitive gaming technology involves all the students in the learning process, as it uses the following elements: dynamics; feeling of belonging and contribution to a common aim process; motivation; concentration and retention of students' attention; group interaction; constant receipt of feedback from the teacher or from groupmates, providing an opportunity to get an assessment of their actions and correct them if a mistake was made.

The EG students overcame certain psychological barriers and the stiffness that were at the beginning of the training. Classes in the experimental groups were held in an atmosphere of a competitive event. During the lesson the team spirit, the desire to win and get extra points promote the students' increased educational activity, the manifestation of the group solidarity and mutual assistance. All the students were active participants in learning, some of them compensated for the lack of language skills by the organizational skills manifestation.

The special emotional atmosphere in class, the aspiration to win and get extra points raises students' interests and motivation in gaining language skills and eliminating the main causes of xenoglossophobia. It resulted in harmonious inter-group interactions.

The results of the work can be useful for the higher school education to train professionals who are confident in their abilities and aspirations, ready to create friendly trusting team relationships, to cooperate and communicate with foreign partners at ease. Some training ways, special lexical and grammar drills in verses and lyrics on the competitive gaming principles are recommended at the lessons in colleges and universities, as well as at extra foreign language courses.

Learning on the competitive gaming principles with an extra points influences the students' stable motivation growth and their increased interest in learning English, both in class and in the extra- curricular activities.

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现代英语广告语篇：形成与发展的起源

**MODERN ENGLISH ADVERTISING DISCOURSE: THE ORIGINS
OF FORMATION AND DEVELOPMENT**

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摘要。 本文专门讨论英语广告话语，特别是其发展和形成的阶段。对广告语篇的研究可以帮助理解广告的符号学本质及其对社会的影响，扩大对英语文化和语言手段的理解。广告话语被认为是一种在务实、社会文化、心理上相互联系并通过大众传播媒体表达的口头或书面文本，具有许多重要的社会和经济功能：吸引人、评价性、信息性、代表性、表达性。除此之外，英语广告话语一直在不断发展，从基本符号开始，到现代互动个性化广告结束，使用全新的技术和语言工具，文章中提供了示例和解释。

关键词：广告语篇、英语语言、商业广告、广告口号、英语广告语篇史。

Abstract. *The article is devoted to the English advertising discourse, and in particular, the stages of its development and formation. The study of advertising discourse makes it possible to understand the semiotic nature of advertising and its impact on society, to expand the understanding of English-speaking culture and the means of language. Advertising discourse, considered as an oral or written text that is pragmatically, socioculturally, psychologically connected and expressed by mass communication media, performs a number of important social and economic functions: appealing, evaluative, informative, representative, expressive. Among other things, the English-language advertising discourse has been constantly developing, starting with elementary signs, ending with modern interactive personalized advertising, using qualitatively new techniques and language tools, examples and explanations of which are presented in the article.*

Keywords: *advertising discourse, the English language, commercial advertising, advertising slogans, the history of English advertising discourse.*

Currently, English advertising discourse plays a significant role in the modern world, being an integral part of the commercial sector and public information exchange. The emergence of new technologies and the expansion of the global Internet have led to the emergence of a variety of advertising platforms and strategies

aimed at the English-speaking audience. At the same time, the modern English-language advertising discourse is actively evolving, adapting to production and consumer changes in society.

It should be noted that the study of advertising discourse makes it possible to understand the semiotic nature of advertising and its impact on society. Advertising identifies, creates and modifies the values, attitudes and perceptions of society [5, p. 436]. It forms images, creates associations and stimulates the need for certain products or services. The study of discourse helps to understand how mass media and advertising campaigns manipulate people's perceptions, influence their choices and behavior.

In addition, the study of modern English-language advertising discourse is an integral part of the study of the language and culture itself. As A.K. Shevtsova notes, advertising is an important aspect of modern culture and can be considered as a reflection of socio-cultural trends and values [13, p. 118]. In turn, the study of discourse helps to expand the vocabulary, as well as to understand the features of the language tools used in advertising, which allows you to improve communication skills and adapt to the English-speaking advertising context.

Initially, the concept of "discourse" had no terminological prerequisites and meant speech as a whole, or text. However, E. Benveniste in his work "General Linguistics" assigned this concept a specific terminological meaning [11, p. 9]. He defined discourse as a socially conditioned organization of speech using principles, a system of signs that are implemented in the language. However, the term "discourse" was fixed in linguistic theory only in 1952 in the article "Discourse analysis" [11, p. 10].

N.D. Arutyunova defines "discourse" as "a coherent text in combination with extra linguistic factors – pragmatic, socio-cultural, psychological and other factors" [11, p. 12].

P. Serio also identified a number of interpretations of this term, one of which is: "the impact of an utterance on its recipient, taking into account the situation of the utterance (within the framework of pragmatics)" [11, p. 10].

Indeed, the main function of discourse within advertising is to influence the reader or listener. In other words, advertising discourse has a significant impact on the formation of attitudes and opinions of a certain audience, determines consumer behavior [13, p. 120]. From this follows the definition of "advertising discourse" by E.Y. Ilyinova considers advertising discourse as a specific form of communication, which is based on the use of advertising strategies and techniques to promote goods, services or ideas [7, p. 6].

Y.M. Mamoginskaya considers "advertising discourse" as an oral or written text that is pragmatically, socioculturally, psychologically connected and expressed by mass communication media [5, p. 439].

In addition to the main influencing (appellative) function, advertising discourse performs other functions. The most complete classification of them was presented by L.A. Kochetova:

- 1) informative – transmission of a message about a service or product;
- 2) representative – description and predication of product characteristics;
- 3) value — determining the values of a particular social group through direct or indirect influence;
- 4) expressive – attributing a positive assessment to a product using stylistic means of language [8, p. 79].

Now, let's give the outline on the history of the development of the English advertising discourse, which can be divided into several stages.

The initial stage (before the XIX century). At this stage, the advertising discourse was limited to elementary forms of communication such as signs, ads written by hand on paper [2, p. 93]. Advertising messages were simple and unstructured, and did not have the complexity of modern advertising discourse [1, p. 202]. For example, the phrases on the signs “books for sale”, “buy horses”.

Development of print media (XVIII - early XX century). The English-language advertising discourse in the format in which it exists today began to develop only at the end of the XVIII century along with the Industrial Revolution. With the development of print media (newspapers, magazines), advertising began to develop in a new format. At this time, the first advertising agencies appeared, which were engaged in the creation and placement of advertisements. Advertising texts have become more complex and purposeful, using psychological techniques [12, p. 72].

A striking example of the English-language advertising discourse of this stage can be considered the slogan of advertising a new kind of soap “**The skin you love to touch**” in 1773, which proves that the advertising discourse of the XVIII century is gradually becoming more liberated and addresses previously “forbidden” topics, such as the private life of the consumer.

In addition, the English-language advertising discourse began to influence the feelings of consumers. So, in the advertisement of the soap company “B.T. Babbitt’s” in 1776, the slogan “**Soap for all nations. Cleanliness is the scale of civilization**”, accompanied by a visually stereotypical drawing of the founder’s father carrying soap. This inspires buyers, pride in their country, so they will buy their soap - a clear evidence of a patriotic perception of the product.

By 1896, the English advertising discourse started to use linguistic (rhetorical questions, epithets, metaphors, etc.) and visual techniques (large font, register, etc.) [12, p. 75]. For example, the advertising of the bicycle company “Primley Bicycle”: at first, the consumer pays attention to the rhetorical question “**Do You Want a Wheel?**”. So, in order to get the answer, the buyer will scrutinize the poster.

In addition, the English-language advertising discourse is becoming more aggressive. For example, the London advertising of tea “Lipton’s Teas” in 1897, which literally brings down on the buyer the advantages of products in the format of drawings: “**LARGEST SALE IN THE WORLD**”, “**APPRECIATED FOR THEIR DELICIOUS FLAVOR EVERYWHERE**”, “**DIRECT FROM THE GARDENS**”, “**BY SPECIAL TO HER MAJESTY QUEEN APPOINTMENT**”, “**FROM SUNNY CEYLON**”. However, it is worth noting that the price of the tea itself is not graphically highlighted so that the buyer is first interested in the products.

The emergence of advertising in electronic media (mid-XX century). With the advent of radio and television, the English-language advertising discourse has received a new scale of development. Advertising texts began to be accompanied by sound and video effects, which made it possible to diversify advertising, it became more attractive and memorable.

In the early 1950s, an Independent radio appeared in the UK, which in the future would become the world-famous BBC corporation [9]. By 1985, the number of radio stations in the UK had grown to 50: the same station could address two different groups of people, thus increasing not only the number of listeners, but also reaching more consumers by geographical and demographic criteria. However, it was difficult to call radio advertising profitable, which is due to its locality, as well as the specifics of the radio stations themselves, on which advertising messages were practically not broadcast [6, p. 104].

The advertising discourse has “adapted” to the new ways of transmitting messages, namely auditory. Advertising messages have become short, challenging and with musical accompaniment. For example, in 1993, the BBC advertised its news program with the slogan “**You give us 22 minutes, we’ll give you the world**”. The slogan includes hyperbole, indicating that in 22 minutes the listener will know the news of the whole world. Naturally, this is not true, but it has a positive effect on the listener.

In 1959, on January 29, an advertisement for the Colonial Store appeared on London radio, which sounded like this: “**Well, you know, there is no place like home, and for your home there is no place like the wonderful home center at the new Colonial Store.**” The ad repeats the phrase “there is no place”, creating a concise description for a new store that will be associated with the house, that arouses consumer’s interest and desire to visit it. Let’s highlight that the proverb **There is no place like home** appears in its modified version, with the inclusion of emotionally-colored **wonderful** and **center** units.

The 1960 Pepsi soda advertisement clearly shows how the advertising discourse began to strive for conciseness and brevity, which is due to the high, at that time, cost of advertising on the air in England.

The slogan of Pepsi soda “**your any place every place where Pepsi is served**”, designed for an adult audience, inspires the buyer that carbonated water is something esteemed, prestigious, appealing to self-respect and authority.

As for television advertising in Britain, its development began in the 1950s. Early commercials were quite different from those with which we are familiar today [6, p. 110]. Of course, they were black and white, like all television from the very beginning. But they were also much longer, more unnatural and more brightly lit, and the advertising discourse itself was presented with excruciating slowness. All in all, they looked like a moving newspaper advertisement [6, p. 112].

For instance, the very first television advertisement for washing powder “Persil” was actually adapted from their posters, where dancers and sailors were dressed in different shades of white, and the announcer assured: “Persil washes whiter. That means cleaner”, that had a huge impact on the “white” consumer during the time of segregation in England.

This style was partly the result of the British lack of experience in television advertising. However, more importantly, this was due to the fact that the British television industry was concerned about not looking too American [6, p. 116].

Until the 1970s, the English-language advertising discourse was aimed at proving to the buyer why a particular product should be purchased [6, p. 118]. For example, an advertisement for Piccadilly cigarettes showed a rich and successful man lighting a cigarette and winking into the frame, then the laconic and memorable phrase “**Buy Piccadilly, buy new life**” appeared on the screen.

The development of online advertising and social networks (recent decades). With the advent of the Internet and social networks, there is a great opportunity for the development of advertising discourse. Advertising has become personalized, analytics allows you to more accurately identify the target audience and customize advertising to its needs. In addition, the modern English-language advertising discourse is becoming more and more interactive. The development of advertising games, voice assistants, chatbots and other interactive elements allow communication participants to become active participants in the advertising process [7, p. 12].

Modern advertising is also inventive in the use of various linguistic means. For example, E.A. Nikulina and V.A. Yakovleva consider the use of onomatopoeia (sound imitation) in advertising and cites as an example the advertising slogan of breakfast cereals “Rice Krispies” “**Snap! Crackle! Pop!**” [9, p. 273].

Another striking example of the use of onomatopoeia in modern English-language discourse, which is cited in the above-mentioned research, is the advertising of cars of the Jaguar brand: “**Purr-fect Storm**”. In this case, the onomatopoeic feature of cats to purr is attracted, attracting buyers who would like their car to “purr” [9, p. 275].

All in all, it is possible to trace the history of the development of the English-language advertising discourse, that has been developing for several centuries, starting from simple units and phrases, and ending with the possibility of using whole sentences, video sequences, various types of multimodality. In the future, a more thorough study of advertising slogans is expected from the point of view of etymology, lexical content and metaphorical peculiarities of advertising slogans.

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现代英汉文学中的新拟人论: T.S. 艾略特和老舍的猫
**NEW ANTHROPOMORPHISM IN MODERN ENGLISH AND
CHINESE LITERATURE: T.S. ELIOT'S AND LAO SHE'S CATS**

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抽象的。 本文致力于在查尔斯·罗伯特·达尔文的杰出著作《通过自然选择论物种起源,或在争取生存的斗争中保护受青睐的种族》中所提出的思想和理论的影响下,英汉文学动物研究的发展。 “生活”。 它探讨了科学研究如何激发人们对某些主题、人物的兴趣,并塑造新型的人与动物交流。 研究材料包括两篇发表于二十世纪三十年代并经过比较分析的文本: T.S. 的《老负鼠的实用猫之书》(1939)。 艾略特和老舍的《猫国》(1932)。 这些动物文本被放在一起考虑,不仅因为它们的猫科动物角色的拟人化特征,而且因为作者努力强调它们的角色所代表的社会和文化背景。

关键词: 动物研究、老舍、T.S. 艾略特, Ch.R. 达尔文, 拟人论, 文学中的猫。

Abstract. *The article is devoted to the development of English and Chinese literary animal studies under the influence of ideas and theories presented in Charles Robert Darwin's outstanding work "On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life". It examines how scientific research can stimulate interest in certain themes, characters and can shape new types of human-animal communication. The research material includes two texts published in the thirties of the twentieth century, which have been comparatively analysed: "Old Possum's Book of Practical Cats" (1939) by T.S. Eliot and "Cat Country" (1932) by Lao She. These animalistic texts are considered together not only because of anthropomorphic features of their feline characters but also due to the authors' endeavour to emphasize the social and cultural contexts in which their characters are represented.*

Keywords: *animal studies, Lao She, T.S. Eliot, Ch.R. Darwin, anthropomorphism, cats in literature.*

Introduction

The brilliant work “On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life” by the English scientist Charles Robert Darwin was published in 1859 and immediately created an incredible sensation, first in England, and then in other countries around the world. A new view of nature in this famous work has greatly contributed to the creation of a favourable environment for the emergence of new forms of artistic understanding of nature, man and the animal world. The American researcher William Irvine, in his article entitled “The Influence of Darwin on Literature”, written about the centenary of “The Origin of Species”, observes: “*Literature has ceased to be much preoccupied with Darwin himself, but it is deeply preoccupied with a world which he, as much as any man, has brought about*” [1, 628].

Darwin’s evolutionary theory revolutionized not only the understanding of human nature, but it redefined the human-nature relationship, allowing the animal to become a full participant in that relationship. Anthropocentrism was seriously challenged by Darwin’s discoveries, as they implied that a homo sapiens is the product of the same natural selection process that created all other species. This undoubtedly led to changes in animal images in literary works.

Not only Darwin’s revolutionary scientific ideas, but also his style of presentation, his simple figurative language, and his poetry of the natural world also contributed to the influx of popularity of literary animal studies at the turn of the 19th and 20th centuries. English literature of this period is rich in new themes, plots, real and fantastical animalistic images inspired by Gothic novels and horror literature (for example, “The Beetle: A Mystery” (1897) by Richard Marsh), parallel imaginary worlds, inhabited by intelligent animals which can speak and so on. One of the brightest English animal fiction works of this period are “The Jungle Book” (1893) by Nobel laureate Rudyard Kipling and the fabulous story “The Wind in The Willows” (1908) by Kenneth Grahame.

The popularity of Darwin’s work spread far beyond England, the author’s homeland. In particular, there was a surge of interest in animal studies in the literary life of China in the first half of the 20th century. The earliest Chinese translation of “The Origin of Species” – “Wuzhong Qiyuan” (“物种起源”), by Ma Junwu (马君武), was first published only in 1903. However, researchers argue that Darwin’s work has made success in Chinese society. Looking through the Chinese translations of “The Origin of Species” and taking into account the socio-political background of China at that time, James Pusey in “China and Charles Darwin” [4] highlights the great influence of the ideas of evolution on China in the early 20th century.

One of the first to introduce Western scientific achievements to Chinese was Yan Fu, an ideologist of reformation, who popularized Darwin’s sensational work

in China. In 1895, he published an essay “Yuanqiang” (“原强”) in the newspaper “Tianjin”, which revealed conceptual issues of “The Origin of Species” considering Chinese reality.

Emphasizing the influence of “The Origin of Species” on China, Chen Dun and Liu Xiangyu point out that “*Chinese modern literature would be different without Theory of Evolution*” (here and further all quotations are translated by the author) [8]. The Chinese translation of the most important Western empirical research in the natural sciences, as well as the subsequent changes in Chinese society, have influenced, among other things, genre specificity, character system, and artistic and philosophical component of new literary works. Evolutionism has manifested itself in literary texts via new forms and methods for animal-human identification, endowing animals with anthropomorphic features and social status.

Methods and Research

The image of cat has been widespread both in English and Chinese literature of the early 20th century. This factor caused the choice of the research material, which includes two texts: “Old Possum’s Book of Practical Cats” (1939) by Thomas Stearns Eliot and “Cat Country” (“猫城记”, 1932) by Lao She. Although these works belong to different literary genres: prose of Lao She and poetry of Eliot, they have been sampled deliberately. Apart from the fact that these texts were published approximately at the same time and their main characters are cats, one of their distinctive features is the anthropomorphic nature of feline images, which is undoubtedly influenced by Darwin’s theory. In the course of comparative analysis, the literary-historical and linguo-cultural methods were used. The relevance of the article is due to the growing interest in literary animalism in general, and to T.S. Eliot’s and Lao She’s works, in particular.

The action of the Lao She’s satirical pamphlet takes place on Mars, which is inhabited by the civilization of the Cat people. The protagonist, an earthling who is captured by mysterious creatures, describes the features of their society, which has fallen into decay due to the cultivation of reverie trees. Lao She in his memoirs “How I wrote “Cat Country” “ (“我怎样写“猫城记” “) emphasized the random choice of the cat image and explained it by picking up a ginger white-spotted kitten on the street: “*My Cat city is a Cat city by accident. If I had brought a rabbit that day, a catman would probably have become a rabbitman, although the catman and the rabbitman would certainly have been equally bad*” [6].

As opposed to Lao She, T.S. Eliot’s choice of feline characters for his book of poems was not fortuitous. According to biographical facts, cats accompanied T.S. Eliot throughout his life as pets. He gave them whimsical names and they often became the subject and object of his poetry. “Old Possum’s Book of Practical Cats” is a kind of encyclopedia, which consists of 15 poems and portrays 13 representatives of different strata of cat community. Eliot falls back on anthropomorphism

to create positive animal images in his poetic texts, playfully blurring the lines between two different species (a human and a cat).

The specificity of the cat images in Eliot's book is based on a phenomenon that provides the insights into their external and internal characteristics, their lifestyle, social background, traditions, customs and stereotypes – “Englishness”. In order to understand the English nature of Eliot's cats, it is necessary to realize that it is impossible to create a literary work without a particular worldview. Creating his literary world, the author identifies or contrasts it with the world where he exists himself. The world of the modernist poet T.S. Eliot was a post-Darwinian world where animal literal images were viewed differently in comparison with pre-Darwinian world.

To prove that anthropomorphism is the essential part of the feline image in Eliot's and Lao She's texts, we compare such aspects as appearance and toilette, speech, gender, eating habits and habitat of their characters.

The characters of “Old Possum's Book of Practical Cats” are mostly representatives of the middle class of English society of the Victorian era. This assumption is based on many factors, one of which is the cats' toilette. For instance, Bustopher Jones in “white spats” personifies the image of the English dandy, socio-cultural type, which was especially popular in the 19th century. Bustopher Jones is distinguished-looking and he stands out in the crowd of cats: “*In his coat of fastidious black: / No commonplace mousers have such well-cut trousers / Or such an impeccable back*” [5, 27].

Unlike Eliot, who dresses his cats in human outfits, Lao She tends to emphasize the “inhuman” in his characters, the victory of the “animal” in the “human-animal” dichotomy. That is why the inhabitants of Cat Country do not wear clothes. The author constantly emphasizes their untidy, dirty look, unworthy of man. Observing the lifestyle and habits of cat people, the narrator expresses anxiety and reluctance to become “half-alive” like them [3].

One of the crucial characteristics of anthropomorphism is speech. Both Eliot and Lao She portray cats that can talk. The only cat able to speak in Eliot's book of poems is Morgan. As the anthropologist K. Fox notes, speech is the first thing that can reveal social identity: “*All English People, whether they admit it or not, are fitted with a sort of social Global Positioning Satellite computer that tells us a person's position on the class map as soon as he or she begins to speak*” [2, 101]. Morgan's speech is as illiterate as a lower class person's speech. The author expresses this with the wrong spelling (“sich”, “horgan”, “jist”), apostrophes replacing consonants (“e's got”, “'igh” “'art”), the use of slang and incorrect grammatical forms (“'ain my”, “me” instead of “my”, “meself” instead of “myself”) [5, 30].

The cat people in Lao She's book are cunning, ridiculous and ignorant. Intoxicated with their ancient culture and once prosperous civilization, they have de-

generated. Their schools and universities, museums and libraries are dilapidated. Their education system is bizarre: they get a degree the day they enter university. That is why the country ranks first on Mars in the number of people with higher education. Moreover, the narrator points out that a cat language consists of about five hundred words only, and usually cat people can write no more than twenty signs. He sarcastically observes that in three days he has been able to speak cat language and illustrates it reciting a poem written by his cat-friend Scorpion: “*Precious leaf, precious flower, precious mountain, precious cat, precious belly...*” [7, 32]. Thus, the author demonstrates poor speech characteristics of cat people and his mocking tone is obvious.

The authors’ attitude to gender issues is reflected in the ratio of male and female personalities. In “Old Possum’s Book of Practical Cats” the masculinity dominates. Female images are typical of the 19th - early 20th centuries and represent two extremes: the embodiment of the ideal woman (Gumbie Cat is a mother, a housewife) and the embodiment of vice and sin (Griddlebone is Gumbie’s antipode, London prostitute).

Masculine images of cats in T.S. Eliot’s poetic book also emphasize the specifics of gender development in the Victorian era. In contrast to the scant set of female roles, the roles of men were diverse. Poems depict masculine characters in war, at work, in places of entertainment and leisure, they are free to walk wherever they like, etc.

Similar gender stereotypes and representations of the era can be found in Lao She’s work. In the cat city, views about the subordination of women in society have been entrenched for centuries. The essence of a woman’s sociocultural status is exemplified by two female characters. One of them is an envoy’s wife, who was forced to make ends meet and assume responsibility for her husband’s concubines after his death. The second one is Revery (迷), the mistress of Young Scorpion. This character was created by the author to show that the relationship between men and women is based solely on fornication. Revery tells to Young Scorio: “*When you fall out of love with me, I will eat 40 reverie leaves and die*” [7, 105]. This female character represents the gender stereotype – women cannot do without men. Lao She, like T.S. Eliot, shows a society where women have an extremely limited range of opportunities to develop professional and personal potential.

The next feature of anthropomorphism in the cat images can be traced in their gastronomic preferences. T.S. Eliot’s cats are gourmets: Bustopher Jones knows where the best winkles and shrimps are served, where to look for delicious venison and mutton, curry and rice pudding; Gus, the theatre cat enjoys drinking gin. In the poem “Mungojerrie and Rumpelteaser” the reader gets the opportunity to get acquainted with some dishes of traditional British Sunday dinner: “*When the family assembled for Sunday dinner, / With their minds made up that they wouldn’t get thinner / On Argentine joint, potatoes and greens*” [5, 15].

Describing the eating habits of the cat people, Lao She again focuses on the inhuman features of the Cat city inhabitants. The narrator draws attention to the single food of a cat civilization on Mars – reverie leaves (迷叶), which has influenced the entire history of this fictional state. “Inhuman” food along with “inhuman” appearance and “inhuman” speech manifest the triumph of animal and demonic, triumph of the absurd over the reasonable.

T.S. Eliot’s and Lao She’s cats are inseparable from the urban context in which they exist. The city of London is a natural habitat for feline characters of “Old Possum’s Book of Practical Cats”. Description of the houses where cats live, their rooms and furniture helps to recreate the domestic atmosphere in the best traditions of Victorian England. Many of the locations mentioned in the text are directly related to the life of T.S. Eliot: these are the places he visited, where he worked, the addresses of his friends. For example, a poem “Growltiger’s Last Stand” is packed with proper names such as “Molesey”, “the Bell”, “the Lion” which describe the Hampton-on-Thames district, where Eliot’s close friends, the Tandy family, lived. The majority of poems in the book was dedicated to them. Victoria Grove, Cornwall Gardens, Launceston Place, Kensington Square are mentioned in the poem about Mungojerrie and Rumpelteser. There, at Emperor’s Gate, T.S. Eliot rented rooms in April 1937 (the poem was written the same year, in October). The toponyms not only form the chronotype of the text (modern elite areas of London and its environs), but also endow the characters with specific features. To a certain extent, the cats of T.S. Eliot follow the city routes of their creator. The use of the names of real streets and establishments in London allows the author to blur the line between the real and fictional worlds. For an Englishman, these proper names evoke a number of specific associations and make the reader believe that the characters and events in the book are real.

The Cat city in Lao She’s book is as fantastic as its characters, who are devoid of human qualities but at the same time resemble humans physically. Unlike the text of T.S. Eliot, which contains allusions to real places, streets and cities, the fully fictional world of Lao She has no references to the urban space and attractions of China. However, in the contour of a fantastic Cat city one can recognize China in the 1930s. Lao She depicts China the way he saw it when he came back after his life in England. When the narrator in his book first arrived in the Cat Country, he exclaimed: “*Having seen the city of Cats, I do not know why, but the thought came to my mind: this civilization is about to die*” [7, 67]. The author’s own concern for the fate of China can be clearly seen in these words.

