



SCIENTIFIC RESEARCH OF THE SCO COUNTRIES: SYNERGY AND INTEGRATION

上合组织国家的科学研究：协同和一体化

Materials of the
International Conference

Date:
October 29

Beijing, China 2019

上合组织国家的科学研究：协同和一体化
国际会议

参与者的英文报告

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

Part 1: Participants' reports in English

2019年10月29日。中国北京
October 29, 2019. Beijing, PRC



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

(October 29, 2019. Beijing, PRC)

ISBN 978-5-905695-70-4

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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ISBN 978-5-905695-70-4

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Foreword

We thank all participants of our conference "Scientific research of the SCO countries: synergy and integration" for the interest shown, for your speeches and reports. Such a wide range of participants, representing all the countries that are members of the Shanghai Cooperation Organization, speaks about the necessity and importance of this event. The reports of the participants cover a wide range of topical scientific problems and our joint interaction will contribute to the further development of both theoretical and applied modern scientific research by scientists from different countries. The result of the conference was the participation of 56 authors from 7 countries (China, Russia, Uzbekistan, Kazakhstan, Azerbaijan, Tajikistan, Kyrgyzstan).

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

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

Fan Fukuan,

Chairman of the organizing committee of the conference

"Scientific research of the SCO countries: synergy and integration"

Full Professor, Doctor of Economic Sciences

前言

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

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

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

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

现代俄罗斯住房自治发展的当前问题
**CURRENT PROBLEMS OF HOUSING SELF-GOVERNMENT
DEVELOPMENT IN MODERN RUSSIA**

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抽象。 本文致力于分析俄罗斯的具体情况以及住房自治的形成和发展问题，例如：商业和非营利性住房管理部门之间的竞争；俄罗斯人口缺乏管理私有财产的传统和技巧；居民在公寓楼的社会资本形成不力；一所房屋的混合所有权；公寓楼房主可选参加房主协会；国家对住房协会的差别化支持体系。这些调查结果确定优先次序的动机奠定了基础，这些动机可以激励公寓楼房主与房主建立伙伴关系；为住房业中业主的活动提供基础设施支持；群众宣传。

关键字：住房的自组织，财产，房主的伙伴关系，服务，舒适，关税，基础设施。

Abstract. *The article is devoted to the analysis of Russian specifics and the problems of the formation and development of housing self-government, such as: competition between the commercial and non-profit housing management sectors; the lack of traditions and skills of managing private property among the Russian population; poor formation of the social capital of residents in apartment buildings; mixed ownership of housing in one house; the optional participation of residents of apartment buildings in associations of homeowners; differentiated system of state support for housing associations. These findings served as the basis for setting priorities for motivating the owners of premises of an apartment building in creating partnerships for homeowners: infrastructure support for the activities of property owners in the housing sector; mass advocacy.*

Keywords: *Self-organization of housing, property, partnership of homeowners, service, comfort, tariff, infrastructure.*

The structural reform of the economy, which began in the post-Soviet era, affected all aspects of Russian society, including housing and communal services. The main content of the reforms included denationalization of the economy, reduction of state funding and the transition to full payment by the population of social services. The main declared goals of the housing and communal services reform were improving the quality and reliability of the housing and communal services provided by developing economic relations in the industry, providing access to the private housing market for housing services, developing homeowners'

initiative on the principles of self-government, as well as effectively regulating the activities of natural monopolies, stimulating resource conservation.

Moreover, according to experts, the implementation of the reform did not lead to the expected results, and the current state of the housing stock, communal infrastructure and the level of tariffs for housing and communal services do not meet the expectations and requirements of a significant part of the Russian population.

One of the most pressing socio-economic problems in the development of *public housing self-government* in modern Russia is to determine its role in the processes of reforming the housing and communal services in the regions and municipalities, and in managing apartment buildings.

Despite the fact that more than 80% of the housing stock has become private, half of Russian citizens are still confident that the financing of major repairs is the responsibility of the state. According to the President of the Russian Federation V. Putin, transferring full responsibility for the overhaul of apartment buildings to the population is currently impossible due to two circumstances:

1. Citizens today are not able to independently solve the problems of decreasing housing;
2. The state has not fulfilled a number of obligations with regard to new owners, in particular, property (during privatization), should have been transferred in proper condition [1].

According to experts, the systemic conditions for the development of housing self-government in modern Russia can be defined as paradoxical [2]. On the one hand, all formal signs were created, such as: demonopolization of the housing management system, development of competition in the housing services market, the ability of homeowners to choose their own way to manage their residential real estate. On the other hand, homeowners do not show due interest and initiative in the maintenance and repair of common property, the creation of homeowners associations (HOAs).

The main reason that determined these features and contradictions in the development of domestic housing self-government was, in our opinion, the accelerated, directive, insufficiently normatively developed implementation of market principles in the housing sector of Russia, the social unpreparedness of the majority of the population for changes.

According to some experts, the realization of the potential of housing self-government is most effectively achieved by creating homeowners associations (HOA). Homeowners associations - is a non-profit organization created for the joint management, ownership, use and disposal of a complex of real estate in an apartment building.

The scientific community denotes the role of homeowners' associations in the development of democracy and the development of civil society in modern Rus-

sia. So, E. S. Shomina, a recognized Russian and international expert on neighboring communities and issues of self-organization of residents, considers homeowners' associations from the perspective of their participation in organizing a housing movement to protect citizens' housing rights, and participating in improving their living environment. E. Shomina notes that the interests of such local groups "... are not limited only to the livelihoods of buildings, but include the livelihoods of collectives, organizations of residents and their problems" [3].

The main legal acts that characterize the legal nature of homeowners' associations are the Civil Code of the Russian Federation, the Federal Law "On Non-Profit Organizations", the Housing Code of the Russian Federation, in addition, the HOA is regulated by a number of other by-laws.

Partnerships of homeowners in Russia have not acquired the status of the institution of managing apartment buildings adequately perceived by the masses of the population:

1. Russian private-ownership housing self-government has no historical and economic continuity.
2. The decisive place in the social structure of the Russian housing movement belongs to pensioners, housewives and former public sector employees;
3. The imperfection of the right field of general residential property management has led to widespread fraud and abuse in this area.

In order to empirically identify and assess the influence of factors restraining the development of housing self-government of citizens (by creating HOA), a sociological survey was conducted among residents of the capital of the Republic of Bashkortostan - the city of Ufa.

The complexity of this aspect of the study, the lack of official statistics for such an analysis objectively targets the use of the empirical method of examination.

The following tasks were set as research:

- ✓ evaluate the degree of satisfaction of citizens with the existing system of housing and communal services;
- ✓ study the willingness of the residents of Ufa to participate in the management of housing and other forms of housing self-government;
- ✓ highlight the factors affecting the activity of homeowners, their desire for self-organization, the creation of HOA and evaluate their impact.

The method of collecting information is a survey of the population according to our own developed tools.

The main hypotheses of the study:

1. The motivation of homeowners to organize themselves will increase as the quality of housing and communal services decreases on the part of commercial organizations (management companies, housing maintenance organizations, etc.), i.e. the more unsatisfactory the activity of the latter will be, the greater will be

the motivation of homeowners to organize themselves, to create partnerships of homeowners.

2. The activity of homeowners, their desire for self-organization, the creation of HOA currently depends on economic, organizational and administrative, technological, socio-psychological, informational factors, as well as the level of housing literacy of the population.

3. A significant rejection factor for part of the HOA institution's population at present is the negative experience of creating and operating HOA in 2008-2016: bureaucratic and administrative obstacles, registering "fake" HOAs, inefficiency of spending financial resources of residents, fraud, raiding, infringement of rights of individual categories of residents, etc.

As the surveyed population were taken adults (over 18 years old) residents of apartment buildings in Ufa [2].

In addition, data were also used from state and municipal statistics of the Russian Federation and the Republic of Bashkortostan, the Ministry of Housing and Communal Services of the Republic of Bashkortostan, the State Housing Inspectorate of the Republic of Bashkortostan, materials from a number of research centers (Simaks Public Opinion Research Center, Russian Independent Institute of Social and National Problems, All-Russian Center for the Study of Public Opinion).

The survey showed that the population is not sufficiently informed about all forms of housing management.

To the question, *"Do you know all forms of managing the common property of an apartment building according to housing legislation, their specifics and characteristics"*:

- the majority of respondents (63.6%) noted that they are mainly aware of traditional forms of service through housing management or management companies;
- only one out of five, or (20.4%) of respondents, noted proper awareness of partnerships by homeowners.

More than a third of respondents (41.82%) are dissatisfied with the quality of housing services provided, considering that the quality does not correspond to tariffs that, according to respondents, are overstated, and their formation system is opaque and incomprehensible to the population (34.7% of those unsatisfied).

19.09% of the respondents are generally satisfied with the quality of housing services (39.09% are satisfied, with some comments), therefore, we can conclude that only a little more than half of the respondents (58.18%) positively evaluate the activities of their servants organizations and management companies.

The main complaints of the population about the work of organizations managing apartment buildings (the survey was conducted in houses that did not create HOA), are as follows:

35% - respondents are dissatisfied with the tariff policy of the management company;

22% - not satisfied with the quality of housing services provided;
 16% - respondents expressed complaints about the quality of the maintenance of the local area;
 9% - noted boorishness, rudeness and low professional level of employees of the serviced organization.

At the same time, only 8.5% of the total number and 14.2% of those dissatisfied with the quality and tariffs expressed a desire to create partnerships for homeowners. Most of the respondents (23%) of those who negatively assessed the level of service for their home consider that solving housing and communal problems depends more on state participation in the management and financial support of housing and communal services than on the activity of the residents themselves.

A significant part of respondents (19.6%) gave priority to traditional forms of services through housing and communal services, considering that it is enough to refuse the services of one such organization and conclude an agreement with another, it will solve a number of problems of housing and communal services, create a safe and comfortable living environment in tenement house.

Some respondents (4.3%) consider it possible to influence the quality of housing services provided through the activity of house committees, while the rest (27.2%) found it difficult to determine their position, table 1.

Table 1

*What changes in the housing management system can improve the quality of housing services, create a comfortable living environment in your home**

Possible answer	Value, %
1. Establishing a Homeowners Partnership (HOA)	14,2
2. Change of service organization (renegotiation of an agreement with another housing department or management company)	19,6
3. Strengthening government participation in the management and financial support of housing and communal services	23
4. Creation of councils of apartment buildings and with their help to interact more closely with the service organization, to control the quality and quantity of services provided	4,3
5. Strengthen the responsibility of dishonest managers of housing and communal services enterprises for violations in the provision of housing and communal services	11,7
6. Difficult to answer	27,2
Total	100%

* The table shows the results of surveys of respondents dissatisfied with the quality of housing services provided.

The third group of residents from the mentioned sample (11.7%) is rather pessimistic in their expectations and believes that a change in the form of managing their own real estate (whether HOA, Housing Management or a private MC), or one organization to another, will not affect the quality of provided housing services, but will affect tariff growth.

The results of the survey show that at present, the majority of homeowners are more likely to have a passive position and a clearly expressed orientation toward shifting responsibility for the state of the housing and communal services sector to the authorities.

The population is distrustful of the introduction of new forms of housing management, the development of self-government in the housing sector. Only those who spoke out in favor of creating a HOA, or revitalizing the activity of house committees (18.5%), share the position that home owners themselves should manage the housing stock, determine the quantity and quality of the provided housing and communal services, and participate in decision-making regarding the maintenance and service of the common property of their home.

The results of an empirical study of the motivational structure of population behavior have disproved the hypothesis that the development of the nonprofit housing management sector (HOA) is determined by its competitiveness with respect to commercial organizations.

Despite the fact that more than a third of the respondents (41.82%) are not satisfied with the quality of the housing services provided, considering that the quality is not in accordance with the tariffs, only 8.5% of the total number and 14% of those dissatisfied expressed the desire to create partnerships of owners housing.

Moreover, the empirical data fully confirmed the author's second and third hypotheses that a significant factor in the rejection for part of the population of the HOA institute is currently the negative experience of creating and operating HOA in Russia and the Republic of Bashkortostan 2008-2016.

The hierarchy of motives of the population towards housing self-organization is as follows:

- the leading position is occupied by the desire of the owner to satisfy his needs for safe, comfortable and well-maintained living in apartment buildings, uninterrupted receipt of housing and communal services (technological motive);

- another important motive was the achievement of economic benefits through HOA (control of spending of residents' funds, control of tariff setting, receipt of budget subsidies for home repairs, etc.);

- the motive for achieving social needs (leading the housing community, interacting with neighbors, contractors, the local administration, etc.) turned out to be less significant for the homeowner, only the third position is the desire of the homeowner to express himself in this activity. This position of residents of apartment buildings, in our opinion, is determined by the transitional state of the socio-

economic system of Russian society, weak social capital, a tendency to state and municipal housing dependency, etc.

In solving many socio-economic problems of the development of housing self-government in general and homeowners' associations in particular, an important role is played by changes in the value system of residents of apartment buildings, which determine the motives of their behavior regarding their property. This is not about the adaptation of the Russian homeowner to new conditions, but about the formation of a qualitatively new, independent, responsible, effective owner, creator of his and neighboring housing space and comfort. Their appearance as a mass layer of effective property owners will determine the effectiveness of both the housing and the entire economic system of the country.

The study showed that the process of forming group values among homeowners is slow, their desire for social consolidation is not detected, which in turn impedes the implementation of the state's strategic tasks in the housing sector, namely, involving the population in the management of their residential real estate, creating safe and comfortable living environment.

These conclusions served as the basis for setting priorities for motivating the owners of premises of an apartment building in creating partnerships for homeowners: - infrastructure support for the activities of property owners in the housing sector; - mass advocacy.