Conclusion

T. S. Eliot’s and Lao She’s cats represent a model of human-animal relationships based on a new approach to animals, influenced by Ch. Darwin’s theory, which stopped the presumption of human superiority over animal. The cats of

T.S. Eliot are personalities endowed with attractive human qualities and worthy of love and worship. The Lao She's feline characters are extremely unattractive and amoral. Lao She, unlike T S. Eliot, emphasizes the inhuman and immoral traits of Cat people, while T.S. Eliot highlights human qualities of his characters (their toilette, speech, eating habits and habitat). The animal images of "Old Possum's Book of Practical Cats" and "Cat Country", presented in this perspective, helped their authors to address issues that were of concern to them: moral, humanity, gender, and many others.

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中国现代语言文化中“仁人”概念层的内容特征
**FEATURES OF THE CONTENT OF THE CONCEPTUAL LAYER
OF THE CONCEPT 仁人 HUMANE PERSON IN CHINESE MODERN
LINGUISTIC CULTURE**

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抽象的。 本文致力于研究现代汉语语言文化中“仁人”概念层内容的特殊性。 论文的目的在于对语言文化概念“仁人”概念层的内容进行识别和分层,包括识别其基本概念特征。 该研究基于定向语言实验的材料,其中要求受访者就给定主题写小论文。 该实验涉及 156 名年龄在 18 岁至 22 岁之间的中国大学生。 用于分析的材料量为 305 篇小论文。

关键词: 语言实验、语言文化概念、人性化的人、心理语言文化学、小论文。

Abstract. *The article is devoted to the study of the peculiarities of the content of the conceptual layer of the concept 仁人 HUMANE MAN in modern Chinese linguistic culture. The purpose of the work is to identify and stratify the content of the conceptual layer of the linguocultural concept 仁人 HUMANE MAN, including identifying its basic conceptual features. The study is based on the material of a directed linguistic experiment, in which informants were asked to write mini-essays on a given topic. The experiment involved 156 Chinese university students aged 18 to 22 years. The volume of material used for analysis was 305 mini-essays.*

Keywords: *linguistic experiment, linguocultural concept, humane person, psycholinguculturology, mini-essays.*

In modern linguoculturology, the idea of heterogeneity, “multi-layeredness” of the structure of a concept is firmly established [Vorkachev, 2004; Karasik, 1999; Slyshkin, 2004; Stepanov, 2004]. In this study, we rely on the proposal proposed by V.I. Karasik’s three-layer structure of the concept [Karasik, 1999: 39], which includes figurative, value and conceptual layers. Thus, the conceptual layer in this work is understood as “the set of essential features of an object or situation and the result of their cognition” [Ibid.].

To analyze the content of the conceptual layer of the concept “HUMANE PERSON,” materials from a linguistic experiment were used, in which speakers of Chinese linguistic culture had to write a mini-essay on the topic “My opinion about a humane person.” The experiment was conducted in a distance format among Chinese students studying at Chinese universities (Northwest University of Nationalities; Sichuan University of Foreign Studies; Lanzhou University; Lanzhou University). 学 Heilongjiang University; 兰州理工大学 University of Technology Lanzhou; 北京航空航天大学 Beijing Aviation and Astronautics University; 沈阳大学山 Shenyang University). A total of 156 native Chinese speakers took part in the experiment. The volume of material used for analysis was 305 mini-essays in Chinese.

Analysis of the data obtained made it possible to identify basic conceptual features in its content, which are presented below in order of frequency of occurrence (from more frequent to less frequent):

a) one who acts for the benefit of his country and society: 于律己，宽以待人，“慎独”“吾日三省吾身”等等的人。同时心怀家国大义。有“为天地立心，为生民立命，为往圣继绝学，为万世开太平”的道德追求和理想的人。 *He is able to put public interests above personal interests, <...> he has a high sense of duty to his family and the state. This is a person who has a moral aspiration and ideal of “creating a virtuous world and a quiet life for people, inheriting the knowledge of the past and creating peace for all generations”* (student SHU, female, 18 years old); A humane person is a person who is forgiving and merciful in life, treats others sincerely and kindly, **contributes to society** (student SZUDN, woman, 19 years old);

b) one who is demanding of himself and strives for self-improvement: 能够做到克己奉公，严于律己，宽以待人，“慎独”“吾日三省吾身”等等的人 <...> *He is capable put public interests above personal ones , be strict with yourself and lenient with others, take care of yourself even when alone with yourself, indulge in self-reflection every day, etc.* (student TUL, female, 21 years old); <...> 该向着该方向努力 *If you have already reached the level of a humane person, then you need to be more strict and demanding of yourself. If you haven't achieved it yet, then you need to work hard at it* (student UL, m., 19 years old);

c) one who loves other people and nature: 人人和善。即使别人伤害了自己，也不会想着用 *A humane person is a person with a kind heart who loves everything that exists, will not voluntarily destroy living things, knows how to be modest and is friendly in dealing with people. Even if another hurts him, he will not think of revenge with hatred, but will forgive him* (student of SHU, m., 21 years old).

Analysis of the obtained contexts allows us to conclude that for modern speakers of Chinese linguistic culture, a humane person not only embodies the primordi-

al Confucian property of “loving people,” but is a true patriot of his country, who constantly strives for self-improvement for the benefit of his society.

During the experiment, the subjects, describing a humane person, used various means of language, including quotations from Confucian canonical texts, for example: “夫仁者，己欲立而立人，己欲达而达人” *A humane person is one who improves himself and helps others in this (“Lun Yu”). A distinctive feature of the obtained characteristics is their extremely positive coloring. In cases where recipients could not clearly formulate their opinion, they described their feelings. They perceive a humane person as a “good person”, a “positive image”, they indicated that they “experience joy and good feelings” when thinking about him: 种种美好，闻之便心生喜悦与好感，而要我总结，我却只能说出其十分之一二，“仁人”是好是智者，是受深受大众喜爱的正面形象 Some things can only be understood, but cannot be expressed in words, such as “a humane person.” I know the beauty of it, and I feel joy and good feelings when I hear it. But if I have to summarize what it is, I can only say one or two tenths of it. A humane person is a **good person**, a wise person and a **positive image**, loved by the public (student SZUDN, m., 21 years old).*

We also find contexts in which the behavior of a humane person is interpreted as unambiguously “good”, “correct”, for example: 仁人即有德行，品行端正的人 *A humane person is a person who is virtuous and has good behavior (student SHU, female, 20 years).* An indication that the actions of a humane person are clearly positively assessed by modern speakers of Chinese linguistic culture is also found in the following contexts: <...> 习和思考一些新的东西 *Humane people are always respected in the world, and people are always ready to follow their example and think about something new (student SZUDN, female, 19 years old); 这是我们应该学习的榜样 This is the one we need to follow as an example (student She, female, 18 years old).* Based on the data obtained, we can conclude that it is necessary to strive to achieve this state. At the same time, in some texts, speakers of Chinese linguistic culture separately note that it is “difficult” to be a humane person, but: <...> 善——实践仁德。也就是说，人们通过对文献和礼仪的学习，以及在日常具体具体事务上的历练， *It is difficult to be a truly “humane person,” but everyone can do good little by little at any time and in any place - by practicing humanity. That is, people can gradually achieve or approach the state of “ren” through the study of literature and etiquette, as well as experience in everyday concrete affairs (student SUYA, m., 20 years old).*

The obtained empirical material allowed us to draw a conclusion about the moral and ethical qualities characteristic of a humane person. First of all, the high level of moral ideals of a humane person is clearly assessed. To illustrate, let's look at the following examples: 求的样子 <...> *When we say “humane person,” we certainly think «a man with high ideals.» A humane person is a virtuous per-*

*son, and this is what we should strive for most (student KhU, m., 21 years old); A humane person is a **virtuous** and well-behaved person (student TUL, m., 19 years old). A humane person is also characterized by the manifestation of other moral qualities, states of mind, socially approved actions and deeds:*

a) kindness: 和, 热爱自然 *When I say “humane man,” I think of a noble man. A humane person, that is, a noble man, must think well, **be kind to others**, be friendly and love nature (student UL, female, 20 years old);*

b) friendliness: <...>他人慈爱友善一视同仁, 这有利于个人品质提高和社会稳定 <...> *In my opinion, **this means you need to be friendly to other people, “treat other people’s old people and children as your own.” True friendliness and love, equal care towards all people help to improve a person’s personal qualities and the stability of society** (student SHU, m., 21 years old);*

c) empathy, a humane person puts himself in the place of others: <...> *Then, you need to pay attention to the influence of external factors. Finally, you need to **learn to put yourself in the place of others**, learn to love others. We must try to become a humane person (student SUYA, m., 18 years old);*

d) consciousness: 达到“仁”的境界的根源在于自己如何去做, 而不是由他人来推动, 只有主体自己的主动追求, 才有可能达到“仁”的理想境界。表明孔子认为“为仁”的要求 <...> *The ideal state of “ren” can only be achieved through the subject’s own active desire. This shows that Confucius believes that **«being humane» is a kind of conscious internal emotional behavior that no person can replace. Only if the attitude is correct, the “ren” requirement can be realized** (student SUYYA, female, 19 years old);*

e) inflexibility and inner strength: 仁人就是一个不受外界影响的有着中庸思想的人, 善良博爱, 不会对外界充满敌意, 反而事事感激 *A humane person is a person **who is not influenced by the outside world and has thinking in the spirit of the “golden mean”**. Kind and brotherly, will not be hostile to the outside world, but is grateful for everything (student SZUDN, female, 20 years old);*

f) justice: 一个有仁德的人能够站在公正立场上, 明辨好人与坏人, 近贤者, 厌恶小人, 远离小人 <...> *A person with humanity can **defend justice** and clearly distinguish good people from bad people, get close to wise men, hate vile people and stay away from them (student TUL, m., 18 years old).*

In addition to characterizing the moral qualities of a humane person, in the respondents’ responses we also find examples of verbalization of the conceptual attribute “has wisdom and knowledge”: A humane person must have a sense of duty, a person love, this a very wise person (student of SHU, female, 18 years old); 提到“仁人”我想到的是君子。一个仁人, 即一个君子, 应当善于思考, 与人为善, 待人亲和, 热爱自然 *When I say “humane man,” I think of a noble man. A humane person, that is, a noble man, **must think well**, be kind to others, be friendly and love nature (student UL, m., 21 years old). At the same time,*

recipients point to Confucius as the standard of the sage: 个所谓的“仁人”。仁人，即为有德行的 <...> *A humane person is either an educator or a thinker, but in the heart of the Chinese people, Confucius can be called the so-called “humane person”.* *A humane person is a decent person. Decent here refers not only to moral behavior* (student XU, m., 21 years old).

In several cases, the recipients’ responses contain an indication that it is typical for a humane person to “hate” and “shun vile people”: 者，厌恶小人，远离小人 <...> *A person with humanity can defend justice, clearly distinguish good people from bad, get close to wise men, hate vile people and stay away from them* (student SUYA, m., 20 years old).

Thus, the analysis of empirical material made it possible to identify the specific content of the conceptual layer of the linguocultural concept 仁人 HUMANE MAN. During the study, it was found that in the conceptual layer of the concept three basic features are distinguished: one who acts for the benefit of his country and society; one who is demanding of himself and strives for self-improvement; someone who loves other people and nature. The study of empirical material also made it possible to establish that the content of the conceptual layer of the concept also contains signs that can be verbalized through the following expressions: the one whose behavior is interpreted as unambiguously “good”, “correct”; one who does his job well; one who has high moral ideals; one who has wisdom and knowledge; one who is characterized by the manifestation of other positively assessed moral qualities, mental states, as well as socially approved actions and deeds.

The prospect of further research is to study the figurative and value layers of the linguocultural concept HUMANE MAN, as well as to conduct a comparative analysis of the features of the content of this concept in Russian and Chinese linguocultures.

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辩证法与人口学说

DIALECTICS AND THE DOCTRINE OF POPULATIONALITY

Apartsev Oleg Rolenovich

抽象的。该论文阐述了科学辩证法“冻结”在尚未充分发展的状态的事实。指出形而上学也没有超越实质原子性。它们一起无法在分析表示中组织超出线性和加法数学方法之外的科学对象的基本描述，这对于现代科学世界观来说是一个严重的问题。建议通过认识人口对象的实质性来利用形而上学现代化的可能性。还可以将群体理论翻译成抽象逻辑应用可接受的版本，以扩展描述任意自然和抽象对象的功能。科学方法的描述能力显著增强，包括通过在分析工具中添加多重性作为辩证法的彻底研究方法。所获得的结论使我们能够在称为“矛盾概括理论”的版本中提出一种人口理论，作为辩证法的基本构造。

关键词：辩证法、群体理论、矛盾概括、信条、线性化、形而上学、资源空间、群体、乘性、加性。

Abstract. *The paper states the fact of “frozen” in an insufficiently undeveloped state of scientific Dialectics. It is pointed out that Metaphysics also does not go beyond substantial atomicity. Together they cannot organize a basic description of scientific objects beyond linear and additive mathematical methods in their analytical representation, which is a serious problem for the modern scientific worldview. It is proposed to use the possibilities of modernization of Metaphysics by recognizing the substantiality of population objects. And also use the translation of Population Theory into a version acceptable for abstract-logical application to expand the functionality for describing arbitrary natural and abstract objects. The descriptive capabilities of scientific methods are significantly increased, including by adding multiplicativity to the analytical arsenal as a thorough research method in Dialectics. The obtained conclusions allow us to propose a Population Theory in the version called “The Theory of Ambivalent Generalization” as a basic construct of Dialectics.*

Keywords: *Dialectics, Population Theory, Ambivalent Generalization, credies, lianearization, Metaphysics, resource space, population, multiplicativity, additivity.*

The question of the thoroughness of Dialectics has existed for a long time, but no matter what sophistic tricks are used to resolve it, the result is obvious: there are

dialectical laws, but there are no mechanisms for generating these laws, as well as unknown carriers for their implementation in the surrounding world [6].

The reality and effectiveness of the laws of Dialectics have not been refuted by anyone for a long time. They are obvious, they are confirmed, both latent and explicit, in all religious dogmas, and in all philosophical teachings. Otherwise, it is impossible to explain the universal nature of the observed reciprocating processes, periodic reverse transitions to previous forms of existence and exits to new states, in the absence of visible reasons for such excesses in natural systems and human life.

This article discusses the question that it is the popularity of the surrounding world and the laws of development inherent in populations that are «*vim vitae*» (*vital force – Latin*) for generating Dialectical processes that arise and occur on the framework of metaphysical entities.

At the moment, Dialectics is exclusively a phantom of intuitive guesses, observations of an endless series of events that cannot be reliably analyzed anywhere, neither on the basis of actual constructions nor on experimental abstract models – there are actually no such models, because there is no theory describing Dialectics.

Considering the metaphysical substrate as exclusively atomistic communities, we are forced to descend to the analysis of the interaction of a single pair of atoms (whatever they are represented by), and describe the entire existing system in terms of binary interactions, which automatically leads only to the linearity of model representations. And then – to the linearity of the integral results of the process in the community under consideration. On the other hand, linearity can be called a platform for specifying and reproducing the additivity function, from the point of view of mathematics. Thus, in today’s description of all and any processes of the surrounding reality, it is possible to use only additive mathematics, based on metaphysical representations, but not to appeal to multiplication in any way.

Such a situation, with the possibility of legal use of only primitive additive models of the surrounding world, cannot but affect the general scientific level, creating a mental disconnect between the abstract and the real, between the basis of science and its advanced outposts. But this problem in the scientific community, apparently, is not given due attention. Perhaps an appropriate comparison is: “Standing at the bottom of the ladder, we are trying to harvest from the top of the crown of the tree, without attempting to climb higher.”

Considering the nonlinearity of dynamics as a general pattern for all dialectical processes, it is simply impossible to describe them standing on the primitive position of linearization. (Except, perhaps, the so-called transition of “quantity to quality”, but in the absence of an assessment of criteria, the appeal to such a research tool is not entirely convincing).

At the same time, Population Theory, in a version suitable for universal abstract-logical application, called the “Theory of Ambivalent Generalization”

(TAG) [1,2,3,4,5], on top of additivity, demonstrates the possibility of implementing the multiplicativity function in population systems, which practically limitlessly expands the possibilities for describing any systems, including nonlinear ones.

Without referring to a large mathematical theory, let us explain that metaphysical atomicity is capable of considering two populations containing two types of atoms.

At the same time, the TAG initially considers three populations [1,4]: the population itself, the population of resources and the population of intra-population exchange particles, called “credies”. Such a construction makes it possible to simulate collective additivity, but multiplicativity is also easily organized in it. (See the illustration to the article.)

Despite all the difficulties of directly using the idea in TAG to solve various scientific problems, the vector set in the philosophical application of the theory has one simple, and from that, of course, a positive moment: the grounds for Dialectics are being found – the recognition of diversity and unity in many complex and, including, nonlinear scenarios demonstrated by objects of different nature which are endlessly repeated in the surrounding world.

And then, through the model identity and the repeatability of population manifestations in various incarnations of existence, as follows from the logic of TAG, the path of consistent and full-fledged construction of Dialectics opens. And, importantly, this approach is the basis for eliminating the ideological confrontation between Dialectics and Metaphysics [6]. A confrontation that lasts for the entire time of the coexistence of these concepts (and this is more than 2000 years!).

Let us decipher what has been said: it is proposed to name all and any populations as carriers of Dialectics, and Ambivalent Generalization, which establishes abstract laws of dynamics of arbitrary populations, will become the “mechanics” of reproducing the laws of Dialectics. It makes no sense to invent some additional science “Dialectics”. Such, without using additional objects, spheres of action, essential manifestations, becomes superfluous.

So, the proposed philosophical concept states:

- The laws of Dialectics are equivalent to the Laws of TAG.
- Populations are full-fledged metaphysical objects, and they are also material carriers of dialectical mechanisms.

In fact, the only question that remains outside the scope of consideration is the “initial generation” of primary population laws, but we will not consider it in the framework of this work.

It is proposed to consider some other, less significant oppositions in the same context, for example: Discreteness – Continuity, Statics – Dynamics.

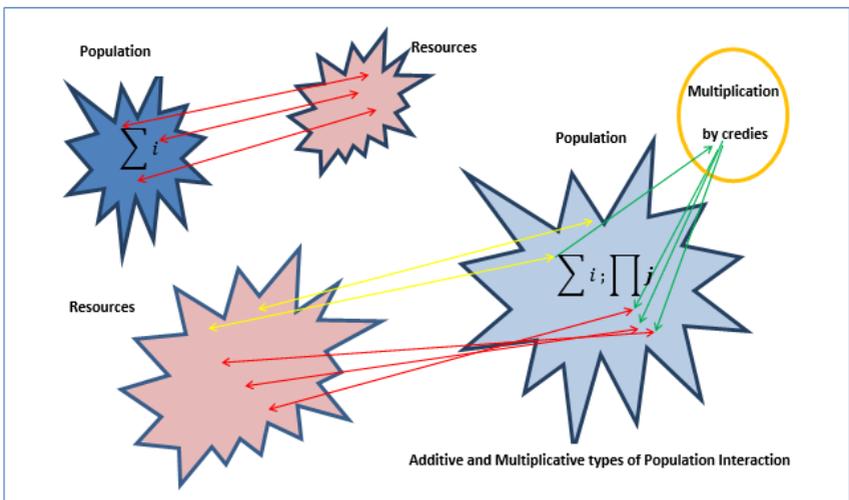
In the population approach, (Discreteness) = (Atomicity) is initially postulated as the main construct of the surrounding world, the basis of its model representa-

tion. We introduce Continuity into circulation as the limiting value of population interaction when the number of members in participating populations tends to infinity. Thus, TAG suggests considering continuity as an abstract discrete representation, which helps to describe the surrounding reality in a simplified but very reliable way, in accordance with the mathematical laws of “large numbers”. A small population structure can be adequately represented by discrete objects that are endowed with attributive properties, at the same time, a more powerful population formation has a quasi-continuous embodiment, and, therefore, the description will be sufficiently continuous in nature [8].

Similarly, Statics is an abstract substitution of continuous temporary processes of internal and external interaction, described by Dynamics, reproduced for any population, in the case when it is possible to state the immutability of external, accessible to an external observer indicators of manifestations of population Dynamics.

In this way, all kinds of transformations make sense if their model representations are correctly described by means of the algebra of population interactions.

It seems that following this path, relying on TAG, it is possible to look for methods of revealing field and corpuscular, as well as differential and integral, additive and multiplicative, and many other embodiments of natural phenomena, some of which have been called the Laws of Nature.



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家庭是公民和爱国主义话语中的希望和支持
**FAMILY AS HOPE AND SUPPORT IN THE DISCOURSE OF
CITIZENSHIP AND PATRIOTISM**

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抽象的。在公民和爱国主义的话语中，家庭（对家庭的态度）是什么样的？作者研究的社会学材料使我们能够识别并显示受访者将家庭视为希望和支持的看法与受访者将自己作为俄罗斯公民和爱国者的认识之间的显着联系。

关键词：家庭、公民、爱国者、爱国主义、公民身份。

Abstract. *What does the family (attitude to the family) look like in the discourse of citizenship and patriotism? The sociological materials of the author's research allow us to identify and show a significant connection between respondents' perception of the family as hope and support, on the one hand, and respondents' awareness of themselves as citizens and patriots of Russia, on the other hand.*

Keywords: *family, citizen, patriot, patriotism, citizenship.*

Sociological studies have shown that with regard to the special military operation (SVO), “adaptation to the dominance of the official narrative is more pronounced than its impact on the collective perceptions of Russians” [1, p. 38]. This “confirms the role and strength of the so-called genotype of social community” [2, p. 245]. In this regard, it can be assumed that, accordingly, the traditions of family life and patriotism, as well as citizenship of Russians, remain strong – even with some differences in socio-cultural characteristics, for example, older and younger generations [2].

However, what do the sociological materials show?

For example, it can be noted that residents of villages and cities of the Samara region have a more positive attitude towards the family; residents of the megalopolis (Samara city) have a noticeably less positive attitude towards the family [3].

We also draw attention to the fact that “studies of family values of young people indicate the importance of the family in the structure of basic life values, despite the loyal attitude to cohabitation” [4, p. 141].

However, what does the family (attitude to the family) look like in the discourse of citizenship and patriotism?

The empirical basis of the article is the data of the author’s sociological survey in 2020 in the Samara region (Russia).

In particular, the pairing of answers to two questions – about family and citizenship – shows the following picture (Table 1).

Table 1

Conjugation of answers about family and citizenship, % of the number of respondents (N=620) and analytical indices (J)

In your opinion, are the words «Family is hope and support» fair?		Do you consider yourself a citizen of the New Russia, ready to exercise your rights and responsibilities?		
Answers	Total	Yes	No	I find it difficult to answer
a) Yes, quite fair	67,4	35,8	12,7	18,9
b) Basically, yes, fair	25,2	8,2	4,2	12,8
c) Perhaps not, unfair	4,8	1,6	1,6	1,6
d) No, totally unfair	0,8	0,2	0,3	0,3
e) I find it difficult to answer	1,8	0,5	0,2	1,1
Total	100,0	46,3	19,0	34,7
Analytical indices (J) (from -1.0 to +1.0)*	+0,77	+0,84	+0,72	+0,70
*Note: The analytical indices (J) hereafter are calculated by the formula [5, p. 65] $J = (a + 0.5b - 0.5c - d) / (a + b + c + d + e)$				

Source: Author’s research.

Approximately two-thirds – 67.4% of all respondents admit that the words about the family as hope and support are quite fair, and less than half - 46.3% of all respondents consider themselves a citizen of the New Russia. At the same time, 35.8% of all respondents highly appreciate the family and recognize themselves as a citizen of the New Russia; 19.0% do not recognize themselves as a citizen of the New Russia; at the same time, 12.7% of all respondents rate the family highly and do not recognize themselves as a citizen of the New Russia.

The analytical index of family assessments (as hopes and supports) is very high (+0.77). Among those who consider themselves a citizen of the New Russia (the answer is “Yes”), the analytical index of family assessments is even higher (+0.84). In addition, among those who do not consider themselves a citizen of the New Russia (the answer is “No”), the analytical index of family assessments is noticeably lower (+0.72). As for those who found it difficult to answer regarding

the recognition of themselves as a citizen of the New Russia, even in this case, the analytical index of family assessments is noticeably lower (+0.70).

Thus, there is clearly a subgroup of respondents who consider themselves a citizen of the New Russia, who rate the family significantly higher (as hope and support) than other subgroups (who do not consider themselves a citizen of the New Russia or find it difficult to answer).

The combination of answers to two questions – about family and patriotism – shows such a picture (Table 2).

Table 2
Conjugation of answers about family and patriotism, % of the number of respondents (N=620) and analytical indices (J)

In your opinion, are the words «Family is hope and support» fair?		Do you consider yourself a patriot of Russia?		
Answers	Total	Yes	No	I find it difficult to answer
a) Yes, quite fair	67,4	43,1	8,9	15,5
b) Basically, yes, fair	25,2	11,9	4,0	9,2
c) Perhaps not, unfair	4,8	2,3	1,9	0,6
d) No, totally unfair	0,8	0,5	0,0	0,3
e) I find it difficult to answer	1,8	0,3	0,5	1,0
Total	100,0	58,1	15,3	26,6
Analytical indices (J) (from -1.0 to +1.0)	+0,77	+0,82	+0,65	+0,74

Source: Author’s research.

If 67.4% of all respondents admit that the words about the family as hope and support are quite fair, then 58.1% consider themselves patriots. At the same time, 43.1% of all respondents rate the family highly and recognize themselves as patriots; 15.3% do not recognize themselves as patriots; at the same time, 8.9% of all respondents rate the family highly and do not recognize themselves as patriots.

The analytical index of family assessments (as hopes and supports) is very high (+0.77). Among those who consider themselves a patriot of Russia (the answer is “Yes”) the analytical index of family ratings is even higher (+0.82). Moreover, among those who do not consider themselves a patriot of Russia (the answer is “No”), the analytical index of family ratings is noticeably lower (+0.65). As for those who found it difficult to answer regarding the recognition of themselves as a patriot of Russia, even in this case, the analytical index of family assessments is noticeably lower (+0.74).

Thus, there is clearly a subgroup of respondents who consider themselves a patriot of Russia (who answered “Yes”), who rate the family significantly higher (as hope and support) than other subgroups (who do not consider themselves a patriot of Russia or find it difficult to answer).

In general, there is a significant connection between respondents’ perception of the family as hope and support, on the one hand, and respondents’ awareness of themselves as citizens and patriots of Russia, on the other hand.

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情境模型与反事实思维的心理机制

**SITUATIONAL MODEL AND THE PSYCHOLOGICAL
MECHANISMS OF COUNTERFACTUAL THINKING**

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注解。“反事实思维”一词表示个人倾向于对已经发生的事件构建可能的替代版本。反事实是对事件结果的表述，即另一种现实。这种思维的几种理论已经被提出，如规范理论和功能理论等。希尔顿识别了反事实建模的两种认知机制：因果联系和选择，并认为因果背景的分析对于理解反事实起着核心作用。思维。在因果结构研究过程中，最重要的作用是对问题情境的叙事和时空模型的研究。

关键词：因果背景、因果贴现、反事实思维、情境模型。

***Annotation.** The term “counterfactual thinking” denotes the tendency of the individual to construct possible alternative versions of events that have already occurred. Counterfactuals are representations about the outcome of an event, an alternative reality. Several theories of this kind of thinking have been proposed, such as norm and functional theory, etc. Hilton identifies the two cognitive mechanisms of counterfactual modeling: causal connection and selection and believes that the analysis of the causal background plays a central role in understanding counterfactual thinking. In the course of studying causal structures, the most important role is played by the study of narrative and spatial-temporal models of the problem situation.*

***Keywords:** causal background, causal discounting, counterfactual thinking, situational model.*

In modern psychology the term “counterfactual thinking” denotes the tendency of the individual to construct possible alternative versions of events that have already occurred. This concept was introduced into the modern psychology of thinking by the german researcher Neil Rose [1]. Considerations of this type usually begin with statements like: “What if...” and “If only...”.

Such thinking is not a mirror image of reality, but represents some possible version of the real world. Counterfactuals are representations about the outcome of an event, an alternative reality. For example, after a student has passed the exam

for three, he thinks: “If I didn’t hang out in discos, then I could pass this exam with a “4”, or even a “5” or “If I didn’t look at the abstract at all, then I wouldn’t see a three.” Imagining an alternative course of events that could lead to a better outcome, a person mentally plays a scenario that implies a certain line of behavior in the past, which, apparently, prompts him to correct in the future, to bring his behavior in line with this scenario (for example, henceforth to hang out less in discos during the session). These are counterfactuals going up. If a person thinks in the mode of counterfactuals, going down and meaning that everything turned out well, then there is no special need to correct his own behavior (next time you can look at the notes before the exam and again successfully “slip through”).

Rose’s research has convincingly shown that upward counterfactuals worsen the emotional state, but has a positive effect on future activities. Conversely, downward counterfactuals improve emotional well-being, but lead to a relative worsening of follow-up activities (compared to the control group that did not receive instruction on counterfactual thinking). Several theories of counterfactual thinking have been put forward. For example, the normative concept holds that the level of negative experiences reflects the degree of discrepancy between the outcomes achieved and the desired outcomes [2]. Irish researcher Ruth Byrne calls this kind of thinking “rational imagination”, emphasizing the rational aspects of this phenomenon [3]. Finally, the functional approach points to the adaptive nature of counterfactuals. Such reasoning reduces the degree of stressful experiences and performs psychotherapeutic functions [4]. Thus, the style (direction) of counterfactuals thinking has an impact on subsequent activities and emotional state, which opens up opportunities for regulating behavior with the help of self-instruction or external pedagogical influence.

Kahneman and Tversky proposed a simpler psychological mechanism of the situational model. According to their theory of norms, people most need an explanation of those results that cause surprise, violating people’s group expectations. The norm theory was built on earlier studies, in which researchers also concluded that unexpected outcomes are more likely than expected to trigger an explanatory search for the cause or causes of the outcome. For example, it will be easier for a driver to mentally “cancel” a car accident after taking an unusual route home (imagining that he has chosen his usual route) than the other way around. When thinking about how events might have unfolded differently, people are more likely to build models that restore episodes to their default standard, mentally discarding unlikely assumptions as root causes [5].

One of the leading modern experts in the field of attribution, a researcher from Toulouse, Hilton, studied the patterns of attribution of complex cause-and-effect patterns describing the dynamics of catastrophes, such as the accident of the American spacecraft “Challenger”. The most important means of constructing

such models according to Hilton is the modeling of systems of counterfactual relationships (counterfactual simulation) [6].

In particular, erroneous interpretations of this incident were due to the fact that the first link was omitted from the causal chain – very cold weather during launch (causal unification). If we ask the question “What is the difference between a failed launch of a space shuttle and previous successful ones”, then we must solve the problems of often hidden implicit differences between situations. Hilton believes that at the heart of an adequate situational model is the representation of events that are essential to obtain the resulting consequences.

In contrast to previous researchers, Hilton identifies two cognitive mechanisms of counterfactual modeling: causal connection and causal selection. Such models are often the result of problems designed to solve some kind of catastrophe or accident (e.g., why the plane crashed) [7]. Thus, analyzing the results of content analysis of the causes of the disaster of the American spacecraft “Challenger”, the author of the model comes to the conclusion that an adequate situational model is based on the representation of events that are essential for obtaining the resulting consequences. At the same time, he identifies two basic mechanisms for analyzing the problem:

1. “causal discounting” (the choice of which of two or more competing models accurately describes the final result);
2. “causal background” (analysis of the causes of what is happening in this situational model).

In the course of causal discounting, in the presence of two competing situational models that differently assess the circumstances and nature of a particular impact, the question of which of the two models better explains what is happening is decided. Under these conditions, the expert must choose which model of the situation was the one that actually led to the event in question. Additional information that makes one model of a situation more likely usually reduces the belief that an explanation based on a model of a competing situation is true. For example, knowing that a cancer patient was a heavy smoker can reduce the belief that working in an asbestos factory is the cause of cancer.

On the contrary, a factor that enters the causal background may remain unclear, but still be considered true. It remains in the situational model that is thought to have led to the event, but is assumed to be an implicit factor. Causal selection gives some events the status of “causal” (e.g., the clock had a malfunction and therefore stopped running), and leads to other events that are associated with the event in question (e.g., a hammer strike) being relegated to the background as “simple conditions”.

So, we can conclude that the result of an explanatory investigation is a situational model, which is a causal understanding by the researcher of how the specific

event in question arose (for example, a catastrophe or a sudden illness). At the same time, the same element can be identified as part of a causal story in one model of the situation, but not in another, depending on whether the causal relationship between its occurrence and the event being explained is proved.

In this regard, the studies conducted by Trabasso and Bartholon on the verification of the above theory of norms, proposed by Kahneman, are of great interest [8]. In the above-mentioned work [2] participants were asked to imagine what could have prevented the death of the fictional hero of the story, Mr. Jones. Participants read a story, in which Mr. Jones leaves his office at a certain time, chooses a certain route, stops at a yellow light at an intersection, and resumes his journey when the light turns green. Mr. Jones dies when a high-speed truck driven by a teenager who was under the influence of drugs crashes into Mr. Jones's car at an intersection. In the two story versions, the departure time or the chosen route varied. In both cases, variants of the narrative were compared with the usual or unusual time and route.

After reading this or that version, the participants were asked to put themselves in the shoes of a family member of the victim of the disaster and to complete their thoughts in writing in response to the question "If only ...". The subjects' responses were analyzed according to one of four conditions (departure time, route traveled, stop at an intersection, or the condition of the truck driver). It turned out that in their written reports, the subjects more often believed that the cause of the death of the hero of this story was a deviation from the normal course of events.

Back in the 80s of the last century cognitive psychologists came to the assumption that understanding the text is not limited to purely textual information and involves the construction of a situational model based on lower levels and providing a holistic understanding of the situation. It should be noted that this model should be integrated with previous information and holistic experience of the subject of cognitive activity. As is known, leading experts in the field of psychology of understanding, Van Dijk and Kintsch, define a situation model as a cognitive representation of events, participants and the entire situation as a whole [9]. Thus, the thesis that in the process of understanding situation-specific events, a person constructs mental mappings or situational models has become generally accepted in modern psychology.

Often mental models that depict a sequence of events can be represented as a comic strip [10] or a chain of specific episodes or events. A classic example is the work of the famous American psychologist Joy Guilford, who used the sequence of events to study social intelligence. In particular, to research the understanding of social situations and sequences of events, the subjects had to supplement the missed fragment of the comic book with a logical and sequential series of events. For example, the ability to draw conclusions and predict situations was deter-

mined by means of the “Cartoon Predictions” technique, in which one of the three cartoons proposed in the subtest is used to predict the development of the situation [11].

Modern psychology of discourse has long come to the conclusion that the situational model is a “mental microcosm” of the narrative. The situational model includes the spatial arrangement and chronological sequence of episodes in the plot. In most plots, there are characters with specific goals, conflicts between characters that need to be resolved, etc. [12]. Also, in the course of a thorough discursive analysis of the responses of the subjects, Trabasso and Bartolone found that the death of the protagonist depends on a whole complex of causal relationships, and not just on a deviation from the standards. Similar conclusions are reached by Byrne, who studied the mental spatial models created by the subjects in the course of solving the above problem situation Kahneman and Tversky [13, 14].

In this regard, it can be concluded that it is necessary to use a systematic approach in the study of the psychological mechanisms of counterfactual thinking. Thus, the thesis that in the process of understanding situation-specific events, a person constructs mental mappings or situational models has become generally accepted in modern psychology. It should be borne in mind that situational models contain both figurative and verbal information. In addition, such models are tied to the spatio-temporal context.

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使用射线鳍鱼类 (Actinopterygii) 作为海水污染的生物指示剂
**USING OF RAY-FINNED FISH SPECIES (ACTINOPTERYGII) AS
BIOINDICATORS OF SEAWATER POLLUTION**

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抽象的。 本文介绍了黑海两个海湾污染程度不同的海颈鳍 (*Scorpaena porcus* Linnaeus, 1758) 的一些形态生理特征, 结果表明, 来自 Laspi 的雄性海颈鳍的肝脏指数为 高于检疫湾鱼类的肝脏指数。 女性的IP没有差异。 两个地区雄性和雌性猪的性腺体指数没有显着差异。 拉斯皮湾女性的富尔顿肥胖系数比拉斯皮湾个体高出 6.8%。 男性富尔顿肥胖系数值无显着差异。 该论文还介绍了 2023 年 7 月在芬兰湾东部浅水区捕获的普通环颈鱼 (*Gymnocephalus cernuus*, Linnaeus, 1758) 的大小质量和一些形态生理特征。 没有显着差异 普通领毛个体的体型、体重和肥胖程度。 颈脖的大小和质量特征符合该物种的典型平均指标。

关键词: 生物监测、放线鱼、鲉鱼、普通颈鳍、海水污染、肝脏指数、性腺指数、肥胖度。

Abstract. *The paper presents a number of morpho-physiological characteristics of the sea ruff (*Scorpaena porcus* Linnaeus, 1758) from two bays of the Black Sea, different in terms of pollution, It was revealed that the liver index of *S. porcus* males from Laspi is higher than the liver index in fish from Quarantine Bay. There were no differences in the IP of females. Gonadosomatic index in males and females *S. porcus* does not differ significantly from the two areas. The Fulton fatness coefficient in females is 6.8% higher in individuals from Laspi Bay. There were no significant differences in the values of the Fulton fatness coefficient in males. The paper presents also size-mass and some morpho-physiological characteristics of the common ruff (*Gymnocephalus cernuus*, Linnaeus, 1758), caught in the shallow part of the eastern part of the Gulf of Finland in July In 2023. There were no significant differences in size, weight and fatness in individuals of the common*

ruff. The size and mass characteristics of the ruff corresponded to the typical average indicators for this species.

Keywords: biomonitoring, Actinopterygii, scorpionfish, Common ruff, pollution of marine waters, liver index, gonad index, fatness.

Introduction.

One of the most important problems of modern science is the pollution of the world's oceans, as a result of which there are changes in biogeochemical processes, disruption of the productive capabilities of the hydrobiont population and a decrease in species diversity, deterioration of the quality of seawater and a decrease in its ability to self-purification, interference with marine activities, including fishing and fish farming, as well as an increasing environmental risks in the field of food safety [3].

As a result, it is necessary to monitor in a timely and systematic manner the condition of the water areas most exposed to regular anthropogenic influence. To increase efficiency and obtain informative data, it is important to study different types of organisms and their various morphophysiological indicators according to the degree of sensitivity to pollution.. Fish are convenient indicators of pollution, since analysis of regular catches in a certain water area makes it possible to assess and predict the consequences of water pollution with toxic substances [2].

One of the most informative indicator species is the sea ruff also known as scorpionfish (*Scorpaena porcus* Linnaeus, 1758). This type meets the requirements for monitor types and is actively used for monitoring work [8]. It is sensitive to the influence of xenobiotic, does not make significant migrations, its biology is well studied, and it is also widespread everywhere [9]. Also a promising object for biomonitoring is the common ruff (*Gymnocephalus cernuus*, Linnaeus, 1758), which belongs to low-value fish species from a commercial point of view, but is a good indicator of the state of habitats and a convenient test object.

To assess the condition of the reservoir, physiological criteria for the condition of fish are used as an indicator and the method of morpho-physiological indicators is widely used. This method allows us to give an idea of the functioning of the organism, its adaptation to living conditions.

Materials and methods.

To characterize the physiological state of fish, under changing environmental conditions, hepatosomatic and gonadosomatic indices, as well as fatness, are most often used. The hepatosomatic index (liver index) and the gonadosomatic index represent the ratio of the mass of an organ to the mass of a fish without organs. Fatness characterizes the content of muscle tissue and fat in the body of fish [4].

The calculation was carried out according to the following formulas:

The liver index is calculated by the formula (1):

$$LI = \frac{P_n * 1000}{P_m} \tag{1}$$

where P_n is the mass of the liver (g), P_m is the mass of the carcass (g).

The gonadosomatic index (GSI) was calculated using the formula (2):

$$GSI = \frac{P_r}{P_{\tau}} * 100 \tag{2}$$

where R_g is the mass of the gonads (g), R_t is the mass of the carcass (g).

The Fulton fatness coefficient was calculated using the formula (3):

$$K_y (\phi) = \frac{P * 100}{L^3} \tag{3}$$

where P is the mass of the fish (g), L is the body length (cm).

The Clark fatness coefficient was calculated by the formula (4):

$$K_y (K\tau) = \frac{P * 100}{L^3} \tag{4}$$

where P is the mass of the carcass (g), L is the length of the body (cm).

Statistical processing was carried out using the Shapiro-Wilk method to calculate normality, as well as the Student’s t-test and the Mann—Whitney U-test.

Results and discussion.

The object of the study was individuals of sea ruff caught in the bays of Quarantine and Laspi in 2021. 79 individuals from the more polluted Quarantine Bay and 37 individuals from the less polluted Laspi Bay, aged from 3 to 8 years, were studied. A complete biological analysis was carried out according to standard methods. [5]. Since these indicators in the sea ruff depend on gender, the data obtained were analyzed separately for females and males.

Table 1

Morphophysiological indicators of Scorpaena porcus from two water areas

Parameter	Bay	Quarantine Bay	Laspi Bay
M±m Min-max	Liver index		
	Females	20.0±2.02 2.12-72.9	16.8±1.6 6.7-28.3
	Males	13.7±1.7* 2.8-47.6	19.6±1.5* 10.1-34.0
	Gonadosomatic index (GSI)		
	Females	1.3±0.2 0.1-10.8	1.2±0.2 0.7-3.1
	Males	0.2±0.4 0.05-0.4	0.2±0.7 0.02-0.8
	Fulton Fatness Coefficient (K _y (φ))		
	Females	4.4±0.1* 3.3-6.3	4.1±0.04* 1.5-2.3
	Males	4.1±0.1 2.3-5.0	4.1±0.1 3.3-5.0

Note: The data is presented as $M \pm m$, where M is the average value, m is the standard error. * - the differences are significant at $p \leq 0.05$.

The liver index of males from Laspi Bay is greater than that of males from Quarantine Bay by 43.1%. The GSI of males and females from different bays does not differ. There were also no significant differences in the liver index of females from Laspi and Quarantine bays.

The increase in the liver index in Laspi Bay can be associated with an increase in anthropogenic load on this territory, the construction of houses and an increase in motor traffic. It can be assumed that due to the slow metabolism of the sea ruff and the peculiarities of the deposition of nutrients in the body, the process of adaptation to the changed environment has not yet been completed [7]. The liver index is also closely related to the stage of reproduction (the stage of maturity of the gonads) and with nutritional characteristics that can be determined by the habitat area, which must be taken into account when analyzing morphophysiological indicators. It is known that mercury intoxication leads to a reduction of glycogen and protein in fish hepatocytes, which may cause a decrease in the liver index in a more polluted, Quarantine Bay.

A slight difference was revealed in the Fulton fatness coefficient in females and amounted to 6.8%, no differences were found in males. There is a wider variability in the values of the liver index and fatness coefficient in fish caught in Quarantine Bay compared with fish from Laspi Bay, which may be due to a more intense anthropogenic load in Quarantine Bay. A similar variability of liver index values in sea ruff was also noted in the work "Features of morphophysiological and biochemical parameters of the liver of sea ruff from bays with different levels of pollution" 2010 [1].

The common ruff (*Gymnocephalus cernuus*) is also a component of the ray-finned species and is close to *Scorpaena porcus* in a number of ecological indicators. The common ruff is the main part of the food base of predatory fish, including commercial fish, therefore, the catch indirectly depends on non-commercial fish species. Including ruff [6]. In recent years, there has been a decrease in the number of ruff in catches in waters with a growing anthropogenic load, since it is very sensitive to oxygen deficiency in the water. Thus, construction works and removal of bottom soil, which reduce the transparency of water, and, as a result, negatively affect the oxygen regime of the reservoir, lead to changes in the main individual and population characteristics of the ruff.

The material for the work was the data collected as a result of a research survey conducted in July 2023 in a shallow area of the Eastern part of the Gulf of Finland. Gill-shaped combined nets were used. 45 individuals of ruff were analyzed.

Data on the size-mass and morphophysiological characteristics are given in Table 2.

Table 2.

Morphophysiological indicators of females and males of the common ruff

Parameter	General	Females	Males
M±m Min-max	Standard length, cm		
	8.7±0.08 7.4-10.0	9.2±0.4 8.0-10.0	8.6±0.5 7.4-9.5
	Weight g		
	13.6±0.35 8.4-20.6	16.4±2.5 9.5-20.6	13.2±0.5 8.4-15.9
	Liver index		
	11.02±1.8 5.3-87.2	9.9±1.0 8.0-12.0	8.9±0.7 5.4-14.1
	Gonadosomatic Index (GSI)		
	0.46±0.1 0.1-1.3	0.9±0.1* 0.9-1.1	0.8±0.1 0.2-1.3
	Fulton fatness coefficient ($K_y (\phi)$)		
	2.1±0.03 1.7-2.4	2.0±0.1 1.9-2.2	2.1±0.05 1.7-2.4
	Clark fatness coefficient ($K_y (\kappa)$)		
	1.9±0.02 1.5-2.1	1.8±0.1 1.7-2.0	2.9±0.05 1.6-2.1

Note: The data is presented as M±m, where M is the average value, m is the standard error. * - the differences are significant at $p \leq 0.05$.

The average length of the common ruff was 8.7 cm, the maximum length was 10 cm, which corresponds to the average for this species. The gonadosomatic index is significantly different – in females it is 12.5% higher than in males. There were no significant differences in length, weight, liver index, as well as the Fulton and Clark fatness coefficient.

The size and mass characteristics of the ruff caught in July 2023 corresponded to the typical average indicators for this species. The presence of caviar was noted in the gonads of females, and taking into account the fact that the ruff spawning is portioned and prolonged (from spring to June-July), and it can be assumed that the increase in female GSI may be associated with the final stage of spawning and the presence of caviar.

Based on the research results, taking into account the anthropogenic load on the studied water area, it can be concluded that changes in the habitat have not yet led to a significant change in morphophysiological indicators.

The common ruff serves as food for perch, pike, salmon, whitefish and cod fish species, it plays an important role in the trophic network, is a sedentary species without making significant migrations and is a promising object of research from the point of view of monitoring and assessing the state of water areas.

Conclusion

The common ruff, like the scorpionfish, has proven to be a reliable bioindicator of the state of the environment. When selecting the optimal organism for biomonitoring of sea waters, as well as for research in the field of food security in the field of fish products, very informative bioindicators are representatives of the Ray-finned family - for the southern seas this is scorpionfish, for desalinated water bodies, such as the Gulf of Finland of the Baltic Sea - the common ruff.

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锁骨肩峰端脱位的诊断及微创手术治疗方法
**DIAGNOSIS AND MINIMALLY INVASIVE METHOD OF
SURGICAL TREATMENT OF DISLOCATION OF THE ACROMIAL
END OF THE CLAVICLE**

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概括。 本文介绍锁骨肩峰端完全脱位的诊断和手术治疗结果。 作者指出, 锁骨肩峰端脱位的诊断和治疗仍然是创伤学领域尚未解决的难题。 尽管有现代诊断方法, 但执业医师经常会犯错误, 不能及时进行必要的治疗, 错过宝贵的时间并出现各种并发症。 治疗这种损伤的保守方法不能达到预期的效果, 并且很少在临床实践中使用。 手术治疗方法是借助各种金属结构对脱位矫正后的 ACC 进行固定, 其特点是创伤性大, 并且经常观察到术后并发症。 随后通过重复的手术干预来移除固定器。 所有这些都为开发诊断和治疗此类损伤的更优化有效方法的必要性奠定了基础。 作者提出了肩峰锁骨末端脱位的放射学、超声诊断和低创伤手术治疗方法以及患者术后积极管理的方法, 这使得 99.8% 的病例取得了良好的结果。 所提出的手术干预不需要额外的设备和固定器移除。 所获得的临床结果证明了它们的高效率以及在创伤和外科诊所条件下应用的可能性。

关键词: 脱位, 锁骨, 肩峰, 固定, 手术。

Summary. *This article presents the results of diagnosis and surgical treatment of complete dislocation of the acromial end of the clavicle. The authors noted that the diagnosis and treatment of dislocation of the acromial end of the clavicle is still an unsolved problem of traumatology. Despite the availability of modern diagnostic methods, practicing physicians often make mistakes, do not carry*

out the necessary treatment in a timely manner, miss precious time and develop various complications. Conservative methods of treatment of this injury do not give the desired results and are rarely used in clinical practice. Surgical methods of treatment provide fixation of the ACC after dislocation correction with the help of various metal structures, which are characterized by traumatism and complications after surgery are often observed. The fixators are subsequently subject to removal by repeated surgical intervention. All this has served as a basis for the necessity of development of a more optimal effective method of diagnostics and treatment of this type of injury. The authors proposed methods of radiologic, ultrasound diagnostics and low-traumatic surgical treatment of acromial clavicle end dislocation and active postoperative management of patients, which allow to achieve good outcomes in 99.8% of cases. The proposed surgical intervention does not require additional equipment and fixator removal. The obtained clinical results testify to their high efficiency and the possibility of their application in the conditions of traumatologic and surgical clinics.

Keywords: *Dislocation, clavicle, acromion, fixation, surgery.*

Dislocation of the acromial end of the clavicle (ACC) is a common injury of the musculoskeletal system. This name for this injury has a centuries-old history. The great ancient Greek physician Hippocrates first separated the concepts of “dislocation of the shoulder” and “dislocation of the acromial end of the clavicle”, which before him were considered the same injury. This definition has remained unchanged since that time. According to the literature, dislocations (ACC) account for 7.0 to 26.1% of all dislocations and more than 10% of all cases of acute trauma to the shoulder girdle, ranking third after dislocations of the elbow and wrist joints. The social significance of this injury is determined by the fact that the vast majority of patients are professionally and socially active people of working age from 25 to 45 years old. Therefore, the restoration of work capacity of such patients is of great medical and social importance.

Diagnosis and treatment of dislocation of the acromial end of the clavicle is still an unsolved problem. Despite the availability of modern diagnostic methods, practicing physicians make mistakes, fail to perform the necessary treatment in a timely manner, and miss valuable time. The existing conservative methods of treatment do not give the desired results and are rarely used in clinical practice. Surgical methods of treatment provide fixation of the ACC after dislocation correction with the help of various metal structures, which are characterized by traumatism and complications after surgery are often observed. The fixators are subsequently subject to removal by repeated surgical intervention. All this necessitates the development of a more optimal effective method of diagnosis and treatment of this type of injury.

Objective of the study. To improve the results of diagnostics and treatment of acromial clavicle end dislocation by using a non-invasive method of diagnostics and minimally invasive method of surgical intervention.

Materials and methods of the study.

Our clinical observation included 116 patients aged 20-50 years with complete dislocation of the acromial end of the clavicle. Damage of the right acromial-clavicular joint was observed in 59, left - 57 patients. Of these, 110 were male and 4 were female. There were 44 patients with fresh dislocations (up to 5 days after injury), 38 patients with non-fresh dislocations (6-21 days after injury), and 34 patients with aged dislocations (22 days and later after injury).

The main cause of the injury was a fall on the shoulder. The ligaments connecting the clavicle and the scapula are torn, and then the clavicle is displaced upwards by the pull of the muscles. The classic mechanism of clavicle ligament rupture and dislocation of the acromial end of the clavicle: on the left - incomplete (subluxation), the clavicular ligament is intact; on the right - complete, the conical and trapezius ligaments, which form a single clavicular ligament, are torn (Fig. 1).

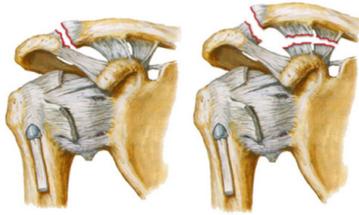


Figure 1. Types of ligament rupture and dislocation of the acromial end of the clavicle (from the Internet).

In dislocation of the acromial end of the clavicle, we used the C.A. Rockwood classification, which identifies six types of dislocation. Types 2 and 3 were the most common, accounting for more than 93% of all dislocations of the acromial end of the clavicle.