The purpose of the formation of infrastructure to ensure the activities of property owners in the housing sector is to create a support system for housing self-government entities, to ensure their needs arising in the process of organization, joint management, ownership, use and, within the limits established by law, of the disposal of common property in an apartment building.

The support infrastructure for homeowner associations (HOAs) is a combination of legal forms (credit, tax systems, communication systems, insurance of engineering, billing, banking services, training and retraining of HOA staff, management consulting, etc.) and entities of the housing services market (contracting organizations, management companies, utilities, consulting firms, business incubators for HOAs, insurance companies, banks, tax inspectorates, law firms, etc.), that ensure the functioning of the housing services market. The main function of infrastructure organizations to ensure the activities of real estate owners in the housing sector is to create favorable conditions for associations of homeowners (HOAs) and their activities, including in the field of methodological, documentary support, counseling, training, insurance, information support, resource support, service and etc.

An effective regional housing and communal policy should provide the conditions for the development of public self-government in the housing sector, become the basis for the transformation of the apartment building management system and bring it to a new, high-quality level.

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自愿性非营利组织的劳动效率评估
**LABOR EFFICIENCY EVALUATION IN VOLUNTARY NON-
PROFIT ORGANIZATIONS**

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抽象。随着俄罗斯自愿性非营利组织活动的发展，经济的迫切问题是在不同管理水平上对劳动力资源的有效性进行分析和评估。在本文中，我们考虑一个基于主要信息系统“俄罗斯志愿者”的可用指标评估非营利组织/协会/小队志愿者活动的劳动潜力的理论示例。

关键词：志愿服务，志愿者，效率评估，劳动力资源，劳动力潜力，非营利组织。

Abstract. *With the development of the activities of voluntary non-profit organizations in Russia, an urgent problem for the economy is the analysis and assessment of the effectiveness of labor resources at different levels of management. In this paper, we consider a theoretical example of assessing the labor potential of volunteer activities of non-profit organizations/associations/squad based on available indicators of the base of the main informative system “Volunteers of Russia”.*

Keywords: *volunteering, volunteers, efficiency evaluation, labor resources, labor potential, non-profit associations.*

Volunteering – is a resource for the development of the socio-economic system at different levels of government: country, region, city. In developed countries, volunteering is a tradition and an important auxiliary tool of society. To do good things free of charge for the benefit of man and/or society is part of the Russian centuries-old tradition. In Soviet times, volunteering was a Timurov, Pioneer and Komsomol movement, which stopped their work in the nineties. In 1991, the XXII Extraordinary Congress of the Komsomol announced the completion of the activities of the Komsomol organization and its dissolution. Together with the Komsomol, the All-Union Lenin Pioneer Organization was automatically disbanded, and voluntary work became an unusual phenomenon in our country.

In the private market economy of Russia, after the collapse of volunteer movements, certain people began to engage in kind and free work:

- wives of wealthy husbands from nothing to do and/or as a fashion statement;
- unsuccessful people - those who are temporarily unemployed, have no professional experience and they use volunteer work as a “springboard” to acquire recommendations and/or skills;
- schoolchildren and students who were driven to some one-time actions, etc.

Over time, changes took place in the country, and humanity adapted to new circumstances in order to voluntarily devote its time, experience/knowledge/skills to the public good, to help others or to hold any event for free.

In the Russian economy in recent years, the voluntary activity of volunteers has been increasing. According to analysts, in Russia more and more often people give up their individualistic and consumer lifestyle, communicate more and help each other more often. Experts believe that it was precisely on this wave that interest in volunteer work in Europe increased for a long time, as in France 46% of the volunteers surveyed noted that they began to engage in volunteer activities, they felt a desire to help others. []

At the state-government level, one of the real ways, a comprehensive approach to the revival of the mass voluntary movement in Russia, was accomplished in the 2000s. For example, in 2009 it was approved by a decree of the Government of the Russian Federation “The Concept for Promoting the Development of Charitable Activities and Volunteering in the Russian Federation, and 2018 was declared by Presidential Decree the year of a volunteer, this means recognizing the merits of people who are ready for self-sacrifice to ordinary compatriots to whom they render tremendous assistance and invaluable help. In the concept of long-term socio-economic development of the Russian Federation for the period up to 2020, voluntary movement is the most important factor in improving the quality of life of the population.

As of 01.01.2019, 501660 people were registered on the official website of the Russian Federation for volunteering, who work for free in 14135 organizations/associations/squads, producing goods or services for consumption by others.

The International Labor Organization recognizes the work of volunteers as a key resource for solving problems around the world. The problem of analyzing and evaluating the effectiveness of labor resources in the framework of the activities of voluntary non-profit organizations is becoming increasingly important in the economy.

The unified Internet information platform “Volunteers of Russia” reflects the characteristics of the labor force and can be recommended for use it the assessment of the effectiveness of volunteering at different levels of government: macro, meso, micro level. An example of assessing the labor potential [1] of the voluntary activities of non-profit organizations/associations/squad for available indicators of the base of the main informative system of volunteering in the country is presented in table.

Table – Measuring the labor resources of volunteers at the micro-level of management using the information platform “Volunteers of Russia”

Components of the assessment of labor resources at the micro level (associations/organizations)	Available indicators of the information platform “Volunteers of Russia”
Education. Performing work with an educational level sufficient to achieve the goal of unification	Volunteer structure by level of education and by type of work
Professionalism. Professional qualities of volunteers that fully comply with the goals of the association for the analyzed period	Request of volunteers for professional characteristics to carry out activities in accordance with the classifier of professions. Selection of candidates for jobs (positions)
Experience. The level of use of volunteer working time for the analyzed period	Time worked by volunteers (hours)
Labor discipline. Loss of working time by the fault of volunteers	Transparency of actions and the ability to communicate with the volunteer without restrictions
Creative potential. Realized and unrealized initiative proposals	Openness of ideological or practical actions/projects
Conflict. Termination of work as a result of conflict	Transparency of volunteers
Age	Personal data of each volunteer
Work experience	Personal volunteer paper
Responsibility. High organization in the performance of labor duties, discipline, lack of complaints from management and consumers, responsible attitude to assigned duties	Personal volunteer rating
The desire for work. Qualitative and quantitative level of job performance	Level and quality (personal rating of the volunteer) of the participation of volunteers in volunteering

Analysis and evaluation of the effectiveness of the work of volunteers is relevant not only in the context of non-profit volunteer organizations, but also beyond, because Absolute qualitative and quantitative estimates in volunteer activity can be delivered by the beneficiary. The benefit created by volunteer labor belongs to the category of “public goods”, and society has the right to evaluate the services provided or the goods received.

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法律实体和个人的隶属关系（关联性），其在俄罗斯联邦破产（破产）程序中的
地位和作用

**AFFILIATION (CONNECTEDNESS) OF LEGAL ENTITIES
AND INDIVIDUALS, ITS PLACE AND ROLE IN INSOLVENCY
(BANKRUPTCY) PROCEDURES IN THE RUSSIAN FEDERATION**

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注解。隶属关系是一种法律类别，当这些关系影响主题的法律能力时，它确定现有法律关系和法人实体整体中相互依赖的现象。社会经济关系复杂化的现代现实，超出了管辖范围，因此有必要重新考虑这些关系，而对这些关系建立充分的法律规定则意味着需要对其进行深入的理论研究。在破产（破产）案件中，隶属关系越来越成为研究和法律评估的主题。在本文的框架内，建议通过历史，法律-教条（形式-教条），解释学和协同的方法，对该法律类别，其在现代法律理论中的地位和作用进行理论和实践的理解。方法。

关键字：隶属关系，人员群体，会员，受益人，穿透责任，破产程序。

Annotation. *Affiliation is a legal category that determines the phenomenon of existing legal relations and interdependencies in the totality of legal entities and individuals, when these relationships affect the legal capacity of the subject (-s). Modern realities of complication of social and economic relations, their going beyond one jurisdiction give rise to the need to rethink these relations, and the creation of adequate legal regulation of these relations refers to the need for their deep theoretical study. Increasingly, affiliation is the subject of study and legal evaluation in insolvency (bankruptcy) cases. In the framework of this article, it is proposed to make theoretical and practical understanding of this legal category, its place and role in the modern theory of law by means of historical-genetic, legal-dogmatic (formal-dogmatic), hermeneutical and synergetic methods.*

Keywords: *affiliation, group of persons, affiliates, beneficiaries, penetrating responsibility, insolvency procedures.*

As part of the ongoing reform of Russian civil and corporate law in 2008, in 2014 the legal category of “affiliation” was legitimized. The doctrine of this category was known - its theoretical development was carried out for several decades, however, due to the current historical situation in Russia, especially in the Soviet

period, research almost stopped. The foreign doctrine has accumulated considerable experience in developing the “affiliation” design, which should be taken into account.

With the adoption of the Law of the RSFSR of March 22, 1991 № 948-1 “On Competition and the Limitation of Monopolistic Activities in Commodity Markets” [2] (as amended on July 26, 2006) (hereinafter - the Law of the RSFSR on Competition), the concept and categories of affiliates.

The term "affiliation" etymologically derives from the late Latin "filialis", which literally translates as "sons", the Latin "filius" – "son" is the basis of the term. Subsequently, the term “affiliation” as a legal category entered the system of the Anglo-Saxon legal family and was considered as derived from “to affiliate”, which is literally designated as adoption, reception as a subsidiary [5, p. 214 – 216].

The importance of the analysis and legal certainty of the relationship that exists both within the corporation and in the relationship of the corporation with other legal entities is emphasized by scientists; the legislator and the law enforcer also take it into account. In this context, it is interesting to turn to English practice, in view of the fact that it is the forerunner of the widespread use of the concept of affiliation. In a case-law of 1897 in the case of “Salomon v. A. Salomon & Co Ltd”, the principle of limited liability of the corporation was formulated in English law for the first time [9, p. 43]. Turning to the plot of the case, we note that the court examined the situation when, failing to cope with financial obligations to creditors, A. Salomon & Co Ltd went bankrupt and its property was not enough to cover the interests of creditors. Creditors before the court raised the question of satisfying their claims at the expense of the property of an individual-majority shareholder of Salomona [12, p. 212 - 215]. In this case, the subject of litigation was the issue of the legal relationship existing between the corporation and a participant in the corporation, as well as the consequences of such a relationship for the substantive resolution of the issue of the relationship between the responsibility of the corporation and the person who established it, and the delineation of this responsibility. The precedent considered has become the basis of theoretical understanding and discussion about the existence and degree of autonomy of the will of the corporation, which generates a limitation on the liability of the founder of the corporation for the obligations of the corporation itself.

As V.D. Fedchuk correctly pointed out, the recognition of the personality of a legal entity and the autonomy of its will made it possible to form the basis for the further establishment and development of various approaches to the description and formation of relationships (special legal ties) between founders and legal entities [6, p. 194]. In other words, the adoption of this decision was a powerful incentive for the development of corporate law.

A legal entity, being a legal fiction, was a special legal construction, which allowed combining a part of capital, material and non-material resources and (or) a community of legal entities with the aim of creating a new, independent legal entity with abstracting its identity from the personalities of the persons who created it. With the development of the use of the design of a legal entity in civil circulation, cases of various kinds of abuse of law began to become more frequent in synchronized growth.

Due to the accumulation of many such cases, the practice turned to theory with the aim of developing a legal justification and the possibility of legitimizing norms and rules that would allow finding a balance between the isolation of a legal entity, its property and responsibility in the context of preventing the use of such isolation for illegal purposes.

So, Kokorin I.V. indicates an increase in the number of references to the principle of "pari passu", which has become increasingly used in the current European order. The basis of this principle is the recognition of subordination of claims of creditors, which is primarily determined by the presence of affiliation (connectedness) of creditors and the debtor [11, p. 124]. This principle allows you to preventively exclude the possible actions of affiliated creditors to create fictitious debt in order to reduce the bankruptcy estate and, as a result, prevent such actions and, as a result, keep a balance of interests of the creditor and the debtor in the event of bankruptcy of the latter.

At the same time, the advantages of this principle can be offset by the absence of clearly established criteria for affiliate communications, which will be of primary importance in determining the priority of the creditor in satisfying his requirements.

The legal nature of the loan agreement concluded between the debtor and its affiliates is ambiguous. The discussion is conducted, in particular, on the question - do corresponding relationship have a corporate or civil nature?

An analysis of these agreements leads to the conclusion about the importance of the fact of affiliation between the parties to the agreement. It is worth agreeing with the opinion of PT Podshilov, who proceeds from the assumption that such loan agreements should be differentiated from loan agreements of persons not affiliated with the debtor, and the presence of affiliation in itself should already be the basis for lowering the priority of the creditor being an affiliated person [10, p. 41 - 42]. This approach fully correlates with the principle of "pari passu" and the subordination of the debtor's affiliates. Assuming that the priority issue will be resolved in favor of the non-affiliated persons of the debtor, affiliated parties may not try to obtain any preferences and preferences to the detriment of non-affiliated creditors through agreements with the debtor.

Noteworthy is the lack of regulation by the legislation on insolvency (bankruptcy) of affiliation, in contrast to civil law. Articles 53² of the Civil Code of the Russian Federation (Part One) dated November 30, 1994 №. 51-Φ3 [1] (as amended on July 18, 2019) (hereinafter – CC RF), recognizing the affiliation itself, does not contain a full definition of this definition, but indicates the presence of coherence affecting the onset of legal consequences. The legislation on insolvency (bankruptcy) indicates only individual, particular cases of affiliation, which are disclosed indirectly, through the definition of interested parties.

Opinions of A.The. Belitskaya, V.S. Belykh, O.A. Belyaeva seems reasonable, who pay attention to the not quite successful equating of the concepts of affiliation and connectedness, which takes place within the framework of Article 53² CC RF; scientists point out that not every legal connection can give rise to affiliation, but affiliation itself presupposes the existence of such a relationship, which in the framework of specific relations gives rise to legal consequences [8].

The position, within which the categories of connectedness and affiliation are not differentiated, is controversial, since not all connectedness that has legal consequences can carry a deformation of a person's legal capacity to exercise his powers in the framework of specific legal relations. In the above mentioned example, it is worth agreeing with the above authors that the notion of an affiliated person contained in the RSFSR Law on Competition as the presence of one person's ability to influence the activity of another person is the most successful definition for determining affiliation, which also seems to be a good definition of the legal nature of the interested person in insolvency procedure (bankruptcy).

So, Article 19 of the Federal Law of October 26, 2002 № 127-Φ3“On Insolvency (Bankruptcy)” [4] (as amended on July 3, 2019) (hereinafter - the Federal Law on Bankruptcy) recognizes as interested parties to the debtor: a person who, in accordance with Federal Law of July 26, 2006 № 135-Φ3“On Protection of Competition” [3] (as amended on July 18, 2019) (hereinafter - the Federal Law on Competition) is included in one group of persons with the debtor; a person who is an affiliate of the debtor.

At the same time, the concept of an affiliated person, and not of persons in a state of affiliation, is contained in the RSFSR Law on Competition, which, in the opinion of the author of this article, also has a certain defect, namely that affiliation as a category of law is also known to other industries. An example is the category of dependent persons recognized by tax law, the category of main and subsidiary enterprises, which is contained in corporate and civil law, as well as other categories based on the existence of a special legal relationship that can entail special legal consequences.

No less debatable is the problem of the relationship between the grounds for recognizing as a debtor the debtor of those persons who form one group with them, on the basis of clause 2 of part 1 of article 9 of the Federal Law on Competition. For example, the head of a debtor, which is separately named in part 2 of article 19 of the Federal Law on Bankruptcy, taking into account the fact that the head of a limited liability company is its sole executive body and forms one group of persons with it, on the basis of this provision of the Federal Law on Competition. It seems that this approach enhances the inconsistency of various branches of law.

The position expressed in the doctrine seems to be justified, according to which it is advisable to create a single list of grounds for recognizing the presence of affiliation in the aggregate of legal entities and individuals, allowing to determine the specified relationship as legally significant, and its consolidation in the framework of civil law. For example, if the affiliation of the Director General and the legal entity is presumed by civil law, then within the framework of special industries, this connection will no longer need to be proved. Such an approach will allow us to consider the issues of fiduciary responsibility of the Director General as a general case, despite the fact that exemption from such responsibility will be considered a special case in each particular branch of law, based on the specifics of regulated relations.

Further, we note the tendency of judicial practice to bring nominal managers of a legal entity to account in the framework of insolvency (bankruptcy) procedures. So, by the decision of the Dorogomilovsky District Court in case № 02-1605 / 2016, Marina Bunina, being the nominee director of "Reality Plus", LLC and acting as a guarantor to the Sudostroitelny Bank under the loan agreement, was brought to subsidiary liability for the debts of the said company for the said loan in the amount of more than 32 million US dollars (more than 2 billion rubles). Bunina was not aware that she acted as a guarantor under this agreement, but even more questions were raised by the fact that Bunina herself was a janitor [13]. In the presented example, the need for refusal in matters of qualification of affiliation from a formal approach in favor of the essential component is clearly demonstrated.

The position of V.A. Laptev, which drew attention to the fact that the legitimization of the category of "affiliation" within the framework of civil law, allows us to interpret this phenomenon more broadly than it was determined by the norms of special legislation, is encouraging [7]. It seems that this broad interpretation will allow to preventively intrude into the regulation of related party transactions even at the stage of their conclusion, and not when these transactions are disputed in the framework of insolvency (bankruptcy) procedures, that is, when the transferred property or the right to return it is already problematic, or it requires

significant costs. Obviously, these costs are often in their temporal, material and other characteristics are incommensurably greater than the part of the bankruptcy estate that could have been received if the transaction was not completed and (or) the transaction was recognized as null and void using the institution of restitution, if there are requirements and obligations under the law making such transactions.

Modern Russian civil and competition (bankruptcy) law follows the path of fine-tuning their tools and their relationships, when the legislator and law enforcer try to minimize or eliminate all possible loopholes for violating the law and for using it as a tool of abuse.

Given the limited scope of this article, the issues of correlation of affiliation with various modifications of penetrating responsibility and (or) transactions with related parties are not considered, as they are the subject of a separate study.

Further, we note the needs of theory and practice in using the ideas of A. Burley and G. Minza, expressed by them in the framework of the theory of a “single economic system” or, as it is commonly called, “collective capitalism” in characterizing the inter-corporate relations of the subsidiary and parent company. At one time, these scientists noted that joint-stock enterprises are no longer private, but act as collective ones. The theory of a single economic system will complement the category of affiliation in terms of its purely legal essence with an economic justification, given that communication can be based not only on legal parameters, but also on economic grounds.

The indicated idea, in its version adapted to the Russian legal system, is also applied in judicial practice when considering cases of insolvency (bankruptcy) - its traces can also be seen in the current version of Section 19 of the Bankruptcy Law.

The development of affiliation through the further development of the theory of a “single economic entity” in insolvency (bankruptcy) relations will make it possible to talk about affiliation where, from the legal point of view, there is no affiliation, but the economic interest fully demonstrates and justifies it.

Summing up the present work, we will draw the following conclusions:

- in the definition of the concept of affiliation, it is advisable to exclude its identification with the concept of connectedness, taking into account the fact that not every legal connectedness can mediate affiliation;

- there is a need to formulate a basic set of signs of affiliation and their consolidation at the level of the codified act - the civil code - indicating the possibility of expanding such signs or the inclusion of separate special, differentiating additional signs, within the framework of special legislation by applying the rule of correlation *lex specialis* and *lex generalis* (general and special norm);

- the definition of the concept of “affiliation” should be supplemented by a definition about a defect in the legal capacity of a dependent person; in other words, to recognize that affiliation is not any legal connectedness of persons with legal consequences, but only one that entails (may entail) a defect in the implementation of the legal capacity of the person. In other words, we are talking about a situation where one person in relation to another person is empowered to give binding instructions;

- the need for recognition of affiliation not only exclusively as legal, but also economic affiliation has been proved, which would make it possible to talk about affiliation when the affiliation is not traced within the framework of legal requirements, but it is obvious from the point of view of qualifying economic interest.

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民间社会对犯罪的责任
CIVIL SOCIETY RESPONSIBILITY FOR CRIME

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注解。证明了公民社会相对于国家的首要地位，显示了公民社会发展的困难以及参与打击犯罪的形式。分析了各种组织在其中的作用和重要性。

关键词：公民社会，国家，发展，参与形成，犯罪对策，作用和重要性，组织。

Annotation. *The primacy of civil society in relation to the state is proved, the difficulties of its development and the formation of its participation in the fight against crime are shown. The role and importance of various organizations in this are analyzed.*

Key words: *civil society, state, development, participation formation, crime counteraction, role and importance, organizations.*

- It is believed that civil society should beat chest against chest for all the best in this life. And who and what will stand up for him?

- The law. After all, in fact, he was created to protect values of life. And civil society ... is, like Pushkin,

"Our everything." At least that's what he created the state.

*- But did **civil society** create a state?*

*- The question here is **what exactly** is considered a civil society.*

Even if society only allowed itself to be formed in due time

*state, then it has **already** shown certain signs*

citizenship, that is, signs of a community of free people,

*striving to form a **stable** management structure and become a kind of*

source of its strength

in counteracting any adversity

(from heard)

First of all, we note that civil society was created precisely for this purpose in the bowels of primitive communal society, so that through its efforts, or at least with its permission, an appropriate administrative apparatus would be formed to regulate people's lives, which would later be called the state.

Initially, there were six main functions of the state, namely:

- a) countering the raids of other tribes;
- b) raiding other tribes;
- c) hunting, maintaining fire and arranging dwellings (caves, huts, etc.);
- d) agriculture;
- e) caring for the younger generation;
- g) counteraction to violations of the established procedure.

With the formation of the state, the role of civil society in life processes did not come to naught, but nevertheless it came down to a large extent to observing them and expressing their opinions, thoughts, endorsements, doubts, opinions, including fairly critical and even harsh, daring, expressed in protest actions, including aggression, violence, cruelty.

All this was quite often characterized in the laws of the state as crimes, and was resolutely suppressed, suppressed and, of course, punished. At the same time, cruelties essentially had no limits. "Once caught - it means answer, moreover, for all the tech who did not fall - as a warning to everyone. That it was not proper ... "

And only beginning about the middle of the XIX century did the first signs of a civilized approach to various protest actions by the state appear. The authorities, of course, understood that ... "everything is not right in the kingdom", and therefore worked not only to "execute" the club, but also to "pardon" the fate.

At about the same time, civil society began to take care of order itself, including by participating in the fight against crime, which quite often was, as the well-known classics of economic, political and legal thought already claimed, a barbaric form of protest against the conditions of its existence.

As for Russia, in 1996 we introduced the Criminal Code (CC), which, through the articles of its chapter 23 ("Crimes against the interests of service in commercial and other organizations"), protected the interests of civil society. Of course, the same Code protects the interests of the state much more broadly, deeply and thoroughly, but nevertheless the first shah made in the right direction is very important. Through it, a clear reference has been given to other branches of the legislation, not only in the sense of placing under the protection of the interests of civil society, but also in the sense of the whole system of protected values in general - as well as specific penalties for acts that violate them, and, therefore, their state censure.

But, unfortunately, it so happened that even the Code of Administrative Offenses (CAO) did not take into account the lesson taught to all law enforcement legislation. Although the Code of Administrative Offenses is the closest in law enforcement function to the Criminal Code, and it was adopted only five years later (2001). This happened because the articles of chapter 23 of the Criminal Code were extremely insufficient to protect the interests of civil society. The reasons for this conclusion are as follows:

firstly, the law unjustifiably limited the concept of civil society - it came down only to organizations working without any state or municipal participation;

secondly, the law does not provide a specific list of “other” organizations, including, for example, political and social organizations, professional and human rights organizations, environmental and aesthetic organizations, housing and communal services, garage, summer cottages and garden plots, charitable and amateur, volunteer and religious;

thirdly, responsibility was conditional on the presence of a statement or consent of the head of the organization;

fourthly, under the Articles of Chapter 23 of the Criminal Code, unconditional liability (upon application or with the consent of the head of the organization) was limited only to cases in which the damage was caused not only to organizations, but also to the interests of citizens, society, the state, and / or municipal organizations;

fifthly, the grounds for liability were established not only by criminal, but also by criminal procedure legislation - in article 23 of the Code of Criminal Procedure of the Russian Federation (CCP).

We believe that private business, operating even with a low participation of the state or municipality, does not lose its status as a structure of civil society. But this is possible only if it is in all respects a legitimate business, that is, a business that complies with literally all the requirements of all laws relating to this field of activity.

If we are talking about, say, a shadow economy, then this is no longer a civil society, but a “society” of lawlessness and arbitrariness. Even if, for example, in the course of illegally organized trade exclusively high-quality goods are sold, and at quite reasonable prices. As if, say, in an illegally functioning bathhouse at quite reasonable tariffs, our decent people in all respects wash themselves pretty well.

These are only the gangs of the Nazi Biletsky in Ukraine, which prevented in October 2019 the withdrawal of her troops from the borders of the DPR and LPR can position themselves as “representatives of civil society”. Although, in fact, they have no rightful place somewhere, but behind bars.

And what about the counter-criminal function of political organizations? The main role here belongs to parties, movements, associations. All of them must act legally, and not only during periods of election campaigns, but also at the stage of direct exercise of power, and especially at the stage of its civilized change.

Of course, the competitiveness of political forces should always be civilized (conscientious). It is difficult to understand the organizers of the election battles, when they require tens and hundreds of thousands of signatures from representatives of some parties to register as candidates, and only a few hundred or thousands of them from others.

As life shows, every political force, having seized power, is trying to linger ... "by the throne", as long as possible, and if possible - forever. And she is moving toward this goal, usually along the shortest path, namely replenishing her ranks as much as possible with citizens from among the newly appointed officials, and then teachers, doctors, police, military personnel, and service personnel of the corresponding structures. The numerous voices of numerous relatives, friends, and friends of these individuals are also used.

It is significant that the power contingent works in such a way that it is clear to everyone that with his departure everything in the country will fall apart - as, indeed, she herself. Nowhere on the horizon is there a single bright person in the ranks of the opposition - everything has been cleared, staked out, equipped, privatized, etc.

What can and should be opposed to this? Firstly, every person who comes to power must declare himself outside of any party affiliation, secondly, it is necessary to limit the stay in power of one and the same party to a maximum of two election periods and, finally, thirdly, it is advisable to exclude any influence on the internal political processes of a foreign factor. Any violations of such requirements must be resolutely suppressed, up to the use of the force of criminal law. But the relevant norms of the Criminal Code should be directly aimed at this.

Besides the fact that political parties, movements and associations themselves must act legally, it would be important if they were responsible for the legitimacy of behavior and other political structures - especially those acting under the influence of receiving all kinds of "subsidies" from outside. The recognition of senior US officials themselves, who admitted in early 2014 that, for example, the Americans spent a total of five billion dollars on ... "democratizing Ukraine," is still not forgotten.

Great responsibility for the rule of law objectively rests with trade union organizations. They must take care not only of the labor rights of their participants, but also of their other rights, including social rights, including housing rights. While many other countries completely got rid of all kinds of shacks, pimped and other shacks, we still keep all this essentially in its original form - instead of

having to demolish such "buildings" under the very foundations and build them in their place fundamentally new housing estates, and such that no fires, floods or "shelling" from the part of the munitions exploding in warehouses can reach.