Diagnosis of dislocation of the acromial end of the clavicle is simple and uncomplicated in most cases, but sometimes presents significant difficulties. The optimal time for diagnosis of fresh injuries of the clavicular-acromial articulation of the CAS is the first 6-12 hours from the moment of injury.

The complex of diagnostic measures included modern methods of investigation: anamnesis collection, examination, performance of clinical test “keys” (the most informative in the acute period), radiologic diagnostics if necessary ultrasound, CT, MRI.

Results and Discussion.

The patients were examined in the standing position with mandatory comparison with a healthy upper arm. In 85% of patients with complete dislocations of the ACL, a deformity of the upper arm in the projection of the ACL, associated with the protrusion of the clavicle over the acromial process of the scapula, was detected. The severity of the deformity indirectly indicated the degree of damage to the ACL (complete or incomplete dislocation). In complete dislocation, the ACC stood out significantly, its external surface was palpable under the skin, and the clavicle remained immobile when the scapula was moved. In incomplete dislocation, the clavicle remained connected through the clavicle-clavicular ligament and moved with the scapula. It was often impossible to palpate the clavicle. Deformity of the upper arm in the projection of the ACL (Fig. 2), associated with elevation of the clavicle above the acromial process of the scapula.



Figure 2. Deformation of the supraspinous shoulder in the CAS projection

It is important to emphasize that signs of ACC instability may appear not immediately after the injury, but 3-5 days or more later, as the swelling decreases. Therefore, attention should be paid to the importance of complete examination of patients in the next hours after the injury, before soft tissue swelling increases. When a finger was pressed on the dislocated ACC, it shifted downward, and when the pressure was stopped, it returned to its original place (the “key” test), which indicated complete dislocations of the ACC. It is mandatory to perform this test on the intact side as well. It should be emphasized that the amplitude of displacement of the clavicle relative to the acromial process of the scapula can normally reach 0.5-1 cm.

It should be noted that one of the main reasons for unsatisfactory outcomes in the treatment of fresh dislocations of the shoulder joint is delayed and incomplete diagnosis. Unfortunately, it is still not uncommon for practicing physicians to diagnose shoulder joint “contusion”, which is often followed by a variety of intra-articular injuries, including ACC dislocations. In such cases, patients seek medical help with chronic instability of the clavicle, when its correction requires more complex plastic surgeries, the results of which are not always satisfactory to the victims.

The most optimal and widespread method of diagnosis is radiography. For comparative assessment of the nature of the injury and the degree of displacement of the ACC, all patients underwent radiographs of both clavicular-acromial joints in the anteroposterior projection. We consider the Zanca projection to be more informative and reliable, in which the radiograph was performed in the anteroposterior projection with the X-ray tube tilted 10-15 degrees upward (Fig. 3).



Figure 3. Radiographs of the clavicular-acromial articulation in anteroposterior projection according to Zanca.

As a rule, on the side of the injury there was a widening of the articular gap or an increase in the upward displacement of the distal end of the clavicle, which was determined by measuring the distance between the lower edge of the clavicle and the upper edge of the clavicular process before and after loading. An increase in this distance by 25-50% compared to the healthy “side” indicated a complete rupture of the claviculoacromial ligaments. In 82% of our patients, this projection allowed timely and correctly diagnosing the true nature of ACC dislocation.

The most common reasons for false diagnosis are individual features of the acromial-clavicular joint (Fig. 4), variability of the angle of the articular gap of the acromial-clavicular joint. Therefore, it is advisable to perform a radiograph of not one shoulder, but two shoulders at once, which will allow to assess the normal structure of the opposite clavicle.

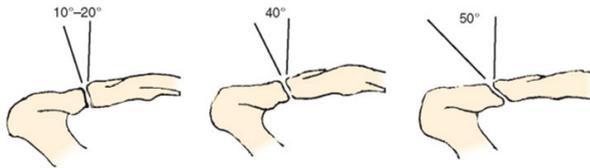


Figure 4. Variability of the angle of the articular gap of the acromial-clavicular joint.

Radiograph of both clavicles on one film (Fig. 5). On the right side (the side with the ruler), complete dislocation

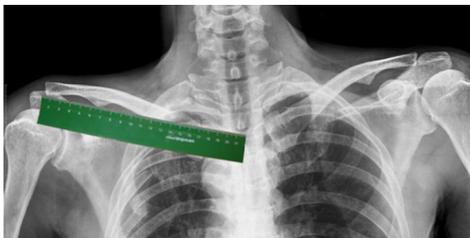


Figure 5. Radiograph of both clavicles on a single film.

In doubtful cases, functional radiography is sometimes performed (Fig. 6) - a weight is placed in the hand, which pulls it downwards and the dislocation becomes more obvious.

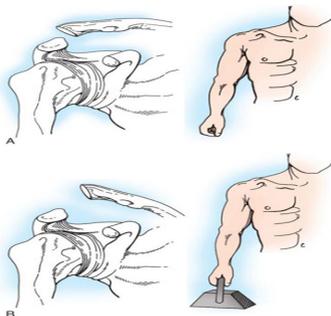


Figure 6. Functional radiography of the CAS.

In 31% of patients, radiography with loading (3-5 kg weight in each arm) was performed for differential diagnosis of the degree of ACC dislocation.

However, despite all the advantages of the radiologic method of investigation, a complete picture of the degree of dislocation of the ACC, the presence of damage to the surrounding soft tissues can be obtained only when combining the methods of clinical, radiologic and ultrasound studies.

Diagnostic method Use of ultrasound.



Figure 7. *Ultrasound of the acromial-clavicular joint*

Ultrasound of the acromial-clavicular joint allows to determine: the width of the articular gap, the distance between the acromion and the acromial end of the clavicle, the “step symptom” between the acromion and the clavicle, disruption of the ligament structure, loosening of its fibers, uneven thickening of the ligament, the presence of fluid inclusions and their volumes.

The use of ultrasound in all patients makes it possible to evaluate the merit of this method of investigation. The advantages of ultrasound are the following: visualization of changes in the ACS after injury during primary diagnosis and treatment monitoring; it allows correct diagnosis of ACS rupture with 100% sensitivity and specificity. Simplicity, reliability and availability of ultrasound in the postoperative period provides an undoubted priority over other instrumental methods.

The key to success in the treatment of complete dislocations of the clavicle are: correct and timely diagnosis; selection of an optimal, minimally traumatic method of surgical treatment with stable fixation of the clavicle; performance of surgery as early as possible after the injury; full rehabilitation and recovery treatment of patients. Only if all these conditions are met, a favorable outcome of treatment is possible.

Operative treatment of dislocation of the ACC.

In our clinic, we operated on 116 patients with complete dislocations (up to 5 days) in 44 patients, stale dislocations (6-21 days from the moment of injury) in 38 patients, and aged dislocations (after 22 days and later) in 34 patients. Surgical intervention was performed in 59 patients on the left and 57 on the right acromial-clavicular joint.

Indications and contraindications for surgery.

Indications for surgery are: fresh, non-fresh, aged dislocations of the acromial end of the clavicle and their recurrences. Contraindications to surgery are: abra-

sions, extensive hematomas, purulent diseases in the area of the damaged articulation, until the disappearance of these signs and exclusion of concomitant diseases.

Technique of surgery.

Under general anesthesia, an arc-shaped incision exposed the acromial-clavicular joint, removed the damaged disk and soft tissues, drill or awl with a diameter of 3 mm at the end of the clavicle, 1 cm from the edge, drill through two parallel bone channels from top to bottom, and the same bone channels drilled in the acromion opposite the clavicle, 1 cm from the bone edge. Lavsan threads are passed through the opposite bone canals. At the level of the claviculoclavicular ligament attachment, a bone canal is drilled through the clavicle from top to bottom transversely. A #6 lavsan thread is passed through this channel, its other end is passed around the clavicular process with a Deschamps needle. Then the clavicle is repositioned, creating an elbow counterbalance. After the dislocation is fully repositioned, the ends of the thread passed through the clavicle are tied firmly into a knot, making sure that the dislocation is stably repositioned. In this position of the clavicular-acromial articulation, tie the ends of the thread through the parallel holes tightly. Restoration of the clavicular-clavicular, clavicular-acromial ligament by lavsanoplasty provides stable fixation after the acromial end of the clavicle is repositioned (Fig. 8). The wound is washed and sutured in layers.

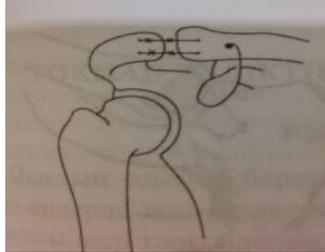


Figure 8. Repair of the clavicular-clavicular, clavicular-acromial ligament by lavsanoplasty.

The arm is temporarily fixed with a bandage, then a Soft-Cast bandage is applied for 3 weeks. The fixator, made of modern material and placed over the healthy shoulder, provides reliable immobilization of the operated clavicular-acromial joint in the postoperative period (Fig. 9). It is easy to apply, light in weight, very convenient to use and greatly facilitates wound care, as well as creates conditions for the use of physiotherapy. After removal of the external fixator, massage, physical therapy and physical therapy are prescribed.

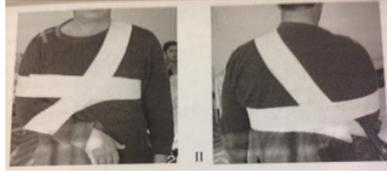


Figure 9. Immobilization of the operated clavicular-acromial joint with the Soft-Cast dressing.

Analysis of the immediate and long-term results of diagnosis and surgical treatment showed that all patients managed to achieve complete elimination of clavicle dislocation and restoration of the function of the damaged segment. Two patients had complications; one of them had suture failure due to noncompliance with the postoperative regimen, and the other had superficial suppuration of the postoperative wound, which was eliminated by local treatment.

Conclusion.

The proposed methods of radiologic and ultrasound diagnostics of minimally traumatic surgical treatment of acromial clavicle dislocation and active postoperative management of patients allow to achieve good outcomes in 99.8% of cases. The surgical intervention does not require additional equipment and removal of the fixator after clavicle dislocation repositioning. The results obtained testify to their high efficiency and possibility of application in trauma and surgical clinics.

医务人员手卫生在预防医院感染中的重要性
**THE IMPORTANCE OF HAND HYGIENE OF MEDICAL
PERSONNEL IN THE PREVENTION OF HAI**

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概括。 本文介绍了一项研究结果,旨在证明医疗机构中的手卫生是在实施《预防与提供医疗保健有关的感染的国家概念》(已批准)框架内预防 HAI 的最有效措施。 由俄罗斯联邦首席国家卫生医生于 2011 年 11 月 6 日发布)。 据透露,医疗保健相关感染(HAI)是现代俄罗斯医疗保健中的一个紧迫问题。 医院感染的主要原因是医疗机构感染控制方法不够有效和抗菌药物的过度使用。 研究过程中采用了内容分析、文献综述、排序、假设演绎、概括、形式化等方法。 使用的材料是在国际书目和摘要数据库(Scopus、PubMed)中发表的文章; 俄罗斯联邦的官方文件以及专门讨论与提供医疗服务相关的感染问题的国际文件(立法法案、计划、公约等)。 系统文献分析表明,预防 HAI 的主要措施之一是手部卫生。 结果发现,通过实施多模式方法可以实现预防 HAI 的最大效果。 根据现有科学研究,确定了医护人员强制执行手部卫生的 5 个要点。 结论是,医院感染预防必须是多模式的,成功实施医院感染预防需要医院层面的文化转变和国家协调,以解决医院感染造成的严重威胁。

关键词: 医疗保健相关感染、手卫生、预防、房间清洁、感染预防概念。

Summary. *The article presents the results of a study aimed at justifying hand hygiene in medical organizations as the most effective measure for the prevention of HAIs within the framework of the implementation of the National Concept for the Prevention of Infections Associated with the Provision of Medical Care (approved by the Chief State Sanitary Doctor of the Russian Federation on November 6, 2011). It was revealed that healthcare-associated infections (HAIs) are a pressing problem in modern Russian healthcare. The main causes of HAIs are insufficiently effective infection control methods in healthcare organizations and excessive use of antimicrobial drugs. During the study, methods such as content analysis, literature review, ranking, hypothetico-deductive method, generalization, and formalization were used. The materials used were articles published in international bibliographic and abstract databases (Scopus,*

PubMed); official documents of the Russian Federation, as well as international documents (legislative acts, programs, conventions, etc.) devoted to the issues of infections associated with the provision of medical care. The systematic literature analysis performed suggests that one of the main measures to prevent HAIs is hand hygiene. It was found that the maximum effect in the prevention of HAI can be achieved through the implementation of a multimodal approach. Based on available scientific research, 5 main points have been identified when hand hygiene is mandatory for healthcare workers. It was concluded that HAI prevention must be multimodal, with successful implementation of HAI prevention requiring a cultural shift at the hospital level and national coordination required to address the serious threat posed by HAI.

Keywords: *healthcare-associated infections, hand hygiene, prevention, room cleaning, infection prevention concept.*

Relevance of the problem

Health care-associated infections (HAIs) are infections that a patient receives while being treated in a health care setting, such as a hospital, or as a result of exposure from a health care worker, such as a doctor or nurse. Infections acquired as a result of medical care can enter the body through portals such as the bloodstream, lungs, skin, urinary tract or digestive tract, causing serious illness. These infections are difficult to treat and can persist in the body for a long time. In the worst cases, infections of this group lead to death [1, 2].

The main causes of HAIs are insufficiently effective infection control methods in healthcare organizations and excessive use of antimicrobial drugs. In the long term, reducing HAI rates depends on the implementation of multimodal prevention strategies that require behavioral and cultural changes. Key components of such strategies include identification of carriers of multidrug-resistant organisms, elimination of environmental reservoirs, measures to suppress cross-transmission, and evidence-based use of antimicrobials. These measures must be implemented within a framework of individual ownership, strong administrative support, and access to up-to-date national and local surveillance data [3].

Treatment of HAIs is exacerbated by rising rates of antimicrobial resistance. Healthcare workers and contaminated hospital environments are increasingly responsible for the transmission and persistence of multidrug-resistant organisms, as well as other pathogens such as *Clostridium difficile*. This makes it urgent to focus on a number of measures to prevent HAIs.

The purpose of this study is to substantiate hand hygiene in medical organizations as the most effective measure for the prevention of HAIs within the framework of the implementation of the National Concept for the Prevention of Infections Associated with the Provision of Medical Care (approved by the Chief State Sanitary Doctor of the Russian Federation on November 6, 2011).

Materials and methods

To achieve this goal, methods such as content analysis, literature review, ranking, hypothetico-deductive method, generalization, and formalization were used.

The materials used were articles published in international bibliographic and abstract databases (Scopus, PubMed); official documents of the Russian Federation, as well as international documents (legislative acts, programs, conventions, etc.) devoted to the issues of infections associated with the provision of medical care. 20 domestic and foreign sources were cited.

results

The main components of HAI prevention have been found to include:

1. antimicrobial stewardship to reduce overuse of antimicrobials and ensure evidence-based use of antimicrobials;
2. infection prevention strategies to control multidrug-resistant - especially methicillin-resistant *Staphylococcus aureus*, vancomycin-resistant *Enterococcus* spp. (VRE organisms) and, more recently, multidrug-resistant gram-negative bacteria;
3. cleaning and disinfection of hospitals;
4. development of prescription guidelines and treatment standards [4, 5, 6].

In this case, the main preventive measures recommended for patients to avoid infection are:

- Mandatory hand washing by the patient himself or the use of liquid, gel hand sanitizers.
- Washing hands by medical workers before performing manipulations or using liquid and/or gel hand sanitizers;
- Taking antibiotics only as prescribed by a doctor;
- Take antibiotics strictly according to the doctor's instructions, and complete the necessary course strictly in accordance with the intended purpose;
- When taking antibiotics or painkillers, care must be taken to protect the digestive tract from side effects;
- Knowledge of patient rights [7, 8].

Available research suggests that *Clostridium difficile* is one of the most common causative agents of HAI, with an annual incidence of 3.65 per 10,000 hospital days and a 30-day relative mortality rate of 6–7%. The profile of *Clostridium difficile* has increased in recent decades. Between 1999 and 2013 a hypervirulent strain of *C. difficile* (ribotype 027), which causes high morbidity in the elderly, has become endemic in hospitals in North America and the United Kingdom. The factors behind its occurrence were poor practice in prescribing antibiotics, especially fluoroquinolones, and inadequate environmental and hand hygiene; these shortcomings are also characteristic of modern Russian healthcare [9, 10, 11].

Complicating the epidemiology is that, according to expert estimates and available research data, up to 1/3 of new cases of *Clostridium difficile* infections

occur outside the home; only 35% of hospital-acquired *Clostridium difficile* infections were associated with other hospital-acquired cases when examined using whole-genome sequencing [12, 13].

Available research data indicate that viable HAI spores were isolated from 49% of surfaces surrounding patients in healthcare settings, including high-touch areas such as call buttons and bed rails, reflecting the pathogen's ability to resist desiccation and survive on hard surfaces. At the same time, other factors, including aerosolization of spores after flushing toilets and the release of asymptomatic carriers, further contribute to the pollution of the environment of medical organizations [14, 15].

Patients admitted to a room previously occupied by patients with *C. difficile* have an increased risk of acquiring a HAI, despite proper cleaning. For asymptomatic carriers of viable *C. difficile* spores, the pathogen was found to contaminate 29% of surrounding surfaces; it is currently unclear whether standard bleach cleaning and standard contact precautions should be carried out in such cases, or whether a special specialized algorithm is required [16].

C. difficile spores, the main causative agent of HAIs, have now been shown to be resistant to standard hospital disinfection methods, including alcohol-based hand rubs and conventional disinfectants (quaternary ammonium compounds). To minimize pathogen transmission, patient care packages should include contact precautions, use of patient-specific equipment, routine cleaning with bleach, and hand hygiene using soap and water [17].

The systematic literature analysis performed suggests that one of the main measures to prevent HAIs is hand hygiene. At the same time, the maximum result in the prevention of HAI can be achieved through the implementation of a multimodal approach.

Hand hygiene is a fundamental principle of quality health care. While interventions are often multimodal in nature and direct cause-and-effect relationships are difficult to prove, there is epidemiological evidence supporting the role of hand hygiene in reducing HAIs.

For example, in the period from 2002 to 2013, hospital-onset *S. aureus* bacteremia (SAB) (MRSA and MSSA) decreased by 63%, and similar reductions have been demonstrated in many countries around the world. This reduction in HAIs occurred in parallel with national initiatives, leading to the widespread implementation of successful hand hygiene programs. Good hand hygiene is a core principle in HCAI prevention packages and remains a key indicator of hospital safety and quality systems [18].

Infection with HAI pathogens occurs in hospital settings through cross-transmission, so hand and environmental hygiene are key prevention strategies. Health care workers, patients and visitors should be made aware of the importance of strict hand hygiene, especially after using the toilet.

Based on available scientific research, 5 main points have been identified when hand hygiene is mandatory for healthcare workers [19, 20].

1. Before contact with the patient. Hand hygiene is performed to protect the patient from pathogen colonization and, in some cases, from exogenous infection, harmful microbes carried on the hands. Situations included in this paragraph: handshake; assisting the patient in self-care; providing assistance and other non-invasive therapeutic procedures: applying an oxygen mask, massage, etc.; conducting a physical non-invasive examination: measuring pulse, blood pressure, auscultation of the chest, recording an ECG, etc.

2. Before clean/aseptic procedures. Hand hygiene is performed to protect the patient from infection by harmful germs, including his/her own germs, entering his/her body. Situations that are included in this item: brushing the patient's teeth, instilling eye drops, performing a digital vaginal or rectal examination, examining the mouth, nose, ear with or without instruments, inserting a suppository / pessary, suctioning the mucous membrane; dressing the wound with or without an instrument, applying ointment to the vesicle, injections/punctures; insertion of an invasive medical device (nasal cannula, nasogastric tube, endotracheal tube, urinary tube, catheter, drainage); preparation of food, medicines, pharmaceutical products, sterile materials.

3. Contact with body fluids. Hand hygiene is performed to protect the healthcare worker from colonizing or contaminating the patient's harmful microbes and to protect the healthcare environment from the spread of germs. Situations that are included in this paragraph: contact with the mucous membrane and intact skin; performing an injection or puncture; insertion of an invasive medical device (vascular access, catheter, tube, drainage, etc.); removal of an invasive medical device; removal of any protective material (napkin, bandage, gauze, sanitary pad, etc.); actions with a sample containing organic matter, after cleaning excrement and any other biological fluids after cleaning any contaminated surfaces and contaminated material (dirty bed linen, dentures, tools, urinal, bedpan, toilets, etc.).

4. After contact with the patient. Hand hygiene is performed to protect the healthcare worker from infection by pathogens and to protect the environment of the healthcare facility from the spread of germs. Situations that are included in this paragraph: after shaking hands, stroking the child's forehead; after helping the patient with self-care; after assistance and other non-invasive treatment; after a non-invasive examination: measurement of pulse, blood pressure, auscultation of the chest, ECG recording, etc.

5. After contact with objects surrounding the patient. Hand hygiene is performed to protect the healthcare worker from colonization by pathogens that may be on surfaces/objects around the patient, as well as to protect the healthcare environment from the spread of pathogens. Situations that are included in this para-

graph: after physical contact with the patient and his environment; after providing medical care, for example, after setting up equipment; after contact with surfaces or other objects, beds, bedside tables, etc.

When considering hand hygiene, the wearing of gloves deserves special attention. The use of gloves does not replace the need for good hand hygiene. Hand hygiene must be performed in all considered moments and other situations, regardless of the indication for the use of gloves. After each use of gloves, throw them away and wash your hands. Gloves should only be worn when indicated according to established standards - otherwise they become a major risk of microbial transmission.

Conclusion

Successful implementation of HAI prevention requires a cultural shift at the hospital level, and national coordination is required to address the serious threat posed by HAI. Prevention of HAIs should be multimodal, with hand hygiene being the most effective measure.

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跌倒恐惧对社会长期居住机构老年人心理生理状况的影响
**THE INFLUENCE OF THE FEAR OF FALLING ON THE
PSYCHOPHYSIOLOGICAL STATUS OF AGED PEOPLE IN A
SOCIAL INSTITUTION OF LONG-TERM RESIDENCE**

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Falls in the elderly are one of the urgent problems of modern geriatrics. According to epidemiological data, in developed countries at least 30% of people over the age of 60 have a history of falling from the height of their own growth, while in the age category over 85, falls occur in every second. The frequency of falling in people who are in social institutions of long-term residence and hospitals is 10 times higher than that in comparison with people living at home [1,2,3]. Prevention of falls and reduction of related injuries is one of the primary tasks of the healthcare system: long recovery of patients leads to high financial costs on the part of the latter, reduces the quality of life and worsens the prognosis of patients [4].

High risks of falling are associated with a large number of causes, but are more associated with frailty and other age-associated pathological changes, comorbidity and polypragmasia. When developing measures aimed at preventing falls, the greatest attention is paid to the organization of an accessible environment, correction of physical activity, rational nutrition, and optimization of drug therapy [5].

In older age groups, the experience of falling in the anamnesis can provoke a secondary fear of falling, which can become an important factor limiting the patient's movements. A decrease in activity, in turn, leads to a decrease in muscle mass and contributes to the development of sarcopenia, as well as against the background of inactivity, the level of functioning decreases. The patient begins to feel his own inability to perform this or that action, to fully serve himself. Due to physical inactivity, a person also loses social competencies, which together leads to the formation of depressive disorders. Therefore, it is necessary to timely identify the fear of falling in various situations and include measures aimed at leveling this factor in rehabilitation programs.

It is believed that to assess the fear of falling, it is enough to get the patient's answer to the screening question: "are you afraid of falling?" [6]. However, in our opinion, screening for fear of falling is not given enough attention. It should be noted that many patients may have a fear of falling in a latent form or have difficulties, due to the need to give a categorical answer "yes" or "no" without taking into account the specific situation. Underestimating this aspect may affect the effectiveness of the patient's rehabilitation.

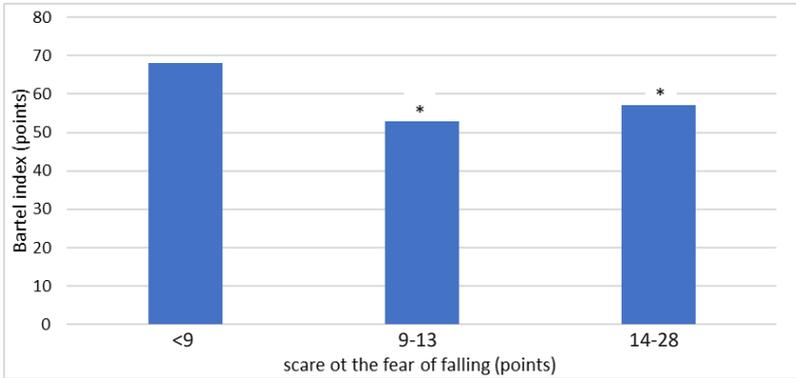
The aim of the study was to study the relationship between the grade of the fear of falling in patients over 60 years of age living in an inpatient social service institution with the psychological and functional status and frequency of falls.

The study included 86 patients (17 men, 69 women) aged 60 to 97 years (average age 83 years) living in a boarding house for the elderly and disabled №1 in St. Petersburg, Russia. The study did not include persons with severe cognitive impairment, patients with limited mobility.

We use the MMSE Short Assessment Scale, the Montreal Cognitive Impairment Assessment Scale (MoCA-test) to assess mental status; the Morse Fall Risk Scale to assess the risk of falling; the geriatric depression scale (GDS), the Bartel index, clinical and anamnestic data of patients to assess the psychophysiological state of patients. To assess the fear of falling, a short scale for assessing the fear of falling and the falls efficacy scale (FES) were used. Processing of the received data was carried out using the software Stat Tech v. 3.1.7.