Trade union organizations could contribute to caring for citizens' rights. In places of compact residence of employees of enterprises, these organizations could take a more active part in maintaining public order, and if necessary, work substantively with their colleagues who have stumbled in life. If people pay membership dues in their trade union organizations, then they have the right to count on their support in essence on all issues in the solution of which they have difficulty. Another thing is that while there are no trade union organizations in our country. And where they are, they don't work. It's time to create and launch them.

Great claims to promote the rule of law exist for human rights organizations. They are especially active in working towards combating corruption and other abuses in the ranks of officials, including (and maybe even primarily) among law enforcement officials. Their desire to penetrate the territory of correctional institutions is especially strongly manifested. And then "blow" publicly about ... "the unrest reigning there."

The situation in these institutions is really not up to par with us - all the more if we take into account that even the first officials of our penitentiary system are sometimes held accountable for various abuses and sent one after another to the colony. But this only once again indicates that representatives of various human rights organizations should from time to time properly visit our correctional facilities, talk with convicts there and share their thoughts on the moral and moral improvement of this system in the media.

But in our open space there are even more those who at different times encountered our law enforcement agencies in connection with a conflict with the law, and they can also give human rights defenders quite valuable information, including on the subject of its use in improving the activities of our correctional institutions. But human rights defenders are mainly interested in convicts with a great penitentiary "experience", since it is from them that they receive information whose dissemination can, in one way or another, discredit our state. The foreign footprint in the work of many of our human rights defenders is obvious.

Civil society should also pay great attention to caring for the rights of people to life, health, freedom, honor, dignity, private and public life. Unfortunately, even the Constitution mostly mentions rights of this kind - instead of, as they say, each of them bowing low. Even the right to life in the Basic Law of the country is given only five short words - only half a line.

Without the protection of human rights defenders, the health of citizens remains. The commercialization of healthcare has gone so far that it seems that the point of no return has already been passed, since the doctor essentially ceased to

be a doctor, and the nurse became a nurse. All these people turned all their worries into knocking money out of patients. This is especially cleverly obtained in collusion with pharmacists.

If the political structures of civil society need to be improved, the trade union structures should be revived, and the human rights ones should be oriented towards protecting the interests of not only the perpetrators of the crimes, but also those affected by them, then the ecological structures will be re-created to a large extent. Our forests are burning all the time, but those that do not burn are cut down, and in the most shameless and merciless way. Civil society, on this occasion, got into the mouth like water.

I remember one day in one of the Nizhny Novgorod markets a photographer nailed a piece of plywood to a tree with an announcement of the address of his photo point. And then he was fined by some environmentalist for a rather large amount. At the same time, poachers illegally felled trees nearby in the forest, and no one punished them for this.

One has only to wonder how nothing has smoked anywhere in Germany that we defeated for more than a third of a century - even car mufflers are equipped with appropriate catalysts that absorb exhaust gases. All the streets of all cities there are washed so that there is no specks of dust anywhere. Standing in expectation of a green traffic light at a crossing, for example, Düsseldorf or Cologne (not to mention Berlin) - in the sense of cleanliness, is like standing somewhere by the river surrounded by a fragrant birch grove - it's a pleasure.

In our country, large cities have long turned for the population into some kind of dust and gas space. The dust component and other features of a gassed urban atmosphere, of course, allow citizens to hold on their feet for some time, but they are not the same people they could be if ... it wasn't this smog that hung almost constantly over the houses.

As life shows, there is work for us and for civil society organizations of an aesthetic orientation. It is no secret that, receiving subsidies from the state for new productions, our theaters still drive mainly old repertoires in a circle, and movie centers do not show any new film production at all. The money allocated "for art" dissolves to the ruble in endless conversations of aesthetes about what kind of theater we need today and what kind of movie we need tomorrow. Estrada, on the other hand, has lost her face, and shows concerts, saturated not only with the deafening noise of musical instruments, but also with all kinds of amusing surroundings.

For more than ten years, the notorious stash of Dom-2 has not left the TV screen (it is otherwise difficult to call this a dubious institution), including with an endless string of grooms Olga Buzova and with whole herds of brides for a kaleidoscope of changing gentlemen. Even the words of Patriarch Kirill about the need

to stop this orgy of shame, cynicism, stupidity and shamelessness are drowning in her general hum, screech, laughter and roar.

Putting an end to all this without criminal law is just as impossible as catching a shark on some kind of children's fishing rod. It is necessary to sharpen and more precisely aim at such socially dangerous manifestations of the corresponding criminal legal tools, and then the positive effect will not slow down.

What should housing and communal organizations do in terms of combating crime? First of all, to provide all the elevators, platforms on the floors, flights of stairs, porches and adjoining territories with video cameras. Where barriers suggest themselves, they must be installed.

And, finally, it is necessary to proceed to the construction of housing with underground and elevated multi-tier parking lots in the adjacent territories. Excess vehicles in yards contribute to road traffic accidents, including fatalities. They crush the children and help them make them drunk. Well, where does it fit? And how much can you endure this?

The young neighbor of the author of this publication on the tenth floor, while parking his "Zhigulenska," hit someone's luxurious and expensive car. Naturally, he was upset, then went up to his apartment, and then jumped out the window and crashed to death. Then people brought flowers to the crash site of the unfortunate motorist for a long time.

It is necessary to provide lighting and video surveillance to all garage and garden cooperatives. Only by minimizing the physical ability to commit a crime can we achieve that rule of law in the country, under the conditions of which the work of each of us can bring real benefits - to ourselves and society.

俄罗斯法律的整体结构以及关于犯罪和刑罚的法律
**THE OVERALL CONFIGURATION OF THE RUSSIAN
LEGISLATION AND PLACE IN IT THE LAWS ON CRIMES AND
PUNISHMENTS**

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注解。 分析了刑罚立法的发展方向，在整个立法体系中的地位，作用和意义，与其他行业的关系，以及它们同时发展的前景。

关键词：发展方向，犯罪和刑罚立法，地点，作用和意义，所有立法制度，其他行业，其同时发展的前景。

Annotation. *The directions of the development of legislation on crimes and punishments are analyzed, its place, role and significance in the system of legislation as a whole, its relationship with other industries, and prospects for their simultaneous development are shown.*

Key words: *directions of development, legislation on crimes and punishments, place, role and significance, system of all legislation, other industries, prospects for their simultaneous development.*

- *What is the place of legislation on crimes and punishments?
in the system of its other branches - the main or auxiliary?*

- *We will not oppose one to the other here -
each industry has its own purpose, its tasks, functions, etc.*

- *But still?*

- *It all depends on the angle of view. In principle, all industries maintain order in the relationship between people, as well as all of them together - with society, its state and, one way or another, with all of humanity.*

*But legislation on crimes and punishments, moreover,
also ... uproots evil, that is, crimes with all its roots.*

Without this, the value of other branches of legislation is essentially zero.

- *And therefore, without legislation on crimes and punishments ... - nowhere.*

It came into this world the first and last to leave it.

"Unless, of course, someday this is destined to happen."

"Perhaps you are right." Although, as they say, wait and see.

- *We will not live ...*
- *The main thing is to live, and not ... to live ...*
- *I agree*
(*from overheard*)

Today, Russia needs a fundamentally new criminal law, both in form and in content. The transitional period of the development of our country is coming to an end, and it is currently preparing to enter directly into the stage of accelerated development, namely the stage of highly effective creation, renewal and prosperity of values, as well as their fair treatment and rational use. In the past three decades, as we all clearly see, China has gone far ahead, and, therefore, Russia has come to actively move there too.

On the general configuration of Russian legislation

The singing in the polyphony of aspirations to update all Russian legislation rightfully belongs precisely to the legislation on crimes and punishments. But it's just a rush, and not the adoption of new such legislation. The first in the series of draft new codes should appear the draft of this legislation, and only then - the draft of all other codes.

But legislation on crimes and punishments should be adopted only after the bulk of other codes are adopted. Closing this process should, in particular, the procedural, executive, evidentiary, preventive and administrative codes.

Such a sequence is fundamentally important, since the priority here should belong to the codes serving the processes of creating values, and only then codes should be adopted that serve the processes of protecting the created values.

There are, however, certain nuances.

The first thing that needs to be taken into account in legislative procedures is that, fortunately, our country is still very large, and we all in Russia are confident that it will always be so. And if she is destined to change territorially, then only the side of the increment of territories. At least the doors for this are always open for us.

Therefore, taking into account the still significant scale of the country - both today and especially in the future, each federal district should have its own legislation, although it is not difficult to understand, with a sufficiently large national legislative block designed to take into account the interests of the whole country as a whole.

Let's look at the United States - there it is with legislation. At the same time, in the Federal District of Columbia (Washington, the capital of the USA), along with its own, the legislation is also common for the whole country. Recall that crime in the United States is about ten times less than ours.

But let's look at our own history - in the last (by the way, far from the best) time period, crime in the USSR was also about ten times less than now - with the recount of the number of recorded crimes per 100,000 population. In the years of the best in this sense of the time, lovers wandered through parks, squares, and just where, essentially, all night long, and no one touched them anywhere. Very

few people were in a hurry to get on ... the “last trolley bus” - like the tram, bus, minibus, electric bus, river boat, etc. Then everyone understood what love was.

By the way, there were no iron doors and bars on the first floors of the houses. Nobody had any idea about alarms. And the key to the front door invariably remained under the rug at the front door. It was understood that if you came to visit someone and nobody was at home, you can freely enter the apartment, have tea and calmly wait for the owners to come.

It seems advisable to establish, along with other federal districts, also the Capital Federal District - on the basis of Moscow and St. Petersburg, as well as the territories between them and around them, and to adopt, along with its purely metropolitan legislation, also legislation on national interests. And in all other federal districts, there should be, with some exceptions, also their own legislation.

The task of national legislation should be to build a common system of values for the whole country, which would penetrate all branches of legislation, both at the federal and regional levels, as if with certain red lines.

***Crime and Punishment Laws as
legislation is the main, capital, leading ...,
which means ... - the head***

In this case, you need to think carefully about a more proper name of the legislation on crimes and punishments. Naming it as criminal law is in principle unsuitable, since it is associated with the fact that in the old days people often paid for their crimes with their heads. Caught the rapist - killed, caught a thief - the same thing, caught a rogue - buried alive in the ground, etc. The word “criminalize” was, apparently, identical then to the word “behead” or hang by the head, poke your head in a bucket of water At least, most people today think so.

But ... new times - new songs. At present, it is no longer possible to go “on” about history, calling the industry in question legislation, for example, “discontinuous” - given the fact that in Russia for several centuries the perpetrators of crimes were literally torn to pieces. For example, with a large crowd of people, they did it this way: they tied their legs to tilted birch trees standing not far from the man sentenced to death, and then, at the command of the main executioner, they released the trees. It would be extremely incorrect to call our branch of legislation and ... “cut-off” - chopped off the heads of offenders, “wheeled” - wheeled them (moving the wheels of wagons), “spiked” - put on the count ...

Although the names of people, derived from the punishments to which they were or should have been, still, by some unthinkable tradition, have remained in our time. Characteristic in this sense is, for example, the name “Kleimenov”. Perhaps the foreheads of the distant ancestors of the carriers of such a surname did not in fact branded inscriptions such as “thief”, “demon”, “devil”, etc. (at least I want to think so), but, nevertheless, they were “awarded” with such a shameful nickname.

One of the paradoxes of history also consists in the fact that now people with similar surnames are contributing (sometimes by entire dynasties of doctors of law) with their, of course, significant scientific works, a great contribution to the moral and moral recovery of society. And not only society, but also the state, including in the area of combating crime.

It seems advisable to replace the phrase “Criminal Code” (“criminal law”, “criminal law”, “criminal justice”, etc.) that has become commonplace, but still fundamentally absurd, with a more suitable, and therefore more acceptable, collocation. Namely, the phrase: “Head Code” (respectively ... - “head legislation”, “head law”, “head justice ...”). Following the example of how the unit is called the head unit in one or another technical system, which gives the necessary focus to the work of all its links. In a word, legislation on crimes and punishments is, figuratively speaking, the head of all legislation in general. Unless, of course, the Constitution, which this head is an even larger head, is not considered.

And indeed: of all the codes, this code (on crimes and punishments) is actually the main one. And the point here is not so much that the Constitution itself calls this branch of legislation the first - in the series of its branches (paragraph “o” article 71) (although this in itself is certainly important), but in the essence of the issue. Here the fact is that the legislative branch under consideration establishes the most stringent responsibility for the most dangerous attacks on the main, basic, key values of life. As well as in the fact that this industry creates certain guidelines for all other branches of the law on offenses - in the sense of both the system of protected values contained in them (in dispositions) and the assessment of the nature and degree of danger of offenses (in sanctions).

No matter how and whatever they talk about it, there is really no more dangerous phenomenon than crime. And it cannot be, unless, of course, we have in mind the war. But it is also based on crime, be it the invasion of Hitler hordes on the USSR or the war of the Kiev authorities against the people of the DPR and LPR.

The scale, depth and power of responding to crimes, including both directly on them and by influencing their initial states, including those that at first were only expressed as administrative offenses, such as petty theft, are also important here. petty hooliganism, etc.

The legislation on crimes and punishments, which is proposed to be renamed here from the criminal to the head, is characterized by head significance also because it sets the criteria for the legal response to offenses to the entire system of law enforcement legislation. Of course, not in the sense of “an eye for an eye ...” - because if you follow precisely this requirement, originating from the Old Testament, then, as the famous Indian leader Mahatma Gandhi (1869-1948) said in his time, very little time, as literally the entire population of the planet can be blind. Here we must take into account the modern understanding of justice.

And the modern understanding of justice in responding to crimes and other offenses consists in the fact that the state, in its attitude to such acts and the perpetrators of them, cannot go on about our base passions. Including types such as revenge, hatred, anger, etc. It should be guided here by our best qualities, including such as condescension, forgiveness, support, participation, help.

Justice without humanity is not justice, but the most dangerous manifestation of injustice. In this regard, the well-known statement of the prominent Russian lawyer Fyodor Nikiforovich Plevako (1842-1908) that “there is no such fallen to which the word “leniency” would not apply is true. It would be advisable to reflect this provision directly in the legislation, giving the circumstances especially mitigating the punishment to the basis of the manifestation of a special indulgence for the perpetrators of the crime - and not just indulgence.

Finally, the crucial provision of the law on crimes and punishments is also determined by that. that its application always involves connecting to the work on countering crime the norms of other branches of legislation. In different cases, these are different norms, but sometimes they can represent two, three, or even more branches of legislation, including constitutional, civil, labor, environmental, etc. - up to international. If the crime is committed abroad, and even encroaches on the interests of Russia and (or) its citizen, then account must also be taken of the norms of the relevant foreign legislation.

Accordingly, when applying the norms of legislation on crimes and punishments, there should be a wide variety of legal knowledge. And besides, provisions from the field of not only legal, but also other knowledge. Sometimes the law enforcer has to understand even the field of space technology. For example, if a hole was discovered in our spaceship in the middle of 2019, moreover, drilled from the inside of the ship, then how, one wonders, can one do without such vast knowledge?

***Possible changes in the law
about crimes and punishments and related industries***

The new configuration of the legislation on crimes and punishments will undoubtedly give a new impetus to its further positive transformations.

First of all, it is important to more fully reflect its principles in the procedural, executive, operational, preventive and administrative legislation - especially such principles as justice and humanity. On the other hand, such principles of some other named branches of the legislation as democracy, openness, publicity, differentiation and individualization of punishment should be reflected in the legislation on crimes and punishments.

In the Special Part of the Law on Crimes and Punishments, it is advisable, in the interests of strengthening the preventive function of its respective articles, to precede the latter with the rules (separate clauses) on administrative responsibility

for the relevant offenses - for example, the rules on responsibility for petty theft, petty hooliganism, petty illegal entrepreneurship and other similar deeds.

Such administrative and legal “inclusions” in the legislation on crimes and punishments are extremely necessary - especially in cases where administrative and legal prejudice is used in this legislation. And it should be used in all cases when, as the danger of an act increases, it develops from an administrative offense into an act that should be assessed as not just dangerous, but also socially dangerous.

Considering that there is no such socially dangerous act that would not grow out of the act of simply dangerous, and, at the same time, there is no such dangerous act that under certain conditions would not grow to the level of socially dangerous, the question itself arises it is advisable to essentially precede all articles of the Special Part of the Law on Crimes and Punishments with additional norms (in the form, for example, of separate paragraphs) - on liability for the corresponding administrative offenses.

The question may arise about such crimes, which objectively cannot have “analogues” that join them in the legislation on administrative offenses. It can be, for example, crimes such as murder, rape, high treason, illegal crossing of the state border, etc. It is clear that there cannot be “petty murder”, “petty rape”, “petty treason” or “petty illegal crossing of the state border”.

The issue of administrative legal prejudice requires special consideration. On the one hand, even a thousand cats in their danger cannot compare with the danger of at least one tiger, but ... the fact is that, as life shows, administrative and legal "cats" are still capable, as their aggression increases, To “walk up” such a danger, which, perhaps, was not even dreamed of by any tiger.

The interests of combating crime require combining crime statistics and administrative offenses into a single statistical system. The need for this is due to the obvious fact that an administrative offense, if there is no corresponding legal response to it, is usually repeated with inevitability, often often in the form of a corresponding “analogue” crime.

The aforesaid follows from the obvious fact that in our country with relatively young statehood (numbering just a little over a thousand years), and with a history constantly accompanied by various kinds of unrest, coups, wars and other phenomena that hinder the development, still positive traditions are very weak. And legal prohibitions are perceived precisely as prohibitions only if their violation entails appropriate legal opposition. In reality, it turns out that if there is no such reaction, then there is no corresponding prohibition.

CLIL作为更新教育大学跨学科交流的方法

CLIL AS A METHODOLOGY FOR UPDATING INTERDISCIPLINARY COMMUNICATIONS IN A PEDAGOGICAL UNIVERSITY

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抽象。 本文讨论了使用CLIL (内容和语言集成学习) 的可能性-CLIL (一种针对教学法的大学生的主题语言集成教学)。 作者分析了在俄罗斯和国外使用CLIL方法的经验, 检查了CLIL方法的主要整合组成部分, 并强调了跨学科联系的主要优势, 将其作为双语教学中教学整合的基础。

关键词: CLIL (内容和语言集成学习), 学科语言集成学习, CLIL方法论, 双语学习, 外语交流能力, 跨学科方法。

Abstract. *The article discusses the possibilities of using CLIL (Content and Language Integrated Learning) - a subject-language integrated teaching of a pedagogical university students. The authors analyzed the experience of using the CLIL methodology both in Russia and abroad, examined the main integrative components of the CLIL methodology, and highlighted the main advantages of interdisciplinary connections as the basis of didactic integration in bilingual education.*

Key words: *CLIL (Content and Language Integrated Learning), subject-language integrated learning, CLIL methodology, bilingual learning, foreign language communicative competence, interdisciplinary approach.*

One of the most successfully used methods of teaching a foreign language is the CLIL methodology (Content and Language Integrated Learning) - an integrated teaching of a subject language, which makes it possible to combine the study of a foreign language with subject disciplines, expand the general educational space through an interdisciplinary approach to teaching a foreign language.

In order to increase the communicative competence of students in a foreign language and taking into account the limited time allocated by the program for studying a foreign language, some universities are actively introducing CLIL - subject-integrated teaching. This technique was first developed by David Marsh more than 20 years ago and is a teaching method based on the idea of mastering a subject area in a foreign language and at the same time. foreign language through the development of subject knowledge [9].

The fundamental components of the CLIL methodology are based on 4 Cs integration:

- Content (subject-content component) - involves mastering the content of the subject, mastering the basic terminological base through a foreign language.
- Communication (social-linguistic component) - is based on the creation of a foreign language communicative field in order to learn a foreign language in the professional field.
- Cognition (cognitive-educational component) - implies the conscious use of a foreign language through the development of subject knowledge, the use of acquired language knowledge in new situations, for example, when solving professional and pedagogical problems, as well as the formation of creative and critical thinking in the process of foreign language communication on professional issues.
- Culture (cultural component) - defines the mastery of intercultural communication skills, understanding and acceptance of the culture of the country of the studied language.

The CLIL technique has long gained its popularity in Europe and is successfully practiced at all educational levels [10]. Numerous studies conducted by foreign scientists from different countries Martínez Agudo, J.D.D. (2019) [11], Anuradha, T., & Viswanathan, R. (2019) [7], indicate a significant increase in the level of foreign language communicative competence of students using the CLIL methodology. Studies of the effectiveness of CLIL in foreign universities (Calderón Jurado, B., Morilla García, C. (2018) [8], Jakonen, T. (2019) [12] indicate an increase in the cognitive activity of students and their motivation to study the subject.

In Russia, the use of CLIL technology is only beginning to slowly be introduced into a variety of courses that contribute to the activation of the process of teaching a foreign language on the basis of its active integration into the process of teaching students professionally significant disciplines. So, the works of L.L. Salekhova are devoted to bilingual education and training in professional disciplines in a foreign language, in which the researcher considers an integrated subject-language approach in order to develop students' cognitive skills [5]. N.I. Almazova, E.A. Zimerman offer a textbook with elements of subject-language integrated learning (CLIL), focused on the formation of foreign language professional competence and the improvement of theoretical knowledge in management [6]. The experience of St. Petersburg Polytechnic University in introducing content-language integrated learning at a university shows the effectiveness

of introducing this technique into the educational process. As a result of testing among students of CLIL-groups, the authors came to the conclusion about increasing the level of foreign language skills of students in all types of speech activity (listening, speaking, reading a letter) [1, p. 96]. The local experience gained at the Tomsk Polytechnic University on the introduction of training courses on the implementation of CLIL allows us to judge the successful creation of the so-called interdisciplinary “pedagogical tandems”, the organization of courses with “double agents”. Central to the CLIL concept, according to the authors, is the use of a foreign language for communication in the study of subject-oriented content and involves the creation of pedagogical tandems [4, p.172].

The idea of implementing an interdisciplinary approach in the format of integration of subject and language knowledge was embodied in the creation of a narrow professional course by two teachers (linguist and subject) working in tandem on the subject "Designing the educational environment in elementary school" for students in the field of preparation "Primary education and a foreign language". The purpose of this course is the formation of integrative subject-linguistic professional competencies of students.

Before introducing this technique into the CLIL course, we faced a number of questions requiring detailed consideration: “What is the purpose of training: language or subject?”, “What level of language literacy should students have?”, “What level of language training should a teacher who leads the subject by specialty have?”, “What is the subject of assessment: the formed foreign language competence of students or their knowledge of the subject? ”, etc.

Answering the first question, interesting and significant in this case is that a dual goal is achieved - at the same time to form students' foreign language competence and deepen and expand knowledge in professional discipline. The strengths of this approach are based on the fact that there is an immersion in the language atmosphere, the practical orientation of language learning develops not only students' hard skills (cognitive skills), but also the so-called soft skills (ability to interact, work in a team, negotiate, including in conflict situations, the ability to see and solve problems in familiar or new professionally oriented situations, develops self-presentation skills, critical and creative thinking skills, etc.).

Thus, the foreign language in this case acts both as a goal and as a means of achieving the educational goals of cognitive activity in mastering subject knowledge in the process of training future specialists.

The lexical and grammatical material that is used during the course with the use of CLIL, to a large extent, corresponds to an increase in the level of language training of students. It is important to master the basic grammar of the English language (the main groups of the times of the real and passive voice, the degree of comparison of adjectives and adverbs, impersonal forms of the verb, etc.), as well as the necessary lexical stock of language tools required to express one’s opinion, value judgment, etc.

A teacher who works in tandem with a linguist (teacher of FL) must also own a foreign language communicative competence (not lower than level B1), allowing him to use his knowledge - both subject and language. A CLIL teacher, being a promoter of a foreign language, is responsible not only for his discipline, but also for the quality of the foreign language through which he teaches his subject. Working in the context of the CLIL methodology, he collaborates:

- With colleagues (teachers of FL), to together gain practical experience in the most effective use of CLIL in the educational process of a university;
- with students, creating a comfortable environment for verbal foreign language communication with them.

The roles of the teacher are changing: from an informant to a mentor, facilitator, moderator, trainer, creating conditions in which a student gets the opportunity to discover and reveal his potentials.

Answering the question "What is the subject of assessment: the formed foreign language competence of students or their knowledge of the subject?", according to many authors, this question still remains open and controversial [2]. How is it necessary to evaluate the acquired knowledge - with the help of a native or foreign language? What is to be evaluated - the level of language proficiency or the content of the statement? It should be noted that students often make lexical errors when they pronounce professional terms. It is these errors, as a rule, that are corrected, and grammatical ones are ignored if they do not violate the semantic load of the utterance. Important evaluation criteria are: the correctness and appropriateness of using the terminological minimum on the subject, the possession of basic speech cliches, the ability to work with foreign language texts: the ability to understand, extract the necessary information, build logical chains, interpret and express your attitude to phenomena related to the professional sphere.

Thus, it can be noted that this technique has several advantages:

- in the absence of classroom hours for learning a foreign language, the integration of language discipline with a profile allows you to "kill two birds with one stone";
- training with the use of CLIL is not based on the transfer of prepared knowledge and skills but on creating conditions for students in order to obtain their own knowledge, understanding and development of necessary skills;
- all training is based on interaction in a foreign language, involving various forms of interaction in the group (student - student, student -teacher, student - group of students, teacher - group of students, etc.), when a foreign language is not a goal, but only a means of acquiring new knowledge, that allows to reduce the language barrier and the fear of making mistakes;
- with the help of the CLIL course, there is an increase in motivation and interest in using foreign language competencies in various fields;
- an important role is played by the inclusion of an intercultural component, the development of students with a more objective view of their own language and culture, as well as the formation of tolerance for the country's culture of the language being studied.

It is important to note that when constructing the material of the course according to the CLIL-methodology, the A.A. Verbitsky principles of problematicity, the leading role of joint activities, as well as modeling of the educational environment through immersion in "quasi-professional activity" [3].

The principle of problematicity implies that the teacher creates problematic situations on the basis of which critical thinking develops, a call to action, an act, and interaction — students identify a problem, enter into its discussion, defend their opinions that do not coincide with others, and use the necessary vocabulary in the process of constructing statements grammatical material.

As an example, students are invited to solve professional pedagogical problems that require several solutions and cause a lot of discussion.

During the discussion, students need to answer the following questions:

What is the contradiction, the difficulty, the question? What is required to be presented as a result of the decision.

Where did the challenge arise? Who are the task participants? What are the difficulties? What doesn't correspond? What is the situation? What is the context of the situation? etc.

Moreover, only that information is included in the problem condition, the content of which determines the option for solving the problem.

In one of the proposed assignments, students are invited to divide into groups and draw up cases on the following topics:

1. What would happen if there was no administration in the school?
2. What would happen if computers replaced teachers?
3. What would happen if a teacher developed his/her own curriculum for each subject?
4. What would happen if there were no ringing bells at school?

The task involves the development of the ability to analyze and evaluate the pedagogical situation from various positions, develops the ability to predict and model the educational environment.

Thus, CLIL-courses allow to create an interdisciplinary foundation of the educational process at the university and contribute to the formation of not only foreign language communicative competence, but also the general cultural and professional competencies of students.