The following results were obtained: 20.9% of the subjects had 1 episode of falling during the year, 8.1% had 2 episodes of falling during the year, 7.0% had 3 or more cases. When comparing two groups of patients who had experience of falling and did not have falls over the past year, statistically significant differences on the Morse scale were revealed: the risk of falling in patients with a history of falls was significantly higher. At the same time, both groups had no statistically significant differences in the severity of the fear of falling. Thus, it can be assumed that the presence of fear of falling is interrelated not only with the fact of the accomplished fall, but also with a number of other factors.

In patients who scored 9 or more points on the short scale of the fear of falls, there was a more significant decrease in daily activity (Bartel index), regardless of the number of falls in the anamnesis. The decrease in daily activity in patients with moderate fear of falling (9-13 points) and high fear of falling (14-28 points) was comparable (picture 1).



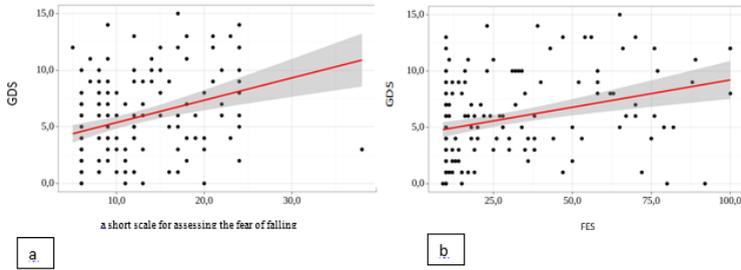
Picture 1. The level of daily activity in patients with varying grade of fear of falling.

* $p < 0,001$ compared to a group that scored less than 9 points (low fear of falling)

Lower scores on the MMSE and MoCA tests were also observed in individuals with a more pronounced fear of falling. The differences were not statistically significant and require further investigation with a large sample size. We note a positive correlation between the level of depressive symptoms and the level of fear of falling, assessed using a short scale for assessing the risk of falling and FES (table 1, picture 2a and 2b).

Table 1. Characteristics of the correlation between the level of depressive symptoms and the level of fear of falling.

Indicators	Characteristics of the correlation		
	ρ	Tightness of communication on the Cheddock scale	p
A short scale for assessing the fear of falling – GDS	0,347	Moderate	< 0,001*
FES – GDS	0,312	Moderate	< 0,001*



Picture 2a. A graph of the regression function characterizing the dependence of the level of depression on the severity of fear (a short scale for assessing the fear of falling).

Picture 2b. A graph of the regression function characterizing the dependence of the level of depression on the severity of fear (FES).

Thus, the fear of falling is an important factor influencing the psycho-emotional, cognitive and functional status of older age groups in social institutions of long-term residence. At the same time, it should be borne in mind that this fear may also be present in persons who have not had a history of falling episodes. A short scale for assessing the fear of falling and falls efficacy scale can be used in a comprehensive assessment of the patient's condition for the personalized development of rehabilitation programs. When developing rehabilitation programs for patients of older age groups in inpatient social service institutions, it is necessary to take into account measures to work with fears of falling.

Conclusion. The fear of falling is an important factor limiting the vital activity of people of older age groups. In turn, restriction in daily activity leads to deterioration of cognitive functions, a decrease in the quality of interaction with the environment, increasing the risks of falling. Thus, a vicious circle is formed and the risk of falling increases. The results of the analysis suggest that by influencing one of the pathogenetic links, namely the secondary fear of falling, it is potentially possible to reduce the risks of falling and improve the quality of life in older age groups in a social hospital.

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肺炎患者的生活质量

QUALITY OF LIFE IN PATIENTS WITH PNEUMONIA

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注解。该研究的重点是肺炎患者的生活质量。肺炎作为呼吸系统常见疾病，对患者的身心健康影响重大。本研究的目的是评估肺炎对身体状况、社会适应和情绪健康等生活质量各个方面的影响。

Annotation. *The study focuses on the quality of life in patients who have had pneumonia. Pneumonia, as a common disease of the respiratory system, has a significant impact on the physical and psychological well-being of patients. The aim of this study is to evaluate the impact of pneumonia on various aspects of quality of life such as physical condition, social adaptation and emotional well-being.*

Introduction. Pneumonia is a serious disease that has a significant impact on the health and quality of life of patients. This inflammatory lung disease is caused by various microorganisms such as bacteria, viruses and fungi and can lead to acute or chronic respiratory pathology. Significant medical advances have been made in the fight against pneumonia, which contributes to patient survival rates. However, when patients carry this disease, they often face a number of physical, emotional and social consequences that impact their quality of life.

Pneumonia, or pneumonia of the lungs, remains one of the most common and serious infectious diseases in the world. Every year, millions of people are confronted with this disease, which can have a variety of consequences for their health

and quality of life. Recently, however, with rapid advances in medical science and practice, and with improvements in the quality of care, most patients successfully survive pneumonia and recover.

It should be noted that the quality of life after pneumonia is of key importance for the overall well-being of patients. It can be accompanied by various complications and leave long-term consequences for the body. However, modern methods of medical rehabilitation provide an opportunity to significantly improve the quality of life of patients after pneumonia.

The aim of the study is to analyze the quality of life in patients with pneumonia, both before and after rehabilitation measures. This will allow us to better understand how pneumonia affects the physical and psychosocial well-being of patients and what specific steps can be taken to improve their well-being.

In the process of the study we will look at various aspects including physical activity recovery, rehabilitation of respiratory function, psychological support and social integration. The influence of age, gender and comorbidities on the quality of life of patients after pneumonia will also be analyzed.

Materials and methods of the study. The study was conducted in the pulmonology department. The study included 30 patients with pneumonia aged from 23 to 73 years after inpatient treatment and 28 age-matched patients without rehabilitation. The mean age of the study subjects was 49.8 ± 1.42 years. There were 13(40.3%) men and 17 (50.6%) women. Medical records, case histories, anamnesis data and chest computed tomography were analyzed to analyze individual contraindications to rehabilitation and participation in the study. Saturation (SO₂) and heart rate (HR) were measured to assess the functional status. To determine the level of exercise tolerance a six-minute walk test was performed before and after rehabilitation. Rehabilitation was carried out in a day hospital. The following parameters were taken into account: severity of the transferred pneumonia, degree of lung damage, sex, weight, age, concomitant diseases. The duration of rehabilitation was 2 weeks.

The program of lung rehabilitation after pneumonia was developed individually. The individualized plan of rehabilitation measures included:

1. therapeutic physical training: breathing exercises to improve the drainage function of the bronchi and respiratory function of the lungs, therapeutic gymnastics in active mode (individual, group) on the indications - 20-30 min, therapeutic gymnastics in passive mode - individual.

2. Physical procedures (no more than 2-3 types of procedures during the course); individually, all procedures according to indications:

- electrostimulation of the neuromuscular apparatus;
- heat procedures (applications of paraffin, ozokerite);
- pain-relieving electro-physical treatments;
- laser therapy;

- magnetotherapy;
- electrophoresis (potassium iodide, magnesium sulfate, proserine, eufylline);
- ultrasound therapy.

3. Psychological correction. Talks meditation group and individual, positive attitude - affirmations.

Quality of life before and after rehabilitation measures was assessed in patients who underwent rehabilitation in a day hospital.

Table 1
Quality of life in patients with pneumonia.

SF -36		Patients with pneumonia (n-30)	Control group (n-28)	%
Physical component	Physical Functionalization (RF)	35,4± 4,03	64,8±3,6	45,3
	Role Functionalization (RR)	39,5±5,5	59 ,4±2,1	33,5
	Bodily pain (BP)	51,36±3,2	73,83± 2,0	30,43
	General Health (GH)	32,63±4,99	52,1±2,6	37,4
Psychological component	Viability (VT)	55,2±1,94	69,2±3,1	20,2
	Social Functioning (SF)	57,46±2,95	78,3±3,4	26,4
	Emotional Functioning (RE)	58,66±6,36	71,7±4,9	18,2
	Mental health (MH)	67,12±3,14	83,14±5,95	19,26

The patients' quality of life (QOL) was assessed using the SF-36 questionnaire (TheShortForm-36) before and after rehabilitation measures. The control group consisted of 28 age-matched patients without COVID- 19 The questionnaire consists of 36 items on 8 scales: Physical Functioning (PF), Role-Physical Functioning (RP), Bodily pain (BP), General Health (GH), Vitality (VT), Social Functioning (SF), RoleEmotional Functioning (RE), Mental Health (MH). All these scales can be divided into two large components: physical health and psychological health. Each component consists of 4 aspects, the physical component consists of aspects such as: physical functioning (PF), role functioning (RP), bodily pain (BP) and general health (GH) The psychological component includes aspects such as: vitality (VT), social functioning (SF), emotional state (RE) and mental health (MH). The results for each question were expressed in scores, which were enclosed in a scale with values from 0 to 100. At the same time, numerical indicators of the sum of scores close to 100 indicated high EF, and closer to 0 - low [1,2].Statistical processing of the obtained data was performed on a personal computer using a package of statistical programs Microsoft Office Excel 2016, IBM SPSS Statistics

20, as well as with the help of an online calculator developed to calculate the indicators of the SF 36 questionnaire scales. The distribution results were presented in the form of $(M \pm m)$, where M - arithmetic mean, m - standard error of the mean.

Study Results. In the examined patients, the priority complaints were: dyspnea, cough, heart pain, headache, unstable or elevated blood pressure (BP), general weakness, sleep disturbance, and muscle pain.

In the examined patients, the priority complaints were: dyspnea, cough, heart pain, headache, unstable or elevated blood pressure (BP), general weakness, sleep disturbance, muscle pain. When analyzing the results of CL in patients who had pneumonia before rehabilitation in comparison with age-matched patients who did not have pneumonia, it was found that in the group of patients with a severe course of the disease a significant decrease in the general index of CL by 29.9% was revealed. The physical component decreased by 45.0%, including physical activity, self-care, walking and other physical skills. This severely limited patients' daily activities of daily living. Role functioning scores decreased by 33.5% and patients had difficulty in performing daily activities due to physical problems. The psychological component decreased by 20.88% due to patients' fatigue and decreased vitality. Patients' satisfaction with their social functioning was lower than in the control group, and patients had difficulty in performing work and usual social activities. After rehabilitation measures, normalization of various parameters such as blood pressure, intensity of headaches, heart pain, dyspnea, sleep, muscle pain and cough was observed after 2 weeks.

Table 2

Analysis of the quality of life of patients with pneumonia before and after rehabilitation measures.

SF -36		Patients with pneumonia (n-30)	Control group (n-28)	%
Physical component	Physical Functionalization (RF)	35,4±4,03	44,6±3,98	<0,011
	Role Functionalization (RR)	39,5±5,5	46,±5,78	≥0,05
	Bodily pain (BP)	51,36±3,2	61,84±3,22	<0,002
	General Health (GH)	50,48±2,44	60,06±1,7	<0,001
Psychological component	Viability (VT)	55,2±1,94	69,96±2,0	<0,001
	Social Functioning (SF)	57,46±2,95	63,96±3,0	<0,003
	Emotional Functioning (RE)	58,66±6,36	67,34±5,76	<0,033
	Mental health (MH)	67,12±2,14	73,14±1,95	0,003

Table 2 shows that there were changes in the quality of life (QOL) parameters after rehabilitation measures. There was a significant improvement in physical functioning, from 35 ± 0.3 to 44.6 ± 3.98 ($p < 0.011$). This indicates an improvement in the subjects' ability to perform physical activities during their normal day, including self-care, walking and climbing stairs. There was also an improvement in the aspect of bodily pain, from 51.36 ± 3.2 to 61.84 ± 3.22 ($p < 0.05$). This indicates a reduction in pain, which has a positive effect on the overall physical condition of the patients. The most significant improvement was seen in the psychological component, from 55.2 ± 1.94 to 69.96 ± 2.0 ($p < 0.001$). This indicates an increase in vitality in the patients.

Conclusions. The patients' satisfaction with their social functioning was lower than in the control group. This is due to the fact that physical and emotional condition prevented the performance of normal social activity. After rehabilitation measures, normalization of some indicators including blood pressure, headaches, heart pain, dyspnea, sleep, muscle pain and cough was observed after 2 weeks. These results indicate significant changes in the QOL of patients with pneumonia, especially in the physical and psychological components. Rehabilitation measures allowed some patients to improve their condition. Implementation of an individual plan of rehabilitation measures is aimed at lung recovery after pneumonia and leads to improvement of clinical condition and quality of life, mainly due to physical functioning.

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印度卟啉症的患病率和现代诊断方法
**PREVALENCE AND MODERN DIAGNOSTIC METHODS OF
PORPHYRIA IN INDIA**

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抽象的。卟啉症是一组罕见的遗传性代谢性疾病，可引起一系列症状和并发症。对印度卟啉症患病率的研究有限，印度使用的诊断方法也没有很好的记录。需要进一步研究以更好地了解印度卟啉症的患病率和特征，并改善获得诊断测试和治疗的时机。

及时识别和治疗可以降低死亡率和发病率，避免触发因素和可用的治疗可以停止发作并提供良好的预后。

关键词：卟啉症，氨基乙酰丙酸，胆色素原，红细胞生成性原卟啉症，迟发性皮肤卟啉症，沃森-施瓦茨试验。

Abstract. *Porphyria is a rare group of inherited metabolic disorders that can cause a range of symptoms and complications. The prevalence of porphyria in India has been studied to a limited extent, and the diagnostic methods used in India are not well documented. Further research is needed to better understand the prevalence and characteristics of porphyria in India, as well as to improve access to diagnostic testing and treatment.*

Timely recognition and treatment could decrease mortality and morbidity, avoiding trigger factors and available treatment could cease the attack and provide a good prognosis.

Keywords: *porphyria, amino levulinic acid, porphobilinogen, erythropoietic protoporphyria, porphyria cutanea tarda, Watson-Schwartz test.*

Introduction. *Porphyria is not a single disease but a group of rare metabolic disorders caused by altered activities of enzymes within the heme biosynthetic*

pathway. It is characterized by excessive accumulation and excretion of porphyrins and their precursors.

There are several types of porphyria, each with different symptoms and disease progression. However general categories of porphyria mainly affects the nervous system and the skin. In addition, there are mixed categories which affect both the systems [1].

Biochemical diagnostic testing is essential and need not be complex if only one or a few first-line tests are used for screening, with further testing only when a screening test is positive. The specific screening test used depends on the type of porphyria suspected.

Even if porphyria could not be cured, certain lifestyle changes may help to avoid triggering symptoms. Treatment for symptoms depend on the type of porphyria presented. Prognosis of porphyria looks promising showing minor number of mortality and morbidity.

Classification of porphyria. Porphyria could be classified based on mode of inheritance, clinically and physiologically. On the basis of mode of inheritance, porphyria could be Autosomal Dominant which include: Acute Intermittent Porphyria (AIP), most cases of Erythropoietic ProtoPorphyria (EPP), Hereditary CoproPorphyria (HCP), Variegate Porphyria (VP), Autosomal Recessive which include: Delta amino levulinic acid Dehydratase Deficiency Porphyria (ADP), Congenital Erythropoietic Porphyria (CEP), some cases of EPP. When EPP is caused by mutations in the ALAS-2 gene, it has an X-linked Dominant pattern of inheritance.

On the basis of clinical presentation, porphyria could be Acute which include: AIP, ADP also known as plumboporphyria, cutaneous which include: Porphyria Cutanea Tarda (PCT) also known as Vampire's disease, EPP, CEP also known as Gunther's disease, and Mixed porphyrias which include: VP, HCP.

Based on physiology, porphyrias are divided as liver or erythropoietic depending on the sites of accumulation of heme precursors, either in the liver or in the bone marrow and red blood cells. CEP, EPP, accumulates their precursors in the bone marrow and AIP, PCT, HCP, VP, accumulates their precursors in the liver [2, 3].

Prevalence of porphyria in India. The prevalence of porphyria in India is poorly studied, with only a few case reports and small case series available in the literature. However, there are some indications that porphyria may be more common in India than previously thought. For example, a recent study by Bhaduri et al. reported a high prevalence of porphyria cutanea tarda (PCT) in a cohort of patients with chronic liver disease in India [4]. Another study by Khandpur et al. reported a high prevalence of PCT and erythropoietic protoporphyria (EPP) in patients with cutaneous lesions in North India [5, 6].

To evaluate the prevalence of porphyria in India, we conduct a systematic review of the available literature and analyze the data from published studies.

The prevalence of porphyria in India indicating a high prevalence in Jammu & Kashmir followed by South-Central Rajasthan and Western Rajasthan respectively. The other parts of India shows sporadic cases.

The prevalence rate of different types of porphyria in India. In 95% of inhabitants, no porphyria symptoms are noticed. The left 5% population is affected by porphyria in which PCT is the most common, followed by EPP, congenital erythropoietic porphyria (CEP), variegate porphyria (VP) respectively.

The study shows a higher percentage for acute intermittent porphyria (AIP), followed by PCT, CEP, EPP, VP respectively [7, 8].

The prevalence of porphyria studied in different sexes and it has been noted that porphyria affect females more than males in a population.

Modern diagnostic methods of porphyria in India. The diagnosis of porphyria in India is typically made using a combination of clinical features, laboratory testing, and genetic analysis. Laboratory testing may include urine and blood tests to measure porphyrin levels and enzyme activity, as well as genetic testing to identify mutations in genes associated with porphyria. However, the availability and accessibility of these diagnostic tests may vary depending on the region and healthcare setting.

Since the symptoms of porphyria are non-specific, the diagnosis is often delayed or even missed altogether. To avoid this problem, porphyria should be considered and ruled out in the many patients who have compatible symptoms but may turn out not to have porphyria.

The diagnostic methods consist of screening tests and confirmatory test. Screening method consist of laboratory tests, instrumental methods are used. The most rapid screening test is done on urine using Watson-Schwartz test. But the most significant information to be noted in case of porphyria is the unreliability in test result when the patient is not having an attack since only during an attack does the abnormal level of porphyrin shows and other times, it's mostly normal or near normal.

The major pathologic finding in AIP is muscle denervation. In patients with neuropathy, EMG studies show a reduced motor nerve conduction velocity, and histopathology is consistent with axonal neuropathy and secondary demyelination.

In case of Acute hepatic porphyria, the best screening tests are urinary porphobilinogen (PBG) and levulinic acid (ALA). On the other hand, in case of cutaneous porphyria, the best screening test is a plasma porphyrin assay. And if one of these screening tests is abnormal, more extensive testing, including urinary, fecal, and red blood cell porphyrins, are often indicated. The procedure for blood test is same

as in normal blood sample collection and then send to laboratory. Urine test consist of 24-hour urine sample in which the patient collect all urine during a 24-hour period because the amounts of substances in urine, including porphyrin, can vary throughout the day, and Random urine test whose procedure is same as in normal urine test and then send to laboratory. Stool test follows the same pattern of collecting in special containers and sending to laboratory to be tested [8, 9].

Watson-Schwartz test – in this method, PBG is detected by a color re-action with Ehrlich reagent and confirming that the color is not removed by chloroform.

Confirmatory test is gene testing. This test may help confirm the diagnosis and determine which specific gene mutation. Followed by this test is genetic counselling in which the consulting doctor may recommend testing for the same mutation in patient's family members and also help the patient and their family to understand how test results may affect their lives.

Conclusion. Porphyria is a rare group of inherited metabolic disorders that can cause a range of symptoms and complications. The prevalence of porphyria in India has been studied to a limited extent, and the diagnostic methods used in India are not well documented. Further research is needed to better understand the prevalence and characteristics of porphyria in India, as well as to improve access to diagnostic testing and treatment.

As porphyria is a group of rare metabolic disorders with non-specific symptoms, it is not easily over ruled by clinical practitioners leading to severe and notable abnormalities in functioning of various organs.

Timely recognition and treatment could decrease mortality and morbidity, avoiding trigger factors and available treatment could cease the attack and provide a good prognosis.

The lack of awareness of porphyria in socio-economically underdeveloped communities result in their poor health and living conditions.

Diagnosis and management of porphyrias require multi-disciplinary collaborations among family practitioners, dermatologists, and porphyria specialists

Development of specialized porphyria centers to provide information, services, support to patients, clinicians and to conduct clinical trials/research on the many unknown aspects of porphyrias is need of the hour.

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结构保温泡沫混凝土的隔声性能

**SOUND INSULATION PROPERTIES OF STRUCTURAL AND
THERMAL INSULATING FOAM CONCRETE**

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抽象的。 本文介绍了泡沫混凝土密度随材料厚度对空气噪声隔离指数影响的研究结果。 现已确定,最有效的选择不使用重混凝土,而是使用密度为 900–1100 kg/m³ 的轻混凝土。 隔断厚度为8厘米,对各类房屋的房间之间的内部隔断均能提供有效的隔音效果,隔断厚度为10厘米,浴室与房间之间的隔声指标达到要求值。 公寓。“B”类房屋的墙壁和公寓之间、公寓房间与楼梯、大厅、走廊、大堂之间的墙壁和隔断所需的噪音防护等级通过墙厚 12 厘米实现,“B”类房屋 – 14 厘米和“А”类房屋 – 16 厘米。

关键词: 非蒸压泡沫混凝土、强度、导热系数、空气噪声隔离指数。

Abstract. *The article presents the results of studies on the influence of foam concrete density depending on the thickness of the material on the airborne noise insulation index. It has been established that the most effective option is to use not heavy concrete, but light concrete with a density of 900-1100 kg/m³. With a partition thickness of 8 cm, the internal partition between rooms for houses of all categories provides effective noise protection, and with a partition thickness of 10 cm, the required value of the sound insulation index is achieved between the bathroom and the room of one apartment. The required degree of noise protection*

for walls and partitions between apartments, between rooms of apartments and staircases, halls, corridors, lobbies for houses of category “B” is achieved with a wall thickness of 12 cm, houses of category “B” - 14 cm and houses of category “A” - 16 cm.

Keywords: *non-autoclaved foam concrete, strength, thermal conductivity, airborne noise insulation index.*

Introduction

Reducing noise levels is one of the important pressing problems of our time - providing environmentally friendly and comfortable working, living and living conditions for the population of cities. The article [1] notes that customers and builders, trying to attract home buyers with large apartment areas, amenities, proximity to transport communications and at the same time trying to reduce construction costs, often “forget” about acoustic comfort. Because of this, partitions and inter-apartment walls have an insufficient airborne noise insulation index; ceilings do not provide sufficient insulation from impact noise; Monolithic structures create favorable conditions for the propagation of structural noise. As a result, in residential premises of multi-storey buildings, sanitary standards for permissible noise are often not observed, which adversely affects public health [2, 3]

LLP “AlmatyBeton Materialdary” is developing foam concrete technology for the production of panels used for constructing non-load-bearing interior and apartment partitions. In the construction of Kazakhstan, partitions are made from piece materials, in particular from splitter and gas-foam blocks, which does not meet the requirements of modern construction technology due to low productivity, the use of a significant number of highly qualified workers, and the partitions themselves do not in all cases provide the required level of sound insulation in the premises. In particular, partitions from blocks are made of smaller thickness, at which the required level of sound insulation is not achieved. In addition, partitions mounted from piece materials are not recommended due to seismic safety conditions, according to the conditions of which [4, p. 172, clause 9.4.1] it is preferable to make non-load-bearing partitions from lightweight panels, and in addition [5, p. 12-13] the index of the degree of sound insulation of interior walls should be at least 41 dB, and between apartment walls - at least 52 dB for houses with comfortable living conditions.

An extract from the requirements of SP RK 2.04-105-2012 regarding the values of airborne noise insulation indices by internal enclosing structures is presented in Table. 1.

Table 1

Standard values of airborne noise insulation indices by internal enclosing structures R_w and reduced impact noise level indices L_{nw} for premises for various purposes (excerpt)

Name and location of the enclosing structure	R_w , dB	L_{nw} , dB
1	2	3
Residential buildings		
8 Walls and partitions between apartments, between apartment premises and staircases, halls, corridors, lobbies:		
- in houses of category A	54	
- in houses of category B	52	
- in houses of category B	50	
11 Partitions between rooms, between the kitchen and the room in the apartment:		
- in houses of category A	43	
- in houses of categories B and C	41	
12 Partitions between the bathroom and the room of one apartment	47	

In Kazakhstan, the categories of houses are deciphered as follows: A – houses with highly comfortable living conditions, B – houses with comfortable living conditions, C – houses with maximum permissible noise levels.

Materials and methods

The following raw materials were used in the production of foam concrete: Portland cement brand M500 D0 from Heidelbergcement (formerly Bukhtarminsky cement plant), ash component of the ash and slag mixture of Almaty CHPP-1*, expanded clay sand, additives and protein foaming agent produced by LLP “Kotloservice”.

The preparation of foam concrete was carried out in the following sequence. First, a mortar mixture of cement, ash and expanded clay sand was prepared and then mixed with separately prepared foam. Samples after 28 days of hardening under normal temperature and humidity conditions were tested in accordance with the standards in force for cellular concrete.

Samples of foam concrete panels for acoustic testing were prepared in a cassette installation at the experimental base of AlmatyBeton LLP “Materialdary” according to the recipe of the authors of the article. The test methodology for determining the sound insulation index of foam concrete panel samples is given in the description of the experimental part of the article.

Results and discussion

Determined by calculation in accordance with the formula recommended in SP RK 2.04-105-2012, the airborne noise insulation index depending on the density of concrete at different material thicknesses is presented in Fig. 1 and table. 2. The

data obtained show that the most effective option is to use not heavy concrete, but light concrete with a density of 900-1100 kg/m³.

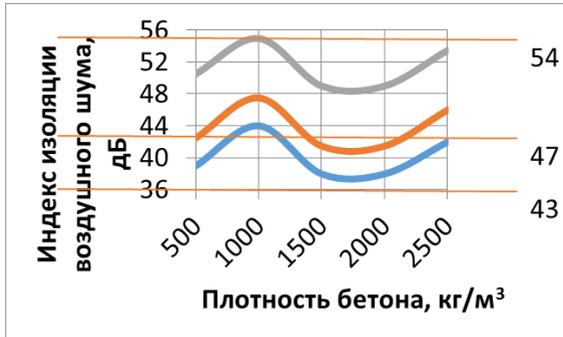


Figure 1. Relationship between concrete density and airborne noise insulation index

Concrete thickness, mm: 1 – 80; 2 – 100; 3 – 140 mm

Table 2

Effect of the thickness of foam concrete with a density of 900 kg/m³ on the airborne noise insulation index

Airborne noise insulation index, dB, with concrete thickness, cm				
8	10	12	14	16
43,9	47,5	50,4	53,2	55,1

Calculated data show the effectiveness of using D900 foam concrete for the manufacture of panels of internal walls and partitions. Already with a wall thickness of 8 cm, the internal partition between rooms for houses of all categories provides effective noise protection, and with a partition thickness of 10 cm, the required value of the sound insulation index is achieved between the bathroom and the room of one apartment.