This technique provides students with the opportunity to use knowledge of a foreign language in the process of studying professional subjects, thereby increasing their confidence in knowledge of a foreign language, removes the language barrier in communication and contributes to the growth of motivation in mastering a foreign-language communicative competence.

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科学中的文字互动

TEXT INTERACTION IN SCIENCE

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抽象。 本文讨论学术语篇中的文本交互,并识别具有较高语义量和最小形式能力的先行文本组,因为它们是源文本内容的总结结果。 研究的相关性取决于对知识构建所涉及的机制的兴趣。 本文介绍了可用来促进和积累知识的科学先例文本的类型。 这些发现可用于语言学的发展和语言教学的实践。

关键词: 先例文本, 科学, 学术话语。

Abstract. *The article deals with text interaction in academic discourse and identifies groups of precedent texts that have high semantic volume and minimal formal capacity, since they are the summarized result of the content of source texts. The research relevance is determined by the interest in the mechanisms involved in knowledge building. The paper presents types of scientific precedent texts that serve to promote and build knowledge. The findings can be used in development of linguistics and in the practice of language teaching.*

Keywords: *precedent text, science, academic discourse.*

The interaction of texts in one text, their influence on each other, on the creator and recipient attracted many researchers, such as M.M. Bakhtin, V.E. Chernyavskaya, Slyshkin G.G., etc. The emergence of a cognitive approach made it possible to bring research in the sphere of intertextuality to a higher conceptual level directly related to the communicative competence of a linguistic personality. Precedent text phenomena are widely discussed in the scientific literature of recent years (Kutyaeva, 2013; Popova, 2017; Slyshkin, 2008).

Academic discourse is characterized by a significantly high degree of intertextuality and, therefore, reliance on precedent texts and their concepts for the studied discourse is one of the system-forming features. Intertextual links with regard to the text of a scientific work are presented in the form of citations and references.

The fragments of a scientific work, the denotative basis of which is another "alien" text play a special structural, semantic and communicative role in the sci-

entific work. The presence of a subtext of previous knowledge in the scientific text is conditioned by such properties of science as continuity, sociality, dialogicity and intertextuality (Chernyavskaya, 2017).

The reliance on prior texts and their concepts in Spanish scientific discourse is one of the systemically important features. In scientific discourse, prior texts are the works of classical scientists, well-known quotations, the names of monographs and articles; the works of world fiction and art also become precedent.

A notion of "prior texts" in science is understood as a mental representative component of a prior text in a concentrated, concise form, based in the mind of the researcher's linguistic personality, an appeal to which is caused by a unique spectrum of associations.

Precedence in science means such properties of phenomena as common knowledge, cognitive significance for a certain scientific community, constant renewability in speech and reinterpretability in other (nonverbal) semiotic systems.

The results of the conducted research suggest that precedent phenomena are one of the ways of storing and transferring knowledge in scientific texts.

Such phenomena refer to socially prior ones, i.e. they are well known to all representatives of the scientific community and the appeal to them is constantly renewed in the speech of representatives of this community.

The following main features of precedence revealed in Spanish scientific articles and thesis works can be identified:

Knownness characterized by such features as the availability of knowledge in a certain sphere, popularity and universality implemented in the Spanish language due to such language mechanisms as: the definite article, a thematic position in the utterance and the use of the author's surname without initials:

"Aristoteles dejó escritas hace 2500 años algunas obras (como su investigación sobre los animales) en las que describía la relación entre diversas especies".

Constant renewal of the unity of all the basic elements of the whole, its properties and connections. It is implemented in Spanish texts by means of set word-combinations, compound words, word-combinations with words of abstract and event-related semantics:

Emisores beta-gamma de alta actividad específica y vida corta (con períodos de desintegración inferiores a 30 años) y radionúclidos emisores alfa en concentraciones.

The feature of standard form is expressed in repetition in an unchanged form by means of symbols. A symbol is a conventional designation of a certain dimension accepted by science, the connection of which with this referent is motivated.

Symbols are signs chosen in the process of world perception and awareness for the stable, regular embodiment of the value content of science in them, its

main categories and meanings. The specificity of a scientific symbol consists in motivating a linguistic sign related to the worldview, background knowledge, and precedent phenomena. A symbol is considered as the result of the semantic development of a sign in science.

Rigid associativity is a cognitive link between a particular linguistic unit and the phenomenon that it nominates. This feature of precedence is expressed by such linguistic mechanisms as references, footnotes and the implicit expression of names.

Such feature of precedence as frequency of use is expressed by acronyms and abbreviations:

"Modelos aditivos generalizados y SIG para predecir la adecuación del habitat de rapaces forestales en el sur de España" (SIG – Sistema de Información Geográfica).

Foreign precedent phenomena that have appeared as a consequence of modern globalization make up a significant part of the prior phenomena in scientific Spanish discourse.

The appearance of Anglo-American precedent phenomena in Spanish scientific discourse shows the dominant influence of the English language in the international scientific community. Latin names and expressions that, being generally known to representatives of the scientific community, are not explained and form part of the universal cognitive space.

Previous knowledge associated with compression aimed at intertextual relations has led to the appearance of terms with a researcher's personal name– eponyms. It is a share, a segment of the core of the concept and contributes to the generation of new meanings in the professional linguistic worldview.

In such precedent phenomena, the meaning of a term is associated with a researcher's name, a literary character, a deity or locality. Accordingly, an anthroponym begins to be used as a common noun, an adjective: *Fórmula de Abel-Plana*, *El tiempo medio de Greenwich (GMT)*, *Coordenadas de Jacobi*, *La aguja de Buffon*, etc.

Scientific texts relevant to the scientific community, constantly renewed in the discourse of members of this community and reinterpreted in various semiotic systems acquire the status of precedent ones and, having become reference for this society.

Concepts of precedent texts have high semantic volume and minimal formal capacity, since they are the result of compression of the content of source texts and a form of their metonymic replacement.

The conducted studies indicate that compression of prior texts is one of the ways to storage and transfer knowledge in Spanish academic texts.

The formation and comprehension of prior names occurs within the framework of a private cognitive matrix that unites various conceptual areas of scientific knowledge. Their actualization is carried out by certain linguistic units of the linguistic context, the semantics of which reflects the essence of the corresponding cognitive context.

A concept from prior texts is a typical method of compressing previous knowledge with the aim of preserving, tightening and further scientific accumulation. Being a reduced speech structure, prior knowledge is verbalized in the form of discrete-point inclusions encrusting the fabric of the whole work.

Unlike the context of previous knowledge, which is always accompanied by references to the source of speech of another person, prior knowledge generally has neither special metatextual or graphic demarcators nor references due to the presumption of knownness. It appeals to the reader's knowledge and memory, reflects the commonality of the apperception database of the sender and the recipient of the scientific message.

The perception and understanding of precedent concepts becomes possible if they are in the recipient's memory, i.e. the ability to correlate the meaning of the source text with the content of the presented scientific work and establish their identity and difference.

The essence of scientific knowledge is in understanding the reality in its past, present and future, in the reliable generalization of facts.

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美国总统唐纳德·特朗普创造的呢称的结构和语义特点
**STRUCTURAL AND SEMANTIC PECULIARITIES
OF NICKNAMES CREATED BY THE USA PRESIDENT
DONALD TRUMP**

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抽象。 本文致力于研究美国总统唐纳德·特朗普 (Donald Trump) 创建的呢称的结构和语义特点以及评估潜力, 以及这些提名在政治话语中的作用。 美国 D.特朗普总统给他的政治对手和一些海外政治领导人提供的呢称根据其语义特征被分为三个主题组: 愚蠢, 不诚实, 重要。 文章还揭示了在政治语言中使用呢称的双重效果。

关键词: 政治语言; 呢称 政治形象 语言行为; 专题小组; 评价对象; 结构和语义上的特点; 俚语; 称呼 代名词; 情感彩色的单词和单词组合

Abstract. *The article is devoted to the study of structural and semantic peculiarities as well as evaluative potential of nicknames created Donald Trump, President of the USA, and the role these nominations play in political discourse. Nicknames, given by President of the USA D. Trump to his political opponents and some overseas political leaders, are classified according to their semantic features into three thematic groups: THE STUPID, THE DISHONEST, THE UN-IMPORTANT. The double effect of using nicknames in the language of politics is also revealed in the article.*

Keywords: *language of politics; nicknames; political image; language behavior; thematic groups; the object of evaluation; structural and semantic peculiarities; slang; epithet; synonym; emotionally colored words and word combinations*

Modern language of politics tends to be less formal, and the language behavior of some politicians also becomes more relaxed and free of certain barriers. Whether it is a positive tendency or not depends on the results of such informality in official relationships. Often political leaders of different countries have to go through long negotiations to achieve necessary agreement, but still political situation in the world is not stable now. Sometimes politicians hardly find com-

mon language due to considerable differences of their political aims, and even small misunderstanding can have unpredictable consequences. So, the emotions in international politics should be under control and tolerance together with the respect of cultural peculiarities of all countries must be the main priority.

Concerning American political leader Donald Trump, it is an example of ineffective political behavior which leads to awkward situations and tense relationships in the world politics. Present President of the USA lacks political tact as well as diplomatic skills and often displays arrogant language behavior. The instance of such intolerance is his tendency to give offensive nicknames to his rivals in the States and to his potential enemies among the overseas political leaders.

Actually, the main purpose of creating nicknames is “to annoy or upset somebody” [2]; due to their originality and expressiveness nicknames possess high evaluative potential, because they exaggerate some negative qualities of a person, so they are “usually given in ridicule” [3]. The usual conditions where such nominations appear and thrive are school, or student communities, or the army (soldiers slang). The sphere of international politics is not a suitable place for such a familiarity, still Trump has another opinion. Here are some examples of nicknames given by him to various politicians:

“*Crooked Hillary*”, a nickname given to Hillary Clinton, his rival during the Presidential elections;

Little Marco – a nickname of Senator of Florida, Marco Rubio;

Mad Alex – Alex Salmond, first ex-minister of Scotland, supporter of the idea of Scotland’s independence of Great Britain;

Little “Rocket Man” – Kim Jong Un, Supreme Leader of North Korea [1], etc.

All the nicknames created by Trump are directed at the underestimation and discreditation of his political colleagues. American President’s aggressive verbal behavior often provokes conflicts. Trump deliberately tries to belittle the importance of other politicians; by means of derogatory nicknames he undermines their reputation and political image, that also negatively reflects on the domestic and foreign policy the USA lead.

The purpose of creating nicknames by Trump can be understandable from psychological point of view. Trump tries to produce the image of a strong leader, demonstrates his own power, creativity and independence, and believes that the best defense is to attack. Thus, it is a kind of self-defense, a weak attempt to fortify his own political image which is far from perfect one.

But in the nicknames created by Trump we noticed several peculiarities. Having analyzed the list of nicknames, we marked three main themes relevant for Donald Trump on which he bases the nicknames, and classified chosen units into three thematic groups: THE STUPID (11 units), THE DISHONEST (6 units), THE UNIMPORTANT (5 units).

THE STUPID	THE DISHONEST	THE UNIMPORTANT
Mad Alex, Dopey Prince, Crazy Jim Acosta, Wacky Glenn Beck, Low IQ Crazy Mika, Crazy Megyn, Psycho Joe, Dopey Sugar, Crazy Bernie, Goofy Elizabeth Warren, Wacky Congresswoman Wilson.	Crooked Hillary, Lyin' Hillary, Lyin' Ted, Sneaky Dianne Feinstein, Very Fake News, Dishonest Press	Little Rocket Man, Little George, Little Katy, Little Marco, Puppet Jones

Structurally, all the nicknames created by Donald Trump contain two basic elements. This is a personal name of the object of evaluation and a negatively colored epithet. [4].

Epithet (-) + Personal Name

Let’s consider the first and the biggest thematic group “THE STUPID”. It contains the word combinations which consist of the Proper name or the title of a ridiculed person and a slang variant of the word “stupid” (crazy, dopey, mad, wacky, goofy, psycho). Judging by the examples, Trump knows a lot of synonyms to the word “stupid”.

The second in quantity of put into it units thematic group is “THE DISHONEST”. It contains the names of different politicians, journalists, news agencies endowed with the slang variant of the word “dishonest” or synonyms to the word “lying” (crooked, lyin’, sneaky, fake).

The third thematic group “THE UNIMPORTANT” is not so big, but in the structure of word combinations put in this group dominates the attribute “little”. By means of this adjective Trump characterizes people whom he doesn’t respect or even openly despises.

In the case of “*Puppet Jones*” Trump implies not only unimportance of the politician, but also shows his dependent state, inability to have his own unbiased opinion.

Special attention requires the nickname “*Little Rocket Man*” given to Kim Jong Un, Supreme Leader of North Korea.

Trump’s attempt to ridicule Korean Leader nearly provoked a serious international conflict the result of which could be really terrible.

Concerning the nickname, we have some linguistic comments.

First, it seems to be an allusion to the song by Elton John “Rocket man”. There are such words in the song “...*Rocket man burning out his fuse up here alone...*”.

So, Trump implied the loneliness in obsession with the nuclear program that Kim Jong Un demonstrated in that period. Kim Jong Un's vain desire to prove his importance, power and influence as a political leader was great, but his means were rather limited, that made him the object of ridicule.

Second, the nickname contains the word "little", that makes it even more expressive and offensive. Because it not only denotes political weakness of ambitious Korean Leader, but also hints at the peculiarities of his appearance. Kim Jong Un is not very tall and quite plump.

While studying the structure and meaning of nicknames created by Trump, we also noticed that American President marks mostly three main faults in other people. We gave these titles to the thematic groups mentioned above (the unimportant, the stupid, the dishonest).