The required degree of noise protection for walls and partitions between apartments, between apartment premises and staircases, halls, corridors, lobbies for houses of category “B” is achieved with a wall thickness of 12 cm, houses of category “B” - 14 cm and houses of category “A” - 16 cm.

When constructing partitions from autoclaved aerated concrete blocks, which are most widely used in Kazakhstan, the thickness of the walls to ensure the required degree of protection from airborne noise must be significantly greater (Table 3). But whether sound insulation standards are observed during the construction of houses in our Republic seems difficult to answer unequivocally.

Table 3

Relationship between the thickness of aerated concrete with a density of 500 kg/m³ and the airborne noise insulation index

Airborne noise insulation index, dB, with concrete thickness, cm						
8	10	12	14	16	20	21
39,2	42,8	45,5	48,2	50,3	53,9	54,7

Based on the requirements for internal wall concrete panels [6], we have developed a composition of structural and thermal insulation non-autoclaved foam concrete with a density of 900 kg/m³, compressive strength class B3.5, thermal conductivity coefficient 0.21 W/(m °C) . Expanded clay sand is used as a fine aggregate - a waste product of the Kazakh company KazKer LLP, located in the village. Otar, Almaty region. Sand for the plant is a waste, since consumers - construction organizations - use only expanded clay gravel of a fraction of 5-20 mm to install a soundproofing layer in the floors of residential buildings. Due to the increased density and, accordingly, thermal conductivity, expanded clay gravel is no longer used as a lightweight filler when producing thermal insulating concrete. The annual volume of expanded clay sand stored as waste is 6,000 m³, while in 2023 the plant plans to launch a second expanded clay production line, which will accordingly lead to a doubling of sand output.

The use of expanded clay sand is due to the need to obtain foam concrete with a compressive strength class of B3.5 with a material density of 900 kg/m³, which turned out to be unattainable when using various types of sand as filler (dune, river, screenings from rock crushing).

The consumption of raw materials for the production of 1 m³ of non-autoclaved foam concrete D900 is: Portland cement grade M500 - 310 kg, expanded clay sand - 0.49 m³, ash component of the ash and slag mixture - 90 kg, additives 7.3 kg, protein foaming agent - 0.6 l.

A review of global construction practice shows that for craneless installation, panels must be made not the size of a room, but, as a rule, the length of the room's height, and a width of no more than 600 mm. The panels are fastened together using a tongue-and-groove system.

Non-load-bearing panels, which include partitions, are not considered structural elements, so their density is limited to the D900 grade. Therefore, a rational option for the manufacture of partitions is to use foam concrete with a density of 900 kg/m³.

To experimentally determine the degree of sound insulation of foam concrete walls 10 cm thick with a material density of 900 kg/m³, a box chamber was made in the form of a hollow cube with an edge size of 1.2 m, inside which an omnidirectional sound source (dodecahedron) AT-001 No. 001 was installed in the

kit). The noise level outside the chamber was recorded using a sound level meter (PKDU 411000.001RE “Multifunctional acoustic meter “ECOPHYSICS”) (Fig. 2).



Figure 2. Preparing the box camera for operation

The results of test data performed using the Signal + 3GRTA software show that the average level of sound insulation index for walls made of foam concrete with a density of 900 kg/m³ and a thickness of 100 mm is 45-46 dB, which meets the requirements for houses with highly comfortable living conditions.

Conclusion

Thus, the results of experimental studies confirm the high efficiency of using foam concrete panels with a density of 900 kg/m³ for the construction of internal partitions. D900 cellular concrete rationally combines the strength and sound insulation properties of the material. Their use, among other positive qualities, ensures environmentally friendly premises, fire safety, as well as the possibility of hanging cabinets, radiators, and household appliances on the wall.

The measured value of the airborne noise insulation index of the tested enclosing structure, made of wall panels made of lightweight concrete grade D900 and separating the box chamber and the production room, was 45-46 dB, which meets the requirements for houses with highly comfortable living conditions.

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保温珍珠岩水泥板

THERMAL INSULATION PERLITE-CEMENT PLATES

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抽象的。介绍了珍珠岩保温混凝土配方及技术开发的研究成果。采用进口原料(亚美尼亚)的膨胀珍珠岩,样品密度200-250 kg/m³,抗压强度0.15-0.25 MPa,干导热系数0.054-0.067 W/(m·°C)获得。

关键词: 珍珠岩, 珍珠岩混凝土, 隔热, 密度, 强度, 导热系数。

Abstract. *The article presents the results of research on the development of compositions and technology of thermal insulating perlite concrete. Using expanded perlite obtained from imported raw materials (Armenia), samples with a density of 200-250 kg/m³, a compressive strength of 0.15-0.25 MPa, and a dry thermal conductivity coefficient of 0.054-0.067 W/(m °C) were obtained. .*

Keywords: *Perlite, perlite concrete, thermal insulation, density, strength, thermal conductivity.*

The problem of heat conservation in recent years has become one of the particularly priority areas in the world, and, accordingly, also in the Republic of Kazakhstan. This is due to the high fuel consumption for heating and maintaining a comfortable thermal regime in the residential premises of buildings and, accordingly, the need to save fuel and energy resources. Thus, according to foreign specialists from the Isover company, the largest share of extracted oil (40%) is

used to heat buildings, 32% is used to obtain fuel for cars, and only 28% is used for industrial needs. With this level of fuel consumption, the need to use highly efficient thermal insulation materials to insulate the external structures of buildings and structures becomes completely obvious.

Thus, calculations carried out in accordance with the standard indicators of thermal protection of enclosing structures show that in the case of installing a wall made of ordinary solid ceramic bricks, the thickness of the external structure for the conditions of Almaty should be about 1.4 m, and for the conditions of Astana - more than 2 m. Therefore, the most widespread construction is of frame houses in which the load-bearing elements are structures made of monolithic reinforced concrete or metal, and the walls are a self-supporting system with effective thermal insulation materials.

According to the calculations of the authors of the article, what thickness of the wall in Almaty, in the case of its construction from traditional wall materials, should currently be visible from Fig. 1. The density values of the materials shown in Fig. 1 are as follows: solid brick – 1800 kg/m³; hollow brick - 1000 kg/m³; expanded clay concrete – 1000 kg/m³; autoclaved aerated concrete block - 500 kg/m³; perlite concrete block – 600 kg/m³; basalt slab – 80-125 kg/m³; expanded polystyrene – 20-25 kg/m³.

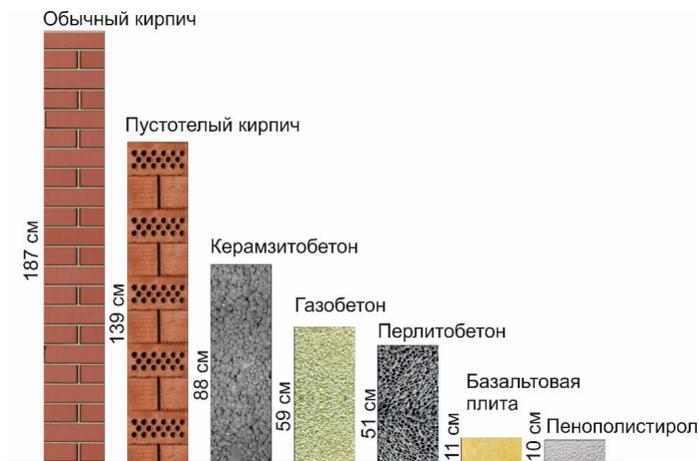


Figure 1. Thicknesses of various materials that provide thermal characteristics of external walls for the conditions of Almaty according to the standards adopted in 2001 (addition to SNiP II-3-79* “Construction Heat Engineering”)

From the analysis of Fig. 1 it follows that external enclosing structures must be multi-layered using heat-insulating materials. As an exception, single-layer walls

can be made from aerated concrete blocks, but the thickness of the wall, taking into account the protective finishing layer, will still be more than 60 cm, which is unacceptable for multi-story buildings due to the significant loss of usable area. On the other hand, when building in a seismic zone, such a wall is also not advisable, not to mention the fact that it is impossible to hang furniture, heating radiators and other household items on such a wall.

Despite their high thermal insulation capacity, mineral wool boards and foam plastics still have two unfavorable aspects: the first is a hidden danger that can manifest itself during the operation of residential buildings, and specifically, environmental unsafety for apartment residents, and the second is fragility, insufficient resistance to fires [1 -2].

Effective thermal insulation products include materials based on expanded perlite, which is due to the low thermal conductivity and density of this material. In the Republic of Kazakhstan, the Union-Perlite company organized the production of expanded perlite based on imported raw materials, in particular imported from Armenia and Georgia. The lightweight, highly porous aggregate produced at the enterprise is mainly sold in the construction industry as one of the components of a dry plaster mixture and in agriculture for application to the soil as a water-retaining component. At the same time, it seems very promising to obtain heat-insulating products based on it, which is hampered by the lack of developments in this area and the corresponding equipment. The reason for this situation is the difficulty of obtaining a homogeneous mixture by mixing a small volume of cement paste with grains of expanded perlite. For example, to obtain a material with a density of 300 kg/m³ based on expanded perlite with a bulk density of 75 kg/m³, approximately 1.4 m³ of aggregate is required to be mixed with cement paste with a volume of only 0.21 m³. And this is with a water-cement ratio (W/C) equal to 1. In this case, it is necessary to take into account the high water demand, as well as the fragility and low strength of expanded perlite grains, which can be crushed to a large extent during mixing. Therefore, factories that previously produced thermal insulating perlite concrete using fuel and energy-intensive technology were unable to compete with other materials and were forced to close.

In particular, the injection technology for producing heat-insulating boards from expanded perlite is carried out in the following way [3. For 1 m³ of expanded perlite, 125-135 kg of cement and about 35 kg of asbestos are consumed. The raw material mixture is prepared in the following sequence: first, water is poured into the mortar mixer (about 850 liters of water per 1 m³ of expanded perlite), then asbestos is loaded, cement and expanded perlite are poured. After introducing the expanded perlite, the mass is stirred for 1.5 minutes and poured into molds. Products formed at a specific pressure of 0.05 MPa are pushed out of the press mold onto a perforated tray. Hardening occurs in special chambers where steaming and

drying are combined. First, the products are kept at a temperature of 150 °C for 4 hours, then at a temperature of 80 °C for 6-8 hours, after which the temperature rises sharply to 150 °C and the products are dried to a residual moisture content of 15-20%.

The perlite cement products obtained in this way were intended for thermal insulation of industrial equipment and pipelines at temperatures of insulated surfaces up to 600 °C.

As can be seen from the data presented, in addition to the complexity and energy intensity of the technology, the raw material mixture contains a significant amount of asbestos, which is generally prohibited for use in European countries.

Interest in the revival of thermal insulating perlite concrete slabs is caused not only by the need to expand the range of products, but also by a sharp increase in the cost of basalt slabs used on a mass scale in housing construction. For example, the cost of 1 m³ of basalt slabs of grade P100, that is, with a density of 100 kg/m³, exceeds 45,000 tenge (more than 100 US dollars). In addition, the binders used in the technology of basalt products are imported materials, which predetermines Kazakhstan's import dependence on foreign countries.

When conducting research on the development of technology, expanded perlite sand grade P75 from Union-Perlite was used based on the Aragatskoye deposit (Armenia).

Cement from domestic plants was used as binders, the physical and mechanical characteristics of which are presented in Table. 1.

Table 1
Physico-mechanical properties of Portland cements

Indicators	Bukhtarma plant	Shymkent plant	Semipalatinsk plant
Specific surface area, cm ² /g	4 100	2 800	3 300
Normal density, %	25	24	27
Setting time, h-min:			
Start	1-15	1-30	1-45
end	2-30	4-25	2-50
Compressive strength after 28 days, MPa	49,5	34,3	42,7

In addition to the main raw materials, various additives were used in the work, in particular, microfibers, inorganic salts, surface-activated substances (SAS), hyperplasticizers, the characteristics of which corresponded to the passport data for these materials.

The second stage of the work involved determining the method of mixing and molding perlite concrete, since the low strength and, accordingly, high fragility of

perlite grains do not allow preparing a molding mixture in the same way as, for example, when producing expanded clay concrete. In this case, it is also necessary to take into account the low consumption of Portland cement per unit volume of the mixture compared to the volume of expanded perlite, which differ by one order of magnitude.

Various sequences of introducing raw materials into the mixer, including water and additives, were tested. As a result of numerous experiments, the most optimal method for mixing the mixture was chosen in which porous cement paste with an excess amount of water is first prepared. Then, with the mixer running, perlite and microfiber are introduced, and the mixture is further mixed for 1-2 minutes.

Water-soluble additives, including calcium chloride, liquid glass and surfactants are introduced together with the mixing water, microfiber - together with perlite.

The composition of perlite concrete was selected separately from expanded perlite from imported raw materials and separately from local raw materials from the Aigul deposit, as well as from a mixture of them. This is due to the significant difference between these highly porous aggregates in bulk density (the main characteristic of such materials) and, accordingly, in density in a piece of grain.

Analysis of the fractional compositions of expanded perlite sands obtained from domestic and imported raw materials shows the following (Table 2). In accordance with the classification according to GOST 10832-2009 (expanded perlite sand and crushed stone), expanded perlite sand with grain sizes from 0.16 to 1.25 mm, obtained by firing perlite rock from the Armenian deposit, corresponds to the VPM brand (fine expanded sand). But at the same time, the volume of the dusty part of the sand, that is, grains less than 0.16 mm in size, is equal to 24.5%, while in the specified standard their content should not exceed 10%. Therefore, during the experiments, the excess volume of the dusty fraction of sand grains was removed. It should be noted that expanded perlite from imported raw materials is characterized by a fairly low average density (55-85 kg/m³), but at the same time increased fragility and brittleness of the grains. All these factors were taken into account when conducting research to optimize the compositions and technology of thermal insulating perlite concrete.

Table 2
Granulometric composition of expanded perlite sand from Union-Perlite

Name	Residues on sieves, %						
	5	2,5	1,25	0,63	0,315	0,16	0,16<
Expanded perlite using imported raw materials	-	-	3,3	6,82	33,0	32,4	24,5

The influence of consumption of perlite, cement of various plants, concentration and consumption of additives, as well as technological factors was investigated. Samples of various sizes were molded: slabs 400x220x50; blocks 222x70.7x70.7; cubes 70.7x70.7x70.7 mm (Fig. 2).



Figure 2. Perlite cement samples

As a result of experimental work, the optimal compositions of medium-density perlite-cement materials were determined, according to the classification of thermal insulation materials (Table 3-5).

Table 3

Compositions of perlite cement from expanded perlite sand grade M75, obtained by expansion of imported raw materials

Components	Consumption of raw materials per 1 m ³ of perlite concrete, at density, kg/m ³			
	200	250	300	350
Perlite, m ³	1,4	1,4	1,4	1,4
Cement, kg	110	160	205	250
Liquid glass, kg	0,6	0,8	1,1	1,3
Calcium chloride, kg	1,2	1,4	1,6	1,8
SAS, l	0,6	0,5	0,4	0,4
Polypropylene fiber, kg	0,36	0,38	0,40	0,42

Table 4

Physico-mechanical properties of perlite cement based on expanded perlite sand from imported raw materials and cement grade M400 D20

Brand by density	Average density, kg/m ³	Compressive strength after 28 days of hardening*, MPa	Thermal conductivity coefficient, W/(m·°C)
D200	220	0,11	0,056

D250	265	0,22	0,065
D300	320	0,38	0,072
D350	360	0,55	0,078

- According to GOST 25820-2014, lightweight concrete grades D200 and D250 in terms of strength are not standardized.

Table 5

Physico-mechanical properties of perlite cement a based on expanded perlite from imported raw materials and cement grade M500 D0

Brand by density	Average density, kg/m ³	Compressive strength after 28 days of hardening*, MPa	Thermal conductivity coefficient, W/(m·°C)
D200	220	0,15	0,054
D250	265	0,28	0,064
D300	320	0,45	0,072
D350	360	0,75	0,077

The study of the microstructure of the samples (Fig. 2) shows the high porosity of the grains of expanded perlite sand. Moreover, the sand at the base of the Aragatskoye deposit consists of hollow hemispheres of various shapes (Fig. 3), which provides, on the one hand, low density, and on the other hand, adequately low strength.

a)

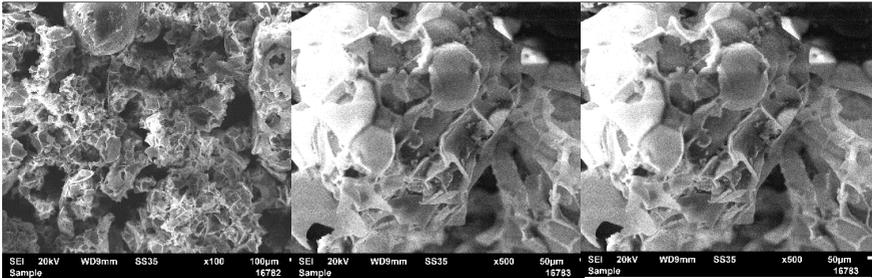


Figure 3. Macrostructure of perlite cement samples made on the basis of the Aragatskoe deposit

Thus, the research results showed the fundamental possibility of producing heat-insulating perlite concrete with an average density of 200-250 kg/m³ and satisfactory strength properties with high heat-shielding properties of the material. It is planned to carry out further research to increase the strength characteristics of perlite concrete materials while maintaining a particularly low density.

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利用激光雷达系统探测粗气溶胶成分
**PROBING OF COARSE AEROSOL FRACTION BY LIDAR
SYSTEMS**

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注解。 提出并分析了一种不使用迭代的激光雷达数据处理新方法。 制定了确定背景照明和衰减系数的算法。

关键词: 背景照度、微阴大气、衰减系数、仪器误差、探测路径。

Annotation. *A new method of lidar data processing without the use of iterations is proposed and analyzed. Algorithms for determining background illumination and attenuation coefficient are formulated.*

Keywords: *background illumination, slightly cloudy atmosphere, attenuation coefficient, instrument error, sounding path.*

Atmosphere this is a gas environment that supports life not only for humans, but also for other organisms. In addition to air and nitrogen (78% and 21%, respectively), the atmosphere contains particles called aerosols. The content of aerosol particles in the air determines the transparency of the atmosphere, which serves as a barrier to solar radiation, and thereby determines the climate of the planet. There are also aerosol systems such as clouds, fog, volcanic dust and others.

The coarsely dispersed aerosol fraction has the greatest influence on the analysis of the atmosphere, its particles exceed a radius of 1 microns [1]. These particles have a great influence in the formation of clouds, and are also influenced by the optical properties of aerosols in the infrared region of the spectrum. These particles are the main components in the component that is measured in the study of

atmospheric aerosol pollution [7, 9-11, 20]. Lidar is used for measurements [2,3,8, 21-23].

Lidar (transliteration LIDAR from the English Light Detection and Ranging) is a technology for obtaining and processing information about objects located at a distance using active optical systems that use the phenomena of light reflection and scattering in transparent and translucent media.

The processing of the obtained data is based on the solution of the lidar equation, which relates the backscattering signal to the attenuation coefficient and the backscattering coefficient.

$$P_r(R) = P_0 * \left(\frac{c\tau}{2}\right) * \beta(R) * A_r * R - \exp(-2 \int \alpha(r) dr) \quad (1)$$

where $P_r(R)$ is the instantaneous value of the received power at time t , P_0 is the sent power at time t_0 , c is the speed of light, τ is the pulse duration, β is the volume scattering coefficient, R is the distance to the object, A_r is the effective area of the receiver, α is the volume attenuation coefficient.

When processing data obtained by lidar, a sequential approximation method is used, which requires a large amount of time [4, 5]. To speed up obtaining the necessary result, a method using an iterative process is used [12-15, 25, 26]. But due to the nonlinearity of the problem, the results are characterized by significant errors [16, 17, 24].

To solve the problems that have arisen, we will use the method without an iterative process [6].

Consider a situation where the atmosphere has constant attenuation and back-scattering coefficients throughout the sounding path, then we get the lidar equation in the following form:

$$P_i = P_* + \frac{B}{R_i^2} \exp(-2\sigma R_i), \quad (2)$$

where

$$B = A\beta. \quad (3)$$

A – lidar constant,

β – is the backscattering coefficient,

σ – is the attenuation coefficient.

P – the power of the backscattering signal,

P_* – the power of solar radiation scattered by the atmosphere in the direction of the lidar receiver,

R – the distance between the lidar and the scattering element.

To solve the problem, it is necessary to find constants that we do not know, namely, P_* , B , σ . To do this, consider the equations together with equation (2)

$$P_{i+1} = P_* + \frac{B}{R_{i+1}^2} \exp(-2\sigma R_{i+1}), \quad (4)$$

$$P_{i+2} = P_* + \frac{B}{R_{i+2}^2} \exp(-2\sigma R_{i+2}). \quad (5)$$

From these equations (2), (4), (5) we get:

$$\frac{(P_i - P_*)R_i^2}{(P_{i+1} - P_*)R_{i+1}^2} = \frac{(P_{i+1} - P_*)R_{i+1}^2}{(P_{i+2} - P_*)R_{i+2}^2} = \exp(2\sigma h), \quad (6)$$

where h – is a step,

$$h = R_{i+1} - R_i. \quad (7)$$

From equation (7) we can get the sum

$$\delta_*^2 = \sum_1^n a_i P_*^2 + b_i P_* + c_i, \quad (8)$$

where

$$a_i = R_{i+1}^4 - R_i^2 R_{i+2}^2, \quad (9)$$

$$b_i = (P_i + P_{i+2})R_i^2 R_{i+2}^2 - 2P_{i+1} R_{i+1}^4, \quad (10)$$

$$c_i = P_{i+1}^2 R_{i+1}^4 - P_i P_{i+2} R_i^2 R_{i+2}^2. \quad (11)$$

With the formulas obtained, you can create an equation for calculating the background illumination

$$P_*^3 + aP_*^2 + bP_* + c = 0, \quad (12)$$

where

$$a = \frac{3\sum_1^n a_i b_i}{2\sum_1^n a_i^2}, \quad b = \frac{\sum_1^n (2c_i + a_i)a_i}{2\sum_1^n a_i^2}, \quad c = \frac{\sum_1^n b_i c_i}{2\sum_1^n a_i^2}. \quad (13)$$

Solution of the Cardano equation (12):

$$P_* = a_* + b_* - \frac{a}{3}, \quad (14)$$

where

$$a_* = \sqrt[3]{-\frac{q}{2} + \sqrt{Q}}, \quad b_* = \sqrt[3]{-\frac{q}{2} - \sqrt{Q}}, \quad (15)$$

$$Q = \left(\frac{p}{3}\right)^3 + \left(\frac{q}{2}\right)^2, \quad p = -\frac{a^2}{3} + b, \quad q = 2\left(\frac{a}{3}\right)^3 - \frac{ab}{3} + c. \quad (16)$$

We also need to determine the attenuation coefficient \square at the same time so that the error is minimal. In this situation, we should also minimize the amount:

$$\delta^2 = \sum_1^n (C - S_i - 2\sigma \int_{R_0}^{R_i} SdR)^2, \tag{17}$$

where $S = (P - P_0)R^2$.

To calculate \square (attenuation coefficient), the equation is formed

$$\sigma = \frac{1}{2} \frac{\sum_1^n S_i \sum_1^n \int_{R_0}^{R_i} SdR - n \sum_1^n (S_i \int_{R_0}^{R_i} SdR)}{n \sum_1^n (\int_{R_0}^{R_i} SdR)^2 - (\sum_1^n \int_{R_0}^{R_i} SdR)^2}. \tag{18}$$

There is an error of numerical integration in equations (17-18), which is a disadvantage of the method [18, 19].

In conclusion, we can say that despite the difficulties identified in the methods, they give results with sufficient accuracy and speed. The analysis revealed the need to develop methods for rapid processing of lidar sensing data of coarse aerosol fraction.

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用动物屠宰行业废水灌溉时黑钙土的植物毒性评估

**ASSESSMENT OF PHYTOTOXICITY OF CHERNOZEMS WHEN
IRRIGATED WITH WASTEWATER FROM ANIMAL SLAUGHTER
INDUSTRIES**

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抽象的。 该文章讨论了动物屠宰行业废水的使用问题。 问题是由于此类水中有机物质、血液、脂肪、蛋白质以及机会性微生物和病原微生物的含量很高。 但是,使用生物过滤器与生物产品相结合的现代净化方法可以处理许多污染物,因此水有机会得到循环利用。 作者提供了有关研究使用处理后的废水进行灌溉的可能性的材料。 该研究的目的是确定处理后的废水对不同类型黑钙土的植物毒性。 在小麦芽的形成过程中,屠宰场废水在两周的试验期间对小麦植株没有毒害作用。 在实验过程中,根据屠宰场蒸馏水和废水的灌溉,通过定量计算蛋白水解和淀粉分解微生物区系,对黑钙土的微生物群落进行了分析。 没有检测到这些生物体的毒性作用。

关键词: 废水、毒性作用、生物测试、微生物群落。

Abstract. *The article addresses the problem of using wastewater obtained from animal slaughter industries. The problem is based on the high content of organic substances, blood, fats, proteins and opportunistic and pathogenic microorganisms in such water. But modern purification methods using biofilters in combination with biological products cope with many pollutants, and, accordingly, water has a chance to be recycled. The authors present material on studying the possibility of using treated wastewater for irrigation. The objective of the research was to determine the phytotoxicity of treated wastewater for different types of chernozems. During the formation of wheat sprouts, slaughterhouse wastewater had no toxic effect on wheat plants during the two-week test period. During the*

experiment, the microbial cenosis of chernozem soils was analyzed by quantitative accounting of proteolytic and amylolytic microflora depending on irrigation with distilled and waste water from the slaughterhouse. No toxic effect was detected for these groups of organisms.