Psychologists state that if a person attributes certain negative qualities to the majority, it is highly likely he himself possesses these qualities. Political image and behavior of "crazy lying little" Mr. Trump proves this theory. As a result, Trump's "creativity" negatively reflected on him. "Curses like chickens come home to roost".

In conclusion, we made an attempt not only reveal structural and semantic peculiarities of nicknames, but also describe characteristic features of those who create them.

It is necessary to mention that many factors influence the image of modern politicians, but nowadays it has become clear that a successful political leader should be both powerful and likable to people in his own country, as well as be respected and have political influence in the whole world.

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青少年学习汉语作为外语的思维特征研究

**A STUDY OF THE CHARACTERISTICS OF THINKING IN
ADOLESCENTS STUDYING CHINESE AS A FOREIGN LANGUAGE**

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注解。 本文致力于研究以中文为外语对思维过程发展的影响。 提出了这项研究的结果和相应的结论。 与未学习汉语的青少年相比,发现了青少年学习汉语的思维差异。 揭示了更高的思维速度,更高的协会生产力以及更快的理解文本含义的过程。 研究表明,汉语学习增强了认知过程发展的强度。

关键字: 汉语, 思维过程, 思维, 学生, 青少年

Annotation. *The article is devoted to the study of the impact of studying Chinese as a foreign language on the development of the thinking process. The results of this study and the corresponding conclusions are presented. The differences in thinking of adolescents studying the Chinese language are revealed in comparison with adolescents not studying the Chinese language. A higher speed of mental operations, increased productivity of associations, as well as an accelerated process of understanding the meaning of the text are revealed. It is shown that the study of the Chinese language enhances the intensity of the development of cognitive processes.*

Keywords: *chinese language, thought processes, thinking, adolescents.*

The globalization of the educational process leaves a definite imprint on the development of cognitive processes in children and adolescents. A modern teenager can be universal, multi-tasking, can also speak different languages. In this regard, the question of the impact of studying Chinese as a foreign language on thinking is significant, since it is currently one of the most popular languages in the world. In this respect, Russia is no exception.

This question is relevant, since the central principle for the entire structure of consciousness and for the entire system of activity is the development of thinking. He performs various tasks of cognitive and personal development. In adolescence, there are important qualitative changes in the field of thinking: a teenager masters the development of concepts, which contributes to the transition to the highest form of intellectual activity, other ways of behavior [1].

Thinking is inextricably linked with speech. Human thoughts are always expressed in internal or external speech form. Therefore, it is important for a teenager to learn a foreign language, since it is an important factor in the formation of a linguistic personality, because contributes to the development of cognitive and intellectual potential of the student. The grammatical and semantic categories of the language are not only means for the mental activity of a person, but also form his ideas and control his thoughts.

There is an assumption that different languages have different effects on the thinking process of a person. This hypothesis, for example, is represented by linguistic relativity and determinism in the ideas of Sepir-Whorf. According to this theory, the structure of the language gives a definition of thinking and a way of knowing reality [3].

In different language environments, systematic thinking and its components manifest themselves in different ways and have their own specifics. The elements of systemic thinking include the ability to analyze facts, identify significant relationships between them, etc. Representatives of different cultures from childhood form different worldviews and mental skills, which will be manifested in the difference in the flow of intellectual processes.

On the basis of practical experience and observations, it was suggested that adolescents who study the Chinese language are distinguished by their developed thinking compared to adolescents who do not learn this language. To confirm this hypothesis, an empirical study was conducted in which the following methods and techniques were used:

- Methodology “Unfinished sentences” (G. Ebbinghaus), aimed at determining the level of speech development, productivity of associations and understanding processes, as well as critical thinking;
- Methodology “Missing letters in words”, which allows to determine the pace of the implementation of the orientational and operational components of thinking;
- The method of scientific observation, which allows to perceive objects of research objectively.

The respondents to the study were students of eighth grades aged 13-14 years of Russian nationality, studying in Russian and Chinese schools. The choice of this age is due to the transition to a qualitatively new higher stage of development of thinking, according to J. Piaget, the stage of formal operations.

The study involved two groups of teenagers in the amount of 24 people: an experimental group of 12 people studying Chinese, and a control group of 12 people who did not study Chinese.

During the study, results were obtained, on the basis of which summary data are presented in graphical form (Figures 1-2).

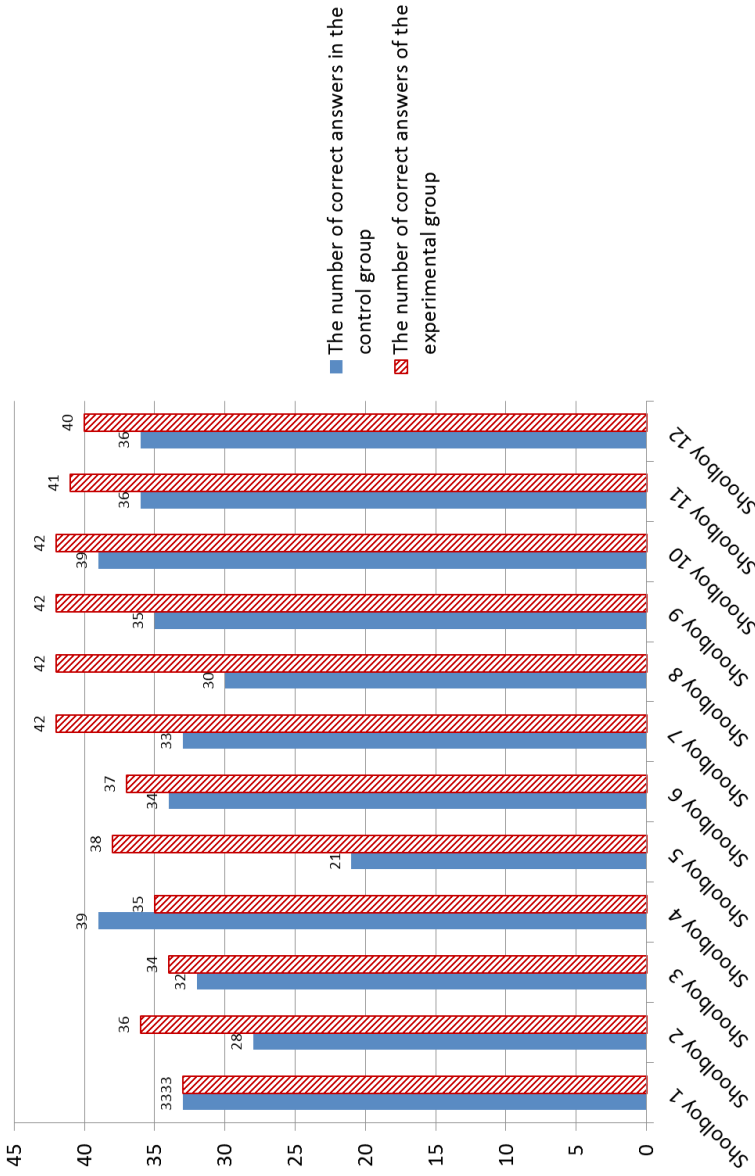


Figure 1. Comparison of the results of the study to determine thinking speeds in the control and experimental groups

First, the goal was set: to determine whether there are differences in the speed of thought processes in adolescents in the experimental and control groups. For this, students were offered a task according to the methodology “Unfinished sentences” (G. Ebbingauz) [2, p. 43]. Compare the results obtained in both groups (Figure 1).

As can be seen from the histogram shown in Figure 1, the lowest result in both groups was shown by one student, the highest in the control group was given by two students (39 correct answers), and in the experimental group, four students (42 correct answers).

The remaining subjects in the control group received results within 28-36 indicators, which indicates an average level. At the same time, the experimental group mainly obtained results within 34-41 indicators, which indicates a fairly high level close to the maximum values.

Thus, on the basis of the obtained data reflected in the histogram of Figure 1, we can come to the following conclusion: students in the experimental group studying Chinese language successfully completed the proposed task: in the allotted time, the largest number of correct words were recorded in the experimental group.

Now we present the summary results of the second study, aimed at determining the level of productivity of associations and processes of understanding [2, p. 45] (Figure 2).

Based on the results reflected in the histogram in Figure 2, we can draw the following conclusion about the peculiarities of thinking of teenagers studying the Chinese language: students from the experimental group successfully completed the task, the purpose of which was to determine the level of speech development, the productivity of associations and understanding processes, than students in the control group. Most of the respondents in the experimental group showed results within 4–8 indicators, while in the control group most of the students showed results within 3-5 indicators.

Observations of the educational activities of respondents at various school lessons, as well as in extracurricular activities, including extra-curricular activities, confirm the findings of an empirical study of differences in the productivity of associations and processes of understanding, critical thinking, as well as the pace of orientational and operational components of thinking.

Thus, the results of the study allow us to conclude that adolescents studying the Chinese language are distinguished by the development of cognitive processes. The identified features also include a higher speed of mental operations, increased productivity of associations, as well as an accelerated process of understanding the meaning of the text in comparison with adolescents who do not learn Chinese.

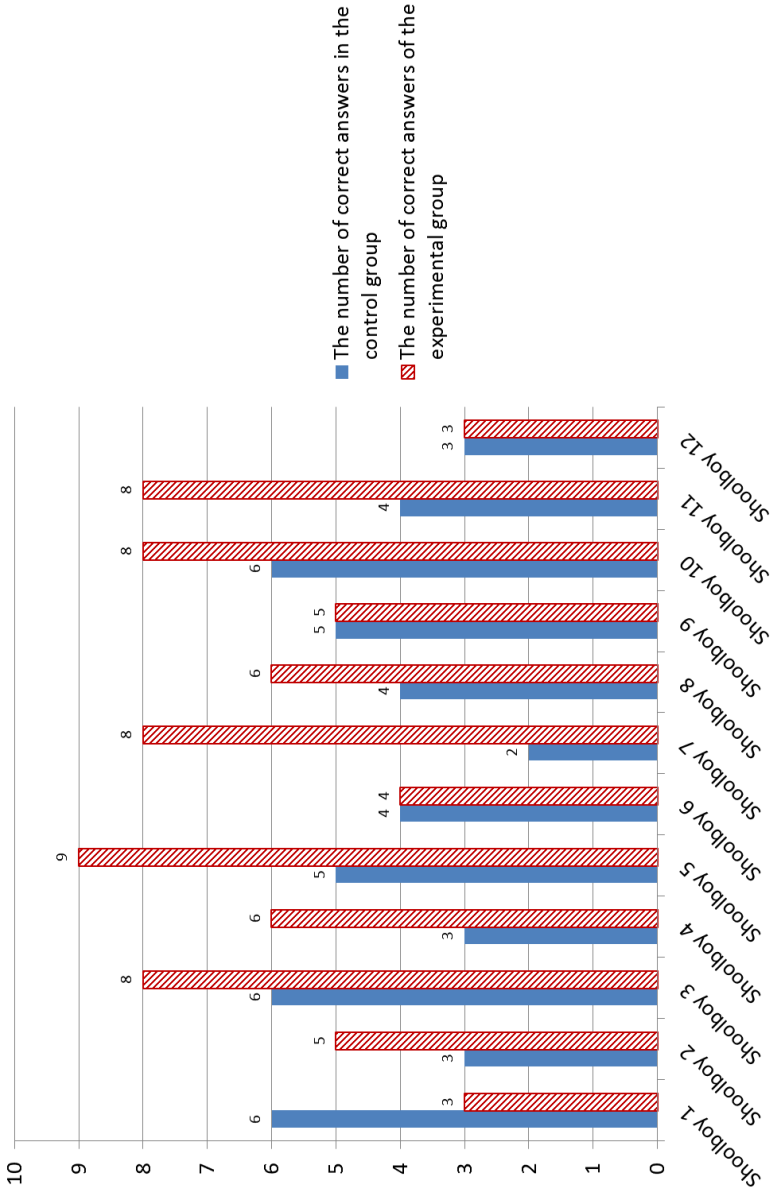


Figure 2. Comparison of research results to determine the level of speech development, the productivity of associations and processes in the control and experimental groups

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1917年军队被摧毁，俄国军官的生活发生了变化
**CHANGES OF THE RUSSIAN OFFICER'S LIVES
IN CONTEXT OF THE ARMY DESTRUCTION IN 1917**

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抽象。在这篇文章中，作者通过在第一次世界大战和俄国大革命开始时的猛烈袭击下的军队死亡的角度来考虑俄国军官生活的变化问题。当时，在训练和教育过程中获得的基础，形成了专业军事人员的生活世界，遭到了持续的破坏。兵役观念与现实的矛盾，如破坏军队服从和纪律的严格等级制度，君主专制政权的垮台，士兵在缺乏政治意识情况下的政治意识的增强军官导致了整个系统的危机现象。他们的出现与国家本身，俄罗斯帝国的支持有关，而俄罗斯帝国曾经是最强大的支持力量，而俄罗斯军队也与整个军官集团有关。

关键字：俄罗斯军官，1917年的军队分解，俄国大革命，生活世界，第一次世界大战。

Abstract. *In this article, the author considers the problem of changes in the life of Russian officers through the prism of the death of the army under the onslaught of the events of the First World War and the beginning of the Great Russian Revolution. At that time, the foundations learned in the process of training and education, which formed the life world of the professional military, underwent consistent destruction. The inconsistency of the formed notions of military service with reality in the form of the destruction of a strict hierarchy in submission and discipline in the army, the fall of the monarchical regime, the growth of political consciousness of the soldiers in the absence of such among the officers led to crisis phenomena in the whole system. They appeared in relation to the state itself, the Russian Empire, its once strongest support - the Russian army, also in relation to the entire officer corps.*

Keywords: *Russian officers, the decomposition of the army in 1917, the Great Russian Revolution, life world, World War I.*

By the beginning of 1917, after two years of participation in the First World War, the Russian army demonstrated all the shortcomings of its organization that directly affected the combat readiness: the lack of proper training of officers, lack of ammunition and food, and an ill-conceived selection of people for senior com-

mand posts. The growth of political consciousness of the soldier masses and active campaigning in the army contributed to the decline in the authority of the government, the deterioration of discipline and the growth of general discontent. The Russian officers reacted most acutely to the problems that existed in the army, which inextricably linked their lives with military service and during the crisis turned out to be unable to withstand revolutionary events. The ideal picture of the army that had developed in the life world of the officer corps and corresponded to the requirements of military education in the late XIX - early XX centuries, ceased to have any value in the conditions of the destruction of the army in 1917.