Keywords: wastewater, toxic effect, biotesting, microbiocenosis.

The problem of ensuring environmental safety when using wastewater is very relevant. The nature of wastewater formation has its own specifics. For example, the use of wastewater from livestock farming has been studied quite well; there is a lot of scientific literature that provides facts about increasing plant productivity and the formation of beneficial soil microflora. Regarding the issue of using wastewater from the meat industry, there is practically no data from Russian researchers. This is dictated by the prohibition of the legislation of the Russian Federation, in particular SanPiN 2.1.7.573-96 in paragraph No. 5.2, which talks about the prohibition of the use of wastewater in free-standing enterprises for the processing of raw materials of animal origin, slaughterhouses. Such wastewater is used mainly in developing countries of Asia and Africa; when there is a shortage of water for irrigation, they use such water, untreated, calling it fertigation [7].

Today, the question arises of studying the possibility of lifting the ban on the use of slaughterhouse wastewater, because a large number of new pre-treatment technologies have emerged, with the help of which fats and proteins, which are found in large quantities in such wastewater, are processed.

In Russia, about 3 thousand enterprises are engaged in slaughtering livestock and these are large consumers of water. From such industries, about 70% of the water will subsequently end up in wastewater with a high concentration of blood, protein, fat, many other organic substances and opportunistic and pathogenic microorganisms. The biggest problem is pollution in terms of biochemical oxygen demand of about 150,000-2000 mg/l and chemical oxygen demand of about 375,000 mg/l [8].

If pre-treatment of slaughterhouse wastewater brings us to acceptable levels of pollutants, then why not use it for irrigation, like any other treated wastewater. Therefore, the purpose of our experiment was to study the possibility of using slaughterhouse wastewater for irrigation of agricultural crops. In this case, the task included an initial study of the composition of waters after preliminary purification, and then the determination of phytotoxicity for different types of chernozems.

Determination of the toxicity of slaughterhouse wastewater was based on changes in seed germination (preliminary stage) and changes in the length of plant seedling roots at early stages (final stage) and comparison of the results obtained with a control (clean sample) [9]. Distilled water samples were used as a control sample. At the end of the experiment, the seedlings were carefully removed from

the substrate. The roots of each plant were thoroughly washed in water. The number of germinated plants in each cup was counted, and the length of the main root was measured with an accuracy of 1 mm. The level of toxic effect of effluent from slaughterhouses on wheat seedlings was judged by the main indicators of the presence of toxic effects: a decrease in seed germination and a decrease in the length of the roots of plant seedlings compared to the control variant.

The degree of toxicity of the tested waters was assessed by the value of the toxicity index (Table 1) according to the methodological recommendations for assessing the integral toxicity of wastewater, which is widely used in biotesting methods [1].

Table 1.
Indicators and criteria of water pollution

Indicators	Degree of pollution			
	No pollution	Light pollution	Average pollution	Heavy pollution
Germination,%	90 - 100	65 - 90	30 - 65	< 30
Toxicity index	< 0,1	0,1 - 0,35	0,36 - 0,7	> 0,71

In wheat seed germination studies, germination was 90-100%, indicating no contamination (toxicity index < 0.1).

The results of phytotesting are presented in Table 2. A comparison was made between the average values of seed germination and the average values of the root length of wheat seedlings in the control and variants of seed moistening with effluent from slaughterhouses. The average germination of seeds and the average length of the main root in the “control” variants were taken as 100%, and the results in the experimental variants were calculated relative to this indicator (Figure 1).

Table 2.
Phytotest results.

№		Max. root length, mm	% to control	№		Average sprout length, mm	% to control
Control – dist. water		48,3	100	Control – dist. water		31,5	100
Experiment	Rep.1	54,2	112,2	Experiment	Rep.1	54,8	173,9
	Rep..2	51,3	106,2		Rep..2	44,2	140,3
	Rep.3	58,6	121,3		Rep.3	48,8	154,9
	Rep.4	49,5	102,5		Rep.4	39,6	125,7



Figure 1. Illustration of experimental results

The average length of wheat seedlings was 1.5 times higher than the control values, indicating that slaughterhouse wastewater did not have a toxic effect on wheat seed germination, possibly acting as a microfertilizer. At the same time, the differences in the length of the root system with the control variant were insignificant.

The next experiment was carried out to study the effect of treated wastewater on phytoproductivity using the example of monocots (spring wheat *Triticum vulgare* L.).

The vegetation experiment was carried out according to the generally accepted method [5]. The soil of the arable horizon of typical chernozem, ordinary chernozem and southern chernozem was used as a substrate for growing plants. The experiment was carried out in triplicate. Before starting the experiment, the soil mass was mixed (homogenized, roots, stones and other inclusions were taken from it, then passed through a sieve with a 5 mm hole). The sifted soil was filled into vessels taking into account the moisture content. No fertilizers were added to the soil.

Before planting seeds in vegetation vessels, the germination capacity of wheat seeds was determined. Four samples of 100 pieces each were taken from wheat seeds, respectively. The seeds were placed in Petri dishes between layers of moistened filter paper [6]. The dishes were kept for 72 hours at room temperature and in natural light, then the results were calculated. The germination rate of wheat seeds was 96%.

The experiment was launched on December 2, 2022. Wheat seeds were sowed 4 seeds per vessel. During the experiment, systematic watering with wastewater without dilution and plant care were organized. The weigh-in took place on December 16, 2022.

Measuring plant biomass in different soils makes it possible to assess the impact of slaughterhouse wastewater on plant development. The dry weight of plants

was not taken into account, since the values were small and did not exceed the error limits of the analytical balances.

The results are presented in Tables 3 and Figure 2

Table 3.
Number of plants in a vessel, dry weight of wheat.

The soil	Experiment Options	Repetitions			Average weight of wheat plants, g/ vessel	% of control (0.74 g/ vessel)
		1	2	3		
Typical chernozem	Number of plants	4	3	3		
	Wet weight	0,56	0,38	0,41	0,45	61
Ordinary chernozem.	Number of plants	4	3	4		
	Wet weight	0,93	0,56	0,61	0,70	95
Southern chernozem	Number of plants	4	4	4		
	Wet weight	0,88	0,75	0,71	0,78	105

We can note that the biomass of wheat on southern and ordinary chernozem was close to the control; in the variant with ordinary chernozem, the average fresh weight of wheat plants is less, which is also explained by lower germination.

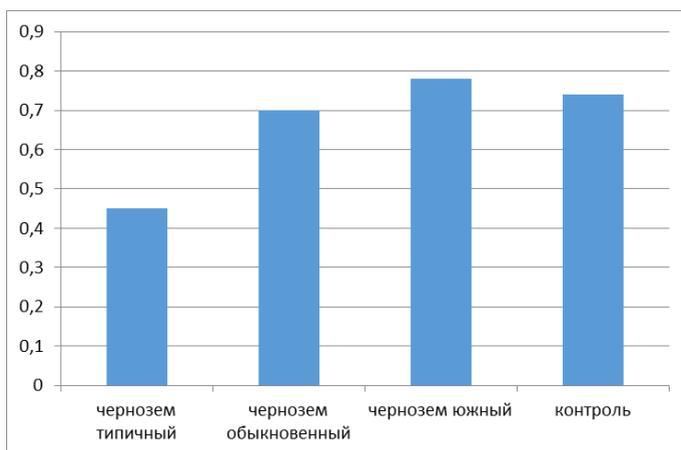


Figure 2. *Change in wheat biomass on different types of soil, g/vessel*

Thus, during the formation of wheat sprouts, wastewater from the slaughterhouse did not have a toxic effect, while an increase in the average length of the wheat sprout was noted (up to 54.8%). At the same time, some plants, and in par-

ticular cereals, can react ambiguously to the entry of pollutants into the soil; small doses of a toxicant can stimulate plant growth in height [2]. This result indicates the need for a longer experiment to study the formation of vegetative mass by plants.

The results of studying the phytoproductivity of plants showed that irrigation with wastewater from a slaughterhouse did not have a toxic effect on wheat plants during the two-week period of the experiment.

Microbiological indicators of soils irrigated with treated wastewater from slaughterhouses were studied on the basis of a quantitative count of microorganisms, which was carried out by inoculation on standard nutrient media [4]. The mineralization coefficient was calculated. It is determined by the ratio of the number of microorganisms counted by inoculation on starch-ammonia agar (SAA) and characterizing the process of transformation of ammonia nitrogen, to the number of microbes counted by inoculation on meat-peptone agar (MPA), characterizing the transformation of soil protein substances.

When analyzing the microbial cenosis of chernozems, we carried out a quantitative accounting of proteolytic and amylolytic microflora, which allows us to assess the fertility potential [3]. Depending on different irrigation methods: distilled water and waste water from a slaughterhouse, variations in CFU were noted on different subtypes of chernozem. The results are presented in Table 5.

Table 5.
Number of microorganisms (millions per 1 g of soil)

Experiment Option	The soil	Number of CFU on nutrient media (millions per 1 g of soil)		Mineralization coefficient
		MPA	SAA	
Control	Typical chernozem	502±103	644±104	1,28
	Ordinary chernozem	472±99	612±114	1,30
	Southern chernozem	473±45	400 ±87	0,85
Drains	Typical chernozem	694±51	605±51	0,87
	Ordinary chernozem	733±108	592±78	0,81
	Southern chernozem	661±85	453±89	0,69

Our analysis of the numerical composition of populations showed that the use of wastewater from the slaughterhouse had virtually no effect on the number of amylolytic microflora; fluctuations in numbers in the study options were within the average error. At the same time, there was an increase in the number of proteolytic microflora. The mineralization coefficient in the control samples was approximately equal to unity, which indicates balanced processes of mineralization and humus synthesis in the soil. In the experimental variants, the mineralization coefficient decreased, which usually indicates either the active decomposition of humus

or the supply of the substance with fertilizers. Since in the experimental variants irrigation was carried out with wastewater from a slaughterhouse, a decrease in the mineralization coefficient may indirectly indicate the supply of available nutrients for proteolytic microflora along with wastewater.

In all variants of the study, we note a high degree of enrichment of the soil with microorganisms of both the proteolytic and amylolytic groups, which indicates the absence of a toxic effect for these groups of organisms.

Conclusions: Slaughterhouse wastewater had no toxic effect on wheat seed germination. The average length of wheat seedlings exceeds the control values by one and a half times; perhaps the composition of the water influenced it as a microfertilizer. Analysis of the microbiocenosis of typical, ordinary and southern chernozems after the use of wastewater did not show a significant change in the number of amylolytic microflora. An increase in the number of proteolytic microflora was noted. The mineralization coefficient decreased, apparently due to additional nutrients for proteolytic microflora with wastewater.

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通过进步质量评估卡尔梅克品种公牛
**ASSESSMENT OF KALMYK BREED BULLS BY PROGRESS
QUALITY**

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注解。 在研究年轻卡尔梅克品种的生长和发育并测试公牛自身生产力时，微卫星分析可以帮助确定某些特征和品质的遗传倾向。 因此，微卫星分析可以成为研究卡尔梅克牛品种遗传特征和改进选择的有用工具。

指标最高的是Yari 69043后代中的I组。13月龄时的平均活重。 达396.5公斤。该组的平均日增重为1112.3克。 最差的指标是第二组，公牛 Guber 64159，分别为361.1 公斤和 1140.0 克。 几乎所有后代的综合指数都是100%。 在位点 BM 2113、INRA 023、TGLA 122、TGLA 227 处观察到最大范围的等位基因。每个位点的等位基因数量分别为 12、12、18 和 12。 TGLA 等位基因的最大数量为 122。卡尔梅克品种信息最丰富的基因座是 INRA 023、TGLA 122 和 TGLA 227。

关键词：卡尔梅克牛，活重，平均日增重，微卫星分析，遗传多样性。

Annotation. *When studying the growth and development of young Kalmyk breeds when testing bulls for their own productivity, microsatellite analysis can help in determining the genetic predisposition to certain characteristics and qualities. Thus, microsatellite analysis can be a useful tool for studying the genetic characteristics and improving the selection of the Kalmyk cattle breed.*

The highest indicators were in group I among the descendants of Yari 69043. The average live weight at the age of 13 months. amounted to 396.5 kg. The

average daily gain for the group was 1112.3 g. The worst indicators were in group II, bull Guber 64159 - 361.1 kg and 1140.0 g, respectively. The complex index for almost all descendants was 100%. The largest range of alleles is observed at loci BM 2113, INRA 023, TGLA 122, TGLA 227. The number of alleles per locus is 12, 12, 18 and 12, respectively. The maximum number of alleles for TGLA is 122. The most informative loci for the Kalmyk breed were INRA 023, TGLA 122 and TGLA 227.

Keywords: *Kalmyk cattle, live weight, average daily gain, microsatellite analysis, genetic diversity.*

Gratitude. The work was carried out within the framework of the state assignment of the Ministry of Science and Higher Education of the Russian Federation (No. 075-03-2022-119/1 “Features of the organization of the genome of beef cattle breeds associated with high adaptive and productive potential based on highly polymorphic genetic markers.”

INTRODUCTION

Testing bulls for their own productivity is an important method for assessing the breeding qualities of animals in beef cattle breeding. Research shows that there is a high positive correlation between the growth rate of a sire and the growth rate of its offspring [1, 6]. Assessing producers based on their own productivity and the quality of their offspring is the main element of selection and breeding work, including targeted selection of the best producers and selection of the best queens. The widespread use of quality-tested improver bulls is an effective way to improve the breeding and productive qualities of beef breeds [2, 7].

Microsatellite analysis of Kalmyk cattle is an important tool for studying the genetic structure and diversity of the population, as well as for assessing the pedigree and genetic resource of animals. Microsatellites, or SSRs (Simple Sequence Repeats), are short, repeating DNA sequences that can be found in an animal’s genome. Microsatellite analysis allows us to determine the number and frequency of alleles in a population, as well as assess genetic diversity and population structure. These data can be used to make decisions on preserving genetic diversity and improving animal breeding [3, 4, 5, 8, 9].

Thus, microsatellite analysis can be a useful tool for studying the genetic characteristics and improving the selection of the Kalmyk cattle breed.

Research methods

Experimental work was carried out at Plodovitoe LLC in the Maloderbetovskiy district of the Republic of Kalmykia, as well as at the regional research and production center for the reproduction of farm animals.

In order to test the bulls for their own productivity, 60 bulls were selected - descendants of three outstanding bulls of the Kalmyk breed: Yari 69043, Guber 64159, Bond 7507. The test was carried out in accordance with the “Recommendations for evaluating Kalmyk breed bulls for the quality of offspring and testing bulls for their own productivity”, developed by the department of beef cattle breeding of the Kalmyk Research Institute of Agriculture. The study design is presented in Figure 1.

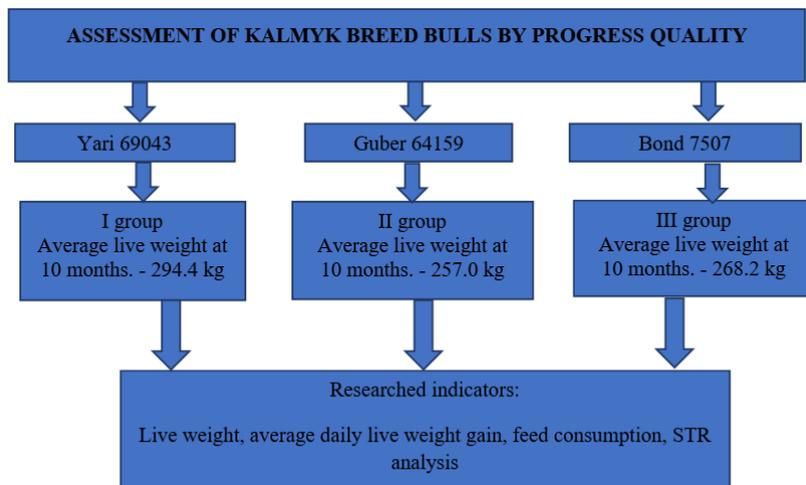


Figure 1. Study diagram

The experimental young animals were kept under the same feeding conditions until the age of 13 months. The intensity of growth and development of experimental animals was determined by monthly weighing at the age of 10, 12, 13 months. Feed consumption was taken into account using the group method according to the generally accepted method.

A microsatellite analysis of the descendants of the Kalmyk breed was carried out at 9 loci: BM1824, BM 2113, INRA023, SPS 115, TGLA 122, TGLA 126, TGLA 227ETH 10, ETH 225.

DNA extraction from whole blood was carried out using a set of reagents for DNA extraction “M-Sorb” Synthol. Polymerase chain reaction was performed on a Bio-Rad C1000 Touch Thermal Cycler. Detection of amplification products was carried out in a Wide Mini-Sub Cell GT horizontal electrophoresis chamber; visualization was carried out using a Clinx Science Instruments ChemiScope 6200Touch gel documentation system. To carry out electrophoresis, we used the AmpliSens kit, setting the following parameters: voltage 100 V, 40 min.

Research Results

The level of feeding of bull calves during testing should ensure their good development and high meat productivity so that by the age of 13 months the animals reach a live weight above 350 kg.

The live weight of bull calves at the age of 10, 12 and 13 months and the average daily gains during the experiment are shown in Table 1. As can be seen, the average live weight at the start of the experiment was 273.2 kg. There were some differences within animal groups. In the descendants of the bull Guber 64159, the live weight varied from 361.5 to 257.0 kg. Among the offspring of Yari 69043 and Bond 7507, this difference was significant - from 396.5 to 294.4 kg and 375.2 and 273.2 kg, respectively.

Table 1
Dynamics of live weight and average daily gains

Groups	Live weight, kg			Average daily gain 13 months, g
	10 months	12 months	13 months	
On average for group 1	294,4	362,1	396,5	1146,7
On average for group 2	257,0	326,9	361,1	1140,0
On average for group 3	268,2	336,7	368,2	1050,1
Average among peers	273,2	341,9	375,2	1112,3

During the growing period from 10 to 13 months of age, the average group indicators differed from each other. Thus, the live weight at 13 months in general according to the experiment was 375.2 kg. The lowest live weight was among the descendants of Guber 64159 - 361.1 kg, the highest among the descendants of Yari 69043 - 396.5 kg. The average daily gain at 13 months was in general according to the experiment 1112.3 g. At the same time, the greatest increase was also in the sons of Yari 69043 - 1146.7 g, and the smallest in the descendants of Bond 7507 - 1050.1 g. Based on the results of the actual feed consumption and the resulting growth, the feed consumption per unit of growth was calculated.

The average feed consumption per 1 kg of growth was 8.5 units. The difference between the minimum and maximum flow rate was on average 0.4 units. per group. Individual differences were (Table 3.6) higher – 8.0-9.7 units. per 1 kg of gain. The highest feed consumption per unit of production was for bulls No. 1890 and 1551 - 9.0 and 9.7 units. respectively, the smallest for No. 1563 and 1557 is 8.0 units.

Table 2

Characteristics of experimental bulls

No. of bulls	Live weight at the age of 13 months	Average daily gain 13 months		Feed consumed per 1 kg of gain	
	kg	kg	indices	unit	indices
On average for group 1	396,5	1146,7	100,0	8,1	108,6
On average for group 2	361,1	1140,0	99,9	7,1	99,8
On average for group 3	368,2	1050,1	100,0	7,4	105,5
Average among peers	375,2	1112,3	100	7,5	104,6

Analyzing the total index, we can say that the largest number of descendants with an index of 100% were Yari 69043 and Bond 7507, only the descendants of Guber 64159 had an index of less than 100%.

Microsatellite analysis was carried out on 60 offspring belonging to the APC PR “Plodovitoe”. Characteristics of the polymorphism of the studied microsatellites showed that genetic diversity is observed in the population of Kalmyk breed cattle (Figure 2).

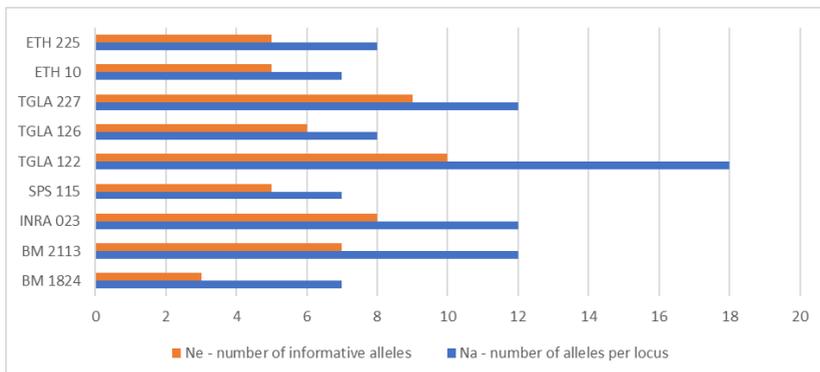


Figure 2. *Characteristics of polymorphism of microsatellites of the descendants of bulls of the Kalmyk breed LLC “Plodovitoe”*

The analysis showed that in the group of animals studied, the largest range of alleles is observed at loci BM 2113, INRA 023, TGLA 122, TGLA 227. The number of alleles per locus is 12, 12, 18 and 12, respectively. The maximum number of alleles for TGLA is 122. The most informative loci for the Kalmyk breed were INRA 023, TGLA 122 and TGLA 227.

A comparative assessment of the economic efficiency of raising bulls of different lines showed that the most economically promising is raising bulls of the

1st group of descendants of Yari 2101. For the 2nd group of bulls, an additional profit was received compared to the bulls of the 3rd group - 1428 rubles, for the 1st group - 161 rubles. At the same time, feed costs per unit of live weight gain were minimal in group 2.

Conclusion

Group and individual differences in the main indicators were revealed. The highest indicators were in group I among the descendants of Yari 69043. The average live weight at the age of 13 months. amounted to 396.5 kg. The average daily gain for the group was 1112.3 g. The worst indicators were in group II, bull Guber 64159 - 361.1 kg and 1140.0 g, respectively. The complex index for almost all descendants was 100%. The largest range of alleles is observed at loci BM 2113, INRA 023, TGLA 122, TGLA 227. The number of alleles per locus is 12, 12, 18 and 12, respectively. The maximum number of alleles for TGLA is 122. The most informative loci for the Kalmyk breed were INRA 023, TGLA 122 and TGLA 227.

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开发基于科学的椴树开花输送机 (TILIA L.) 以提高蜂蜜生产率
**DEVELOPMENT OF A SCIENTIFICALLY-BASED LINDEN
FLOWERING CONVEYOR (TILIA L.) TO INCREASE HONEY
PRODUCTIVITY**

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注解。 据统计, 俄罗斯联邦在蜂蜜出口和产量方面排名第五——每年1万吨。与此同时, 克里米亚共和国并未跻身蜂产品生产前十名地区之列。 这是因为克里米亚采集蜂蜜的饲料基地尚未系统化。 该研究的目的是选择一个混合椴树品种的方案, 在重建和改进现有的、设计和创建在克里米亚共和国境内生长的新防护林人工林的过程中, 不同的开花日期以优化其分布 在蜂蜜生产中最合理地利用时间和地域。 这些研究是在 2021 年至 2023 年期间进行的。 对现有椴树防护林林分的分析表明, 该属以三个主要树种为代表: 大叶椴树 (*Tilia platyphyllos* Scop.)、毛毡椴树 (*Tilia tomentosa* Moench)、心形椴树 (*Tilia cordata* Mill.)、以及杂交种间起源。 已经确定, 可以选择一种能够确保从六月初到七月底期间均匀开花的椴树品种混合方案, 以便蜜蜂采蜜更加均匀。 树木开花物候期的个体变化几乎完全服从正态高斯分布, 标准差等于 2.5, 数学期望等于 5.0。 预测不同花期椴树品种混合方案选择的影响, 在保持防护林人工林整体蜂蜜生产力的同时, 提供统一的产品供应, 使蜂群可以合理采集产品, 减少对蜂群的需求。 单位面积的浓度。 同时, 每天最多回蜂蜜量不会超过41.9公斤。 在实施所开发的优化养蜂饲料基础的方法时, 有必要改变椴树种植材料的生产, 过渡到开花时间不同的物种的混合方案, 并以嫁接形式培育幼苗, 以保留这种具有经济价值的特征。

关键词: 养蜂业、蜂蜜生产力、椴树、蜂蜜生产力、输送机。

Annotation. *According to statistics, the Russian Federation ranks fifth in the export and production of honey – 10,000 tons per year. At the same time, the Republic of Crimea is not among the top ten regions producing bee products. This is due to the fact that the feed base for collecting honey is not systematized in the Crimea. The purpose of the study is to select a scheme for mixing linden species, during the reconstruction and improvement of existing, design and creation of new protective forest plantations growing on the territory of the Republic of Crimea, differing in flowering dates to optimize their distribution over time and territory for the most rational use in honey production. The studies were conducted in the period 2021-2023. Analysis of existing protective forest stands of linden showed that the genus is represented by three main species: Large-leaved linden (*Tilia platyphyllos* Scop.), felt linden (*Tilia tomentosa* Moench), heart-shaped linden (*Tilia cordata* Mill.), as well as hybrid interspecific origin. It has been established that it is possible to select a scheme for mixing linden species that can ensure uniform flowering in the period from the beginning of the second decade of June to the end of the second decade of July for a more uniform honey collection by bees. The individual passage of the phenological phases of flowering by trees is almost completely subject to the normal Gaussian distribution with a standard deviation equal to 2.5 and a mathematical expectation equal to 5.0. The forecast of the influence of the selection of a scheme for mixing linden species with different flowering periods, while maintaining the overall honey productivity of protective forest plantations, provides a uniform supply of products that can be collected rationally by bee colonies with less need for their concentration per unit area. At the same time, the maximum daily return of honey will not exceed 41.9 kg of honey per day. When implementing the developed approach to optimizing the feed base for beekeeping, it is necessary to change the production of linden planting material with the transition to mixing schemes of species that differ in flowering time and grow seedlings in grafted form to preserve this economically valuable feature.*

Keywords: *beekeeping, honey productivity, linden, honey productivity, conveyor.*

Introduction

The Russian Federation, according to statistics, ranks fifth in the export and production of honey – 10,000 tons per year [1, 2]. At the same time, the Republic of Crimea, as a southern region, which has great potential for the development of this honey production industry, is not among the top ten regions of producers of beekeeping products [3].

The Republic of Crimea does not have large honey producers. In general, they do not exist in most regions of Russia, which could enter the world market and compete [3, 4, 5]. This is due to the fact that the feed base for collecting honey is not systematized in the Crimea. One of the directions of beekeeping development can be the correct selection of the mixing scheme of breeds with high honey productivity, as well as the development of scientifically based approaches to optimize the production process of obtaining bee products [6, 7].

The most honey-bearing forest areas that need to be developed and thanks to which it is possible to produce valuable honey, with a large yield of bee colonies, are considered to be from: linden (1000 or more kg of honey /ha), acacia (up to 1000 kg of honey /ha), etc. [8-11].

However, honey harvesting is limited by a strong peak and heterogeneity in the intensity of flowering of each individual breed. Which significantly complicates its collection by bee colonies, which do not always have time to increase their numbers by such peaks, which leads to incomplete collection of honey products, and, as a result, non-production losses. This may be due to the fact that, coming out of hibernation, the number of worker bees in hives is minimal and increases gradually, respectively, with feed resources [12]. By the time of the potential maximum bribe, bee colonies often do not have time to increase the working mass [6]. In such a situation, it becomes an objectively important task for beekeeping to ensure the maximum supply of honey from the most productive breeds by bee colonies by increasing their long flowering period, which will allow relatively evenly, without large extreme peaks, to ensure honey collection and thereby significantly reduce unproductive nectar losses [13, 14, 15].

This leads to the following problems: the flowering peaks of linden trees, by species composition, create excessive nectar productivity for bee colonies during the period when they are unable to assimilate it. At the same time, a significant potential for the production of valuable honey and related bee products is lost [16].

The purpose of the study is to consider the possibility of selecting schemes for mixing linden species growing on the territory of the Republic of Crimea, differing in flowering time to optimize their distribution over time and throughout the territory of protective forest plantations, as well as the most rational use in the production of honey.

Material and methods of research

The research was carried out in the period 2021-2023 on one of the sections of the linden forest strip in the Simferopol district of the Republic of Crimea. Trees aged 35... 40 years, having a normal growth habit, reaching a height of up to 8 ... 9 meters, regularly (annually) blooming.

Protective forest stands are represented by alley planting consisting of two rows of trees along the road. The number of trees in the forest strip represented by

the lime tree is 132 pcs. During the study, the species composition was determined according to the botanical characteristics.

The timing of flowering was determined by the Madebeikin method [10]. To study the timing of flowering during the survey of the site, the timing of flowering was recorded with a frequency of at least once every three days from the moment of separation of buds of inflorescences on single trees. Also, during the visual inspection, the dates of the beginning of flowering were noted (5% of the flowers opened – the bees' summer began), mass flowering (most of the flowers opened – the bees' mass summer) and the end of flowering (all the flowers bloomed – the end of the bees' summer).

According to the registered calendar dates of flowering, as well as the individual passage of the phenological phase of flowering, a mathematical formula for calculating the honey productivity of trees and plantings was determined, based on the potential productivity of linden equal to 1000 kg of honey / ha. The study of the individual development of the phenological phases of flowering of individual trees has shown that they, in general, according to the duration of the beginning, mass flowering and its end by the flight of bees, obey the Gaussian distribution and have the form of the formula:

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-a)^2}{2\sigma^2}}, \quad (1)$$

where: $f(x)$ - is a function of the proportion of the flowering intensity of the linden tree; x - is the days of flowering (from the beginning, number); σ - is the standard deviation (taken in the formula equal to 2.5); a - is the mathematical expectation (taken in the formula equal to 5.0); σ^2 - is the variance of the distribution.

Results

The analysis showed that among the studied trees in the amount of 132 pieces, three main species were identified (Fig. 1): large-leaved linden (*Tilia platyphyllos* Scop.) - 64% of the total number of trees, felt linden (*Tilia tomentosa* Moench) - 15% and heart-shaped linden (*Tilia cordata* Mill.) 13%, respectively. The remaining trees (8% of the total) were not clearly identified by species composition. Taking into account their origin, in forest nurseries, from sowing seeds of free pollination of flowers of various species, they may have a hybrid interspecific character.

The data is shown in the diagram in Figure 2. If we take into account the normality of the distribution of the flowering period of lime trees for 10 days, then the peak of the honey harvest comes only after 2 days. During this period, the lime tree gives the maximum amount of honey - 237.77 kg / ha.

Based on the fact that during the survey of the site, the principal possibility of flowering of linden trees of various species distributed over time was estab-

lished, as well as taking into account the estimated honey productivity of individual forms, there is a potential opportunity to choose plants from existing protective forest plantations that ensure the uniform entry of trees into the flowering period, which will increase honey collections from 1 ha squares.

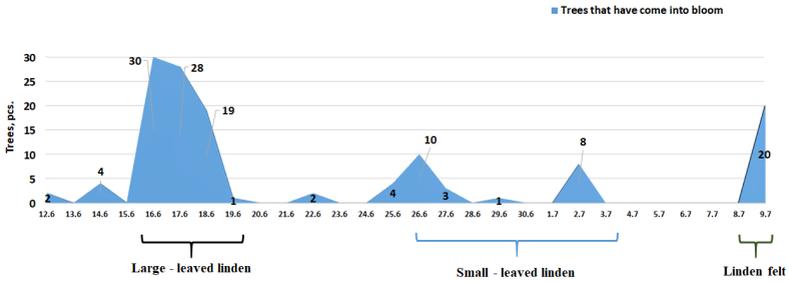


Figure 1. Calendar dates of flowering of linden trees on the territory of the studied site

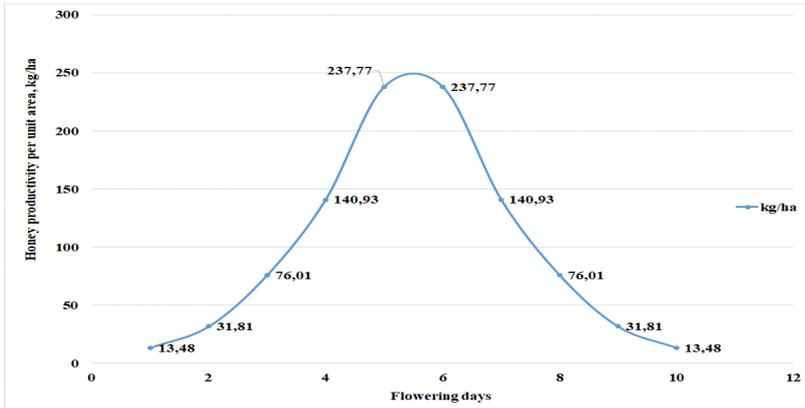


Figure 2. Honey productivity per unit area at the peak of flowering

Modeling of honey collections using conditional six forms with different (conveyor) flowering periods shows the fundamental possibility of uniform collection. The peak is significantly reduced and the period is lengthened. Due to this, bees will be able to pollinate most of the plants and collect honey, 41.9 kg/ha per day (Figure 3).

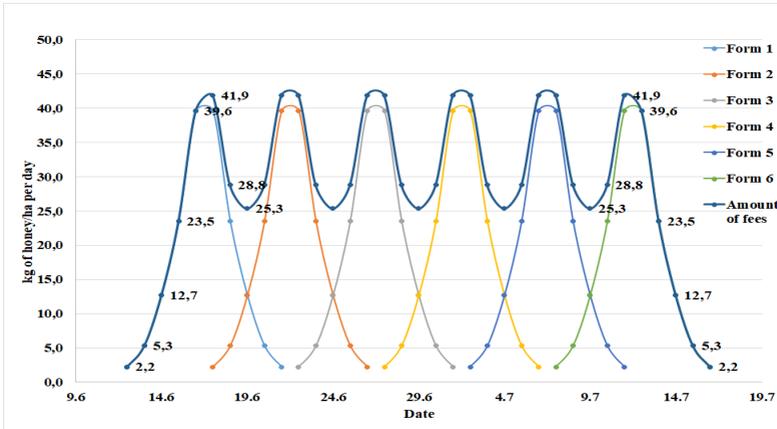


Figure 3. Honey productivity of the linden mold conveyor

The introduction of such an approach will allow to take one of the leading places in the production of honey in the country and solve the problem of providing beekeeping with a fodder base. However, there are also problems that may complicate the dissemination of the methodology.

With seed propagation, the flowering time of the forms cannot exactly meet expectations. It is necessary to propagate the forms selected in the course of research vegetatively. This will require a change in the production technology of linden planting material.

The possibility of selecting tree shapes to provide a fodder base for honey production will entail the development of a new industry during the reconstruction and improvement of existing, design and creation of new protective forest plantations – a complex for the production of grafted planting material. This approach will allow maintaining the stability of the selected tree forms in the flowering period, since the previously selected forms that maintain their stability will retain this economically important feature. This completely correlates with the previously obtained data by other researchers [17, 18].

The selection of forms that differ in terms of flowering time will require selection work in existing plantings for the purpose of differentiated selection, which is associated with expeditionary research.

On the other hand, such an approach creates prerequisites for the industrial production of honey and related bee products in a single enterprise. This technological cycle in stationary conditions, in which the transportation of bee colonies over long distances and the contact of bees themselves with territories that are not controlled by the manufacturer in terms of the content of insecticides in nectar that

can negatively affect the development of bees can practically be eliminated, can solve the problem of their mass death that is relevant today.

Conclusions

1. Analysis of existing protective forest stands of linden in the Republic of Crimea showed that the genus is represented by three main species: Large-leaved linden (*Tilia platyphyllos* Scop.) - 64% of the total number of trees, Felt linden (*Tilia tomentosa* Moench) 15%, and heart-shaped linden (*Tilia cordata* Mill.) 13%, respectively. The remaining trees may have a hybrid origin.

2. Taking into account the timing of flowering has shown that it is possible to choose schemes for mixing linden species that can ensure uniform flowering for a more uniform honey collection by bees.

3. It is established that the individual passage of the phenological phases of flowering by trees is almost completely subject to the normal Gaussian distribution with a standard deviation of 2.5 and a mathematical expectation of 5.0.

4. The forecast of the influence of the selection of the scheme of mixing linden species with different flowering periods, ensuring, while maintaining the overall honey productivity, a uniform supply of products that can be collected rationally by bee colonies with less need for their concentration per unit area. At the same time, the maximum daily return of honey will not exceed 41.9 kg of honey per day.

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蜂巢臭氧空气处理的特点

FEATURES OF OZONE-AIR TREATMENT OF BEE HIVES

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抽象的。文章讨论了一种现代、环保的蜂箱消毒方法，以及利用臭氧防治蜜蜂细菌性疾病。有许多研究证明在养蜂中使用这种气体的有效性。但与此同时，还有一些尚未解决的问题。研究结果表明，其中之一是整个蜂巢体积中臭氧的分布极其不均匀。

关键词：臭氧、臭氧-空气混合物、养蜂业、蜂箱、蜂箱消毒、蜜蜂细菌性疾病。

Abstract. *The article discusses a modern and environmentally friendly method of disinfecting bee hives, as well as the prevention and treatment of bacterial diseases of bees using ozone. There are many studies proving the effectiveness of using this gas in beekeeping. But meanwhile, there are a number of unresolved problems. One of them, as it turned out from the study, is the extremely uneven distribution of ozone throughout the volume of the hive.*

Keywords: *ozone, ozone-air mixture, beekeeping, beehive, disinfection of beehives, bacterial diseases of bees.*

Today, the use of ozone in beekeeping is becoming increasingly popular. This gas is used not only to disinfect hives, but also to stimulate the spring development of bees, prevent and treat their bacterial diseases [1, 2, 3]. This is primarily due to the environmental friendliness of this gas. Despite the fact that ozone is a strong oxidizing agent and is dangerous for humans (the maximum permissible concentration is 0.1 mg/m³), it is unstable and disintegrates quickly. It is known that the ozone concentration in a ventilated room decreases by 2 times after 7-10 minutes, which is caused by surface splitting and air exchange [4]. In outdoor apiary farming conditions, the half-life of this gas will be even shorter. Thus, an apiary equipped with an ozonizing unit and a timer is safe for humans, provided that he is not on it during treatment. Despite the proven positive effect of using ozone in beekeeping, there are a number of problems, such as, for example, strong heating of the ozonizer discharge device during its operation, which in turn destabilizes

the concentration of the resulting ozone. In addition, there is no information in the literature about how the ozone concentration is distributed inside a beehive, which is a complex biological system.

Well-known scientific studies of the use of ozone in beekeeping have determined the necessary parameters for ozone-air treatment of hives. For example, in [3] it is indicated that to stimulate the spring development of bees, a concentration of 32 mg/m³ and exposure of 24 hours are required, once a day, for 24 days. And for the prevention and treatment of such a bacterial disease of bees as ascosferosis, an exposure of 1 hour and an ozone concentration of 250 mg/m³ and 500 mg/m³, respectively, are required. At the same time, the results obtained in laboratory conditions based on an analysis of the survival of test bacteria (*Escherichia coli* and *Staphylococcus aureus*) show that to reduce contamination, a concentration of 50 mg/m³ and an exposure of 30 minutes are required [1]. It is assumed that when an ozone-air mixture with such parameters is supplied, the same concentration will be in the beehive. As it turned out as a result of our research, this is not always the case.

In order to see how the ozone concentration is distributed in a bee hive, we took two double-hulled hives in which holes were made at the bottom and top. These holes were closed during ozonation and were opened only to sample the gas mixture and determine the ozone concentration. The XLA-BX-O3 device was used as an ozone concentration meter (Fig. 1). The ozone-air mixture was generated by a plate-type discharge device and supplied to the hives by a compressor with a capacity of 125 l/min using flexible pipelines 1 and 7 meters long. This was done in order to evaluate the effect of pipeline length on the supply of ozone to the hives. The treatment was carried out in August at temperatures from 20 to 30°C, which in turn, as will be shown below, influenced the generation of ozone.



Figure 1. Photos of measuring ozone concentration in one of the holes made in the lower part of the hive (left) and the ozonation process itself (right).

The results of the study, in which the ozone-air mixture was supplied through the lower bee-entrance, are shown in Fig. 2.

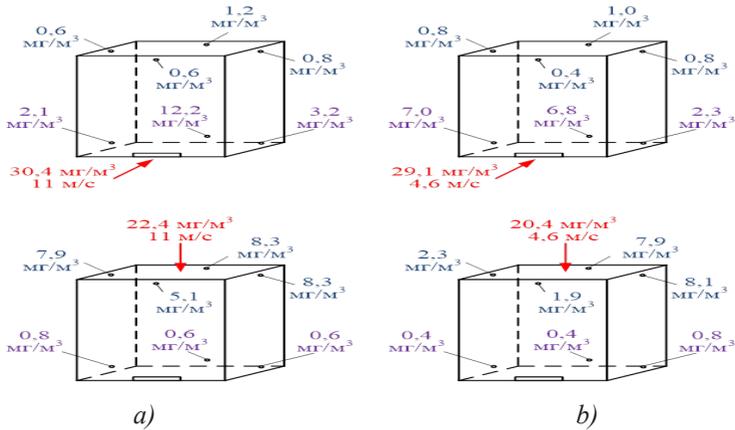


Figure 2. Images of both hives under study when ozone is supplied through the lower entrance, indicating the resulting ozone concentrations at the measured points: a) with a length of the ozone supply pipeline of 1 m; b) with a length of the ozone supply pipeline of 7 m.

As you can see, an increase in the length of the pipeline by 7 times reduces the speed of the ozone-air mixture by more than 2 times (from 11 m/s to 4.6 m/s), but at the same time the ozone concentration at the entrance to the hive dropped by only 4.3%. As for the distribution of ozone inside the hive, the experiment made it possible to see a strong unevenness of ozone even in the lower part of the hive compared to the supplied concentration. There was virtually no ozone in the upper part of the hive. The assumption is that supplying ozone to the hive from above should increase the uniformity of its distribution because ozone is heavier than air was also not confirmed (Fig. 3). At the same time, the decrease in the concentration of ozone supplied to the hive (compared to the results shown in Fig. 2) from 30 mg/m³ to 20 mg/m³ is associated with an increase in ambient temperature and heating of the discharge device, as discussed above.

Apparently, the main disturbing influences that destabilize the ozone concentration in hives are: the decay of ozone on the internal surfaces of the bee home, ventilation of the air in it by the bees themselves, their breathing, as well as the breathing of their brood.

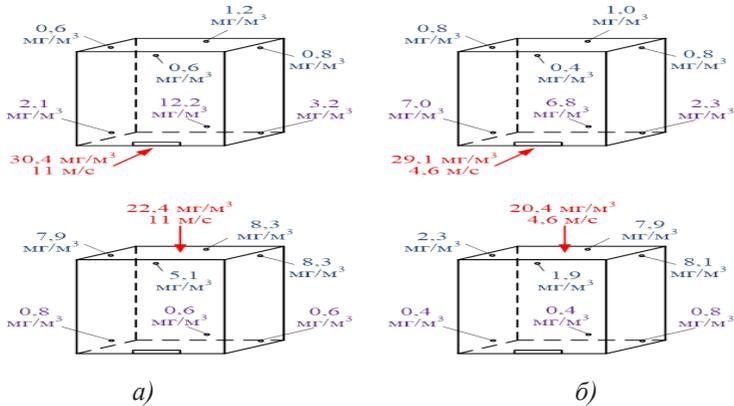


Figure 3. Images of both hives under study when ozone is supplied to the upper part of the bee's home, indicating the resulting ozone concentrations at the measured points: a) with a length of the ozone supply pipeline of 1 m; b) with a length of the ozone supply pipeline of 7 m. Puc. 3.

Thus, the studies have shown that increasing the length of the ozone supply pipeline reduces the supply of this gas to the hive, while its concentration changes slightly. At the same time, there is a strong uneven distribution of ozone in the hive. In our opinion, one of the ways to increase the uniformity of ozone in the hive is to supply it simultaneously to both the lower and upper parts of the bee's home. Moreover, the ozone concentration at the inlet in both parts of the hive should be about 200-250 mg/m³ in order to create a concentration inside it close to 50 mg/m³ recommended in [1]. For bees, as studies by D.A. Ovsyannikov, such high concentration values are not dangerous [3]. If it is not possible to create such a concentration, then the exposure time should be increased to more than 30 minutes.

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腐植酸钾促进剂对奥伦堡乌拉尔地区冬小麦产量的影响
**THE EFFECT OF THE PREPARATION POTASSIUM HUMATE
PROMPTER ON THE YIELD OF WINTER WHEAT IN THE
ORENBURG URALS**

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抽象的。介绍了腐植酸钾促进剂对冬小麦产量影响的研究结果。该研究的目的是确定使用腐殖质制剂的各种方法对不可持续农业地区冬小麦作物结构形成和粮食产量的影响。提供了各种使用该制剂的方法对作物结构和作物产量影响的数据。

关键词: 冬小麦, 腐植酸钾提示剂, 种子处理, 营养植物处理。

Abstract. *The results of studies on the effect of the drug Potassium Humate Prompter on the yield of winter wheat are presented. The objective of the research was to determine the influence of various methods of using a humic preparation on the formation of the crop structure and grain yield of winter wheat in the zone of unsustainable agriculture. Data on the influence of various methods of using the preparation on the structure of the crop and crop yield are presented.*

Keywords: *winter wheat, potassium humate Prompter, seed treatment, treatment of vegetative plants.*

Winter wheat is one of the most important, most valuable and high-yielding grain crops, occupying more than 30% of the sown area in the structure of grain crops, as it is the most valuable food crop. Its value lies in the fact that the grain has a high content of protein (16%) and carbohydrates (80%)[1]. In the Orenburg region, winter wheat occupies a leading place and is the main and most productive grain crop.

In recent years, the area sown with winter wheat in the Orenburg region is 24-38%.

According to the statistical department for the Orenburg region, over the past 20 years the average winter yield was 17.3 c/ha, which is 38.2% higher than spring wheat.

At the same time, the varieties zoned and cultivated in the region have a potential yield according to the state variety network from 35 to 60.0 c/ha or more. Improving technologies for cultivating winter wheat and introducing them into production is an urgent task of great practical importance. In recent years, the use of preparations based on humic acids has occupied a significant place in crop production [2]. They are used to stimulate the growth and development of plants and as substances with bioprotective properties. They improve the absorption of nutrients by plants and increase plant resistance to climatic and biotic stressors. In many cases, HP enhance the impact of chemical agents: mineral fertilizers, plant protection products, inoculants [3,4]. Humates can protect plants from a number of viral and fungal diseases. The protective effects of humates are most pronounced under extreme conditions (high or low temperature, drought or waterlogging, insufficient light, oxygen in the soil) [5].

Taking into account the above, we conducted research to study the effectiveness of the humic preparation Potassium Humate Prompter produced by JSC Shchelkovo Agrokhim on winter wheat. Research was carried out in Lipovskoye LLC, Buzulukchi district in 2016-2017 on southern chernozems in a 6-field grain-fallow crop rotation. The experiment was carried out in 3 repetitions. The object of research was the zoned winter wheat variety Orenburgskaya 105. The agricultural technology for cultivating winter wheat in the experiment corresponded to that adopted on the farm. The seeding rate was 5 million germinating grains per 1 hectare. The weight norm was determined taking into account the weight of 1000 ears and sowing suitability and amounted to 225 kg/ha.

Winter wheat variety Orenburgskaya 105 was sown in pairs.

Winter wheat was harvested in the phase of full ripeness using a “Sampo-130” self-propelled combine using direct combining.

Experience scheme

1. Control, seed treatment with Benifis ME 0.8 l/t + Imidor about 1.25 l/t;
2. Treatment of seeds with Benifis ME 0.8 l/t + Imidor pro 1.25 l/t + Potassium humate Prompter 0.5 l/t;
3. Treatment of seeds with Benifis ME 0.8 l/t + Imidor pro 1.25 l/t + Potassium humate Prompter 0.5 l/t + treatment of vegetative plants with potassium humate Prompter in the autumn tillering phase 0.5 l/t.
4. Treatment of seeds with Benifis ME 0.8 l/ton + Imidor pro 1.25 l/ton + Potassium humate Prompter 0.5 l/t + treatment of vegetative plants with potassium humate Prompter in the autumn tillering phase 0.5 l/ha + in spring tillering phase 0.5 l/ha.

5. Treatment of seeds with Benifis ME 0.8 l/t + Imidor pro 1.25 l/t + Potassium humate Prompter 0.5 l/t + treatment of vegetative plants with potassium humate Prompter in the autumn tillering phase 0.5 l/ha + in spring tillering phase 0.5 l/ha + heading phase 0.5 l/ha. Seeds were processed immediately before sowing.

Table 1
Effect of Potassium Humate Prompter on the structure of the winter wheat harvest, 2017

No.	Experiment options	Productive stem, pcs./m ²	Number of grains in an ear, pcs.	Grain weight per ear, g	Weight of 1000 grains, g
1.	Control (without processing)	296,4	22,2	0.82	36,7
2.	Seed treatment	319,8	22,4	0,85	38,3
3.	Seed treatment + treatment during autumn tillering	323,7	22,2	0,85	38,4
4.	Seed treatment + autumn tillering treatment + spring tillering	344,8	22,1	0,87	39,5
5.	Seed treatment + treatment during autumn tillering + spring tillering + heading	358,4	21,4	0,92	42,9

Note: treatment rate Potassium humate Seed prompter -0.5 l/t; during vegetation - 0.5 l/ha

The data presented in Table 1 indicate that the main contribution to the formation of an increase in grain yield is made by such structural elements as productive tillering and the weight of one grain. Application of Potassium Humate Prompter. increased the number of productive stems by 7.9-20.9%. Moreover, the largest number of them was noted in the variant during seed treatment and 3-fold processing during the growing season (option 5) - 358.4 pcs/m², which is 62 pcs/m² higher than the control variant. In addition, humic preparations contributed to an increase in the weight of 1000 grains compared to the control, while the greatest effect was also obtained in the variant with the use of Potassium Humate Prompter in the heading phase. where the increase in grain weight per ear compared to other options was 0.05-0.1 grams, and the weight of 1000 grains was 3.4-6.2 grams

The use of the drug Potassium Humate Prompter both when treating seeds before sowing and during the growing season contributed to an increase in the yield of winter wheat compared to the control option (Table 2).

Table 2 shows that the lowest yield of winter wheat variety Orenburgskaya 105 (25.0 c/ha) was obtained in the control; the largest increase in yield was provided by treating the seeds with a tank mixture of Benifis ME 0.8 l/ton + Imidor about

1.25 l/ton + Potassium humate Prompter 0.5 l/t + treatment of vegetative plants with potassium humate Prompter in the autumn tillering phase 0.5 l/ha + in the spring tillering phase 0.5 l/ha + in the heading phase 0.5 l/ha. in this option, the grain yield was 32.9 c/ha, which is 31.6% higher than the control option. The yield of options with only seed treatment and seed treatment + treatment of vegetative plants during autumn tillering did not differ significantly.

Table 2
Effect of the drug Potassium Humate Prompter on grain yield of winter wheat, c/ha

No.	Experiment options	Productivity, c/ha	Increased control	
			Deviation from control +/-	
			c/ha	%
1.	Control (without processing)	25.0	-	-
2.	Seed treatment	27.0	+2	8
3.	Seed treatment + treatment during autumn tillering	27.6	+2,6	10.4
4.	Seed treatment + autumn tillering treatment + spring tillering	30.1	+5,1	20,4
5.	Seed treatment + treatment during autumn tillering + spring tillering + heading	32.9	+7,9	31,6
	HCP ₀₅	1,36c/ha	-	-

Thus, the use of the drug Potassium Humate Prompter as a growth stimulant on winter wheat makes it possible to obtain an increase in yield by improving its structural parameters.

Treatment of seeds and the use of humates during the growing season contributes to better plant survival and, accordingly, increases the productive stem. increases the weight of 1000 grains, which together contributes to higher yields.

The highest yield was obtained in the variant with seed treatment and treatment of vegetative plants in the phase of autumn tillering, spring tillering, heading with the drug Potassium Humate Prompter at a dose of 0.5 l/ha.

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