The very concept of "life world" in a broad sense can be interpreted as a person's idea of the world. Man is always included in the world, in consciousness, with the help of which he perceives it [6, p. 8]. An important characteristic of the life world is that this world is historically and socially given to man. It is a reflection of certain historical and social conditions in which any person lives and forms [1, p. 377]. Therefore, it seems impossible for us to cover the issue of changing the life world of Russian officers without resorting to the origins of its formation - training and education. In this regard, we should pay attention to what ideas about the essence of the military profession were the basis for the formation of the officer corps in the period under consideration and why precisely these ideas, faced with reality, will become one of the causes of the crisis in the life of Russian officers.

To begin with, it should be noted that by the end of the XIXth - beginning of the XXth centuries a three-stage military education system had developed and successfully functioned in Russia, which made it possible to obtain general and primary special, basic professional and higher professional education: before the First World War, there were 21 military schools in Russia (infantry, cavalry, Cossack, artillery, engineering and military topographical), the improvement of the knowledge of officer personnel was carried out in officer schools by the branches of the armed forces, higher military officers could be educated at 5 military academies [15, p. 68].

Characteristic features of the system noted above were: mismatch of the level of material support with the highest status of military service of an officer and, accordingly, a student of a military educational institution; expressed patriotic orientation in the education of future officers, the formation of their selfless devotion to the sovereign and the Fatherland, indestructible fidelity to military duty; "Fencing" pupils of military schools from issues of state policy; a rigid and ramified system of differentiation of graduates in their distribution and appointment to positions at the end of military schools, depending on the results of training; Spartan conditions of life of future commanders throughout the entire training period, which practically did not differ from the soldiers; the existence and all

kinds of support at the highest level of the formal and informal specific traditions of military schools, reflecting the spirit of camaraderie and mutual assistance not only for a close circle of friends, but, at least for all cadets of their school, aimed at protecting cadet honor and dignity, inadmissibility of deceit that causes harm to others, approving of daring and courage; the possibility of promotion on the career ladder, both depending on social status, and depending on personal merit [15, p. 69].

The notions learned through education of heroism and the leading place of achievement in the officer's service by 1917 led to the death of the brilliant army command, which put the state in urgent need of speedy training of new personnel. There is evidence according to which, after mobilization in general, only military schools issued at least 92 thousand officers [7, p. 114], which for a short period of training could not learn the backbone of all military affairs - morale [10, p. 60-61], therefore, they themselves were weighed down by the war and did not contribute to strengthening the military spirit of their soldiers.

It was by the beginning of 1917 that all the negative phenomena in the army manifested itself most vividly, indicating its imminent death: the soldiers' reluctance to fight, which led not only to the intentional destruction of ammunition and shells, but also to the previously unthinkable killings of commanding officers [12, p. 71]; the beginning of the intervention of the army in politics, which was especially clearly manifested by the participation of troops in the uprisings [9, p. 57], and even more loosened the apparatus of state power. Force-trained officers of the imperial army also could not be role models in their troops, since they were affected by the process in the form of the so-called "decomposition of the officer corps": drunkenness, gambling, debauchery, arbitrariness [4, p. 13], violence and rudeness [5, p. 37]. There is every reason to believe that not all of this was an innovation brought by two years of a protracted war and a new officer, some of the mentioned elements of the discrepancy in the moral character of the officer took place long before that, but were more likely an exception to the rule than their confirmation. Most often, even during the First World War, there was an illiterate selection of commanding officers, as indicated by the officers themselves [2, p. 7], as well as the distance in communication between chiefs and subordinates [11, p. 269], which introduced even greater discord in the management of the army.

The situation in the army worsened after the publication of "Order № 1" [14], which completely erased the last restraining factors of observance of elementary norms of military discipline in relations between the rank and file and officers. Although the very fact of the beginning of revolutionary events in February 1917 and the fall of the monarchy marked a new starting point in the life of both the state itself and the army.

In light of this, the oath taken by the officers and leading its origin from the depths of centuries was of paramount importance. Violation of the oath was regarded as dishonorable, regardless of what considerations were guided by the person who violated it, therefore, cases of violation of the oath were isolated. An officer could make some kind of political choice only if the oath ceased to act [8, p. 210]. And such a situation developed only at the beginning of 1917.

It is possible to illustrate the significance of the military oath from the point of view of representatives of the officer corps itself using materials from the memoirs of Colonel A.A. Ignatiev, who during the First World War held the post of Russian military attache in France. When he faced the need to issue an order to the administration entrusted to him on recognition of the Provisional Government by the highest authority in Russia, he could not decide to sign the drawn up order for a long time. In this case, his thoughts very subtly reflect the peculiarities of officer psychology: "What else prevents me from signing an order that marks my entry into the ranks of those who overthrew the king from the throne? And at that moment, some kind of inner voice, which I could not drown out, helped solve the riddle: And what about the "oath"? .. Officer oath? Did you forget about it? About the cavalry guard standard, before which you took it, vowing to defend "the king and the fatherland" "to the last drop of blood". When giving an order, you will not only violate it yourself, but you will demand to violate it from your subordinates as well. It became scary, I wanted to tear everything that was written ... But the king himself ... He violated the oath made in my presence under the ancient arches of the Dormition Cathedral during the coronation. There is no "abdication" for the Russian Tsar. <...>. Nicholas II, by his abdication, himself frees me from the oath given to him, and what a bad example he sets for all of us, the military!" [11, p. 284-285]. Such considerations then determined the position of the officer corps.

The destruction of the ideas that laid the foundation of the army led to its death, because after the events discussed above it became an armed propaganda crowd. It was after February that a psychological scrapping was revealed among the officers and rank-and-file personnel, depriving them of the core around which the whole point of military service had been built before: "For Faith, Tsar and Fatherland!". One of the foundation stones, on which the moral foundations of the Russian army were based, was taken out, and the whole building collapsed after it.

Order "№ 1", which we noted earlier, played its role in the decomposition of the army, which contained provisions for the immediate creation of elected committees from representatives of lower ranks in all military divisions, units and services, as well as on ships. The main point in the order was the third paragraph, according to which, in all political speeches, military units were now subordinated not to officers, but to their elected committees and the Council. The order introduced equal rights of the "lower ranks" with other citizens in political, civil and private life, the title of officers was abolished, etc.

The requirements, the fulfillment of which was necessary on the basis of an order, contradicted the centuries-old foundations of military service, came into conflict and in fact destroyed the idea of the very basis of the professional activity of Russian officers. In this regard, many of them correlated the publication of the order with the beginning of the decomposition of the army, since they understood that the new order of things destroyed the hierarchy of submission in it, without which it would be impossible not only to conduct successful military operations, but also the very existence of the army. The emotional shock that the Russian officers had to face at this time was expressed by P.N. Krasnov: "I experienced a terrible drama. Death seemed welcome. After all, everything that I prayed for, believed in and loved from the cradle for fifty years collapsed - the army perished" [12, p. 102]. However, not all army officers gave "Order № 1" a leading role in the decomposition of the army, for example, A.A. Brusilov wrote that the mood of the masses and the very course of the historical process would inevitably lead to the collapse of the army even without the participation of special orders and declarations [3, p. 285]. In this matter, this position seems more objective, since the process of destruction of the system itself began de facto before the adoption of the relevant order, and it only approved it de jure.

As a result, the Russian officers, who had been educated before the outbreak of the First World War and for the most part adhered to the basics of this education, turned out to be almost helpless in relation to the events that took place, in particular, on political issues. At the beginning of the 20th century, the autocracy carefully guarded its officer corps from participating in the country's political life. Moreover, as early as the first half of the XIXth century, officers were given the following subscription during production: "I am the undersigned, give a subscription in the fact that I don't go to Masonic lodges and secret societies, Dumas, Governments and others under whatever names they are, I didn't belong and will never belong, and that I was not a member of these societies by promise or oath, I didn't visit and did not even know about them, and through reprimands outside the lodges, Dumas, orders both about societies and about members also knew nothing and never gave any obligations or oaths" [8, p. 288].

Several factors had a strong influence on the change in the political views of the officer corps during the revolution. First, both in Petrograd and in other front-line formations, the relationship between the mass of soldiers and the officers left much to be desired. The reason for such a relationship dates back to the era of serfdom, when the officers and soldiers of the army were manned from two different and even hostile classes: officers from the nobility, and soldiers from the serfs. The officers saw in the actions of the mass of soldiers the beginnings of a social revolution, which they did not sympathize with and for the most part did not want to help. General A.A. Brusilov noted in his memoirs: "The corps of of-

ficers, which does not understand anything in politics, the thought of which was strictly forbidden, was in the hands of the mass of soldiers, and the officers had no influence on this mass. The officer immediately became an enemy in the minds of soldiers, for he demanded a continuation of the war and was in the eyes of a soldier a type of master in military uniform”[3, p.233]. The second most important factor that influenced the attitude of the officer corps to revolutionary events was the fact that a large number of political parties were concentrated in Petrograd, which even before the revolutionary events began unsuccessful campaigning in the ranks of the officers. For obvious reasons, in revolutionary Russia, almost all political parties fought for the army [13, p. 77-78].

Thus, we can state that the life of the Russian officer of the late XIX - early XX, formed as a result of receiving the appropriate education, was not adapted to the reality that he had to face first in the First World War, and then the Great Russian Revolution of 1917. Having lost control of the army, having lost the very foundation of the organization of military service, the vital world of Russian officers is violating its integrity. Since the life world itself is an integral system, when this integrity is violated, an extremely serious state sets in for a person when he perceives himself not as a whole, but as consisting of several parts. In such a situation, a person cannot behave adequately, in accordance with the situation - he seeks to create a new world for himself in which he is trying to restore integrity, begins to build explanatory schemes, which later happens with the Russian officers already in the conditions of the Civil War, when everyone sought to find a new meaning in his profession and cultivate his ideas about military service either on the basis of previously existing ones or by attracting new, previously unknown ones.

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苏维埃时代的热门电影：各种各样的子类型，受欢迎的爱情来源和当今俄罗斯和中国观众的欢迎

**SOVIET-ERA SMASH HIT MOVIES: VARIETY OF SUBGENRES,
SOURCES OF POPULAR LOVE AND PRESENT-DAY RECEPTION
BY RUSSIAN AND CHINESE AUDIENCES**

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抽象。大众爱情不一定能保证电影的高艺术品质，但这是该电影作为其民族文化现象（其文化背景的重要特征的一种媒介）的重要作用的明确证据。苏联时代的热门电影已经吸引了数百万观众，大部分都是在社会政治研究框架内进行解释的，而了解其文化意义和古典品质仍然是次要的。研究他们热爱的起源可能会更好地了解外国学习者对俄罗斯文化的特殊性。给出的研究旨在解释苏联时代的流行电影现象及其对中国学生的当今意义。

关键词：苏联时代的电影，俄罗斯电影史，作为文化现象的电影，面向外国学习者的俄罗斯电影。

Abstract. *Popular love may not guarantee high artistic quality but of a movie but it is a definitive evidence of that movie's major role as a phenomenon of its national culture, a medium of important features of its cultural context. Soviet-era smash hit movies, having attracted millions of viewers, are mostly interpreted within socio-political research framework whereas understanding their cultural significance and classical quality is still subpar. Researching origins of their popular love may lead to better understanding of Russian culture specificity for foreign learners. The given research is aimed at explaining the phenomenon of Soviet-era popular cinema and its present-day significance to Chinese students.*

Key words: *Soviet-era movies, history of Russian cinema, movies as cultural phenomenon, Russian movies for foreign learners.*

1. Problem definition

Soviet-era cinema history kept a special kind of statistics for most movies of post-war time (1949-1989): instead of taking into account the net box office figures it only counted the number of cinema-goers. The statistics is far from accurate but it is popularly believed that about 250 movies of that period broke the record of 30 million viewers, while over 90 movies reached even higher for a figure of over 40 million viewers each. These record-breaking figures should not be viewed only as the Soviet-era history phenomenon; most of those movies still attract millions of TV-viewers while some of them are almost completely forgotten.

There is no definite formula to explain or predict a movie's popularity with cinema-goers. The popular love is determined by a complex sum of cultural, social, psychological and artistic factors. The sheer prominence of a movie as a piece of art has little to do with measuring its popular success: Andrey Tarkovsky's movies were and still are considered to be genuine masterpieces but never won any general popularity.

On the contrary, a movie's huge success during its time never guaranteed its potential to become a piece of immortal classics. For instance, the 1980 action movie *Pirates of the XX century* by Boris Durov is arguably the most popular Soviet movie ever made with over 100 million cinema-viewers, whereas nowadays it is no longer among the list of most quoted Soviet-era films.

Any smash hit movie of old times, notwithstanding how well-remembered and quoted it is in the present-day culture, is valuable as a complex of its contemporary values and ideas. Being able to concentrate and preserve those values and ideas, to be in harmony with its cultural context, is a major value factor of the movie as a cultural phenomenon.

Among the Soviet-era smash-hit movies there is a wide array of various genres and subgenres. Among the most popular hits there are high-budget action movies (*Pirates of the XX century*, *Air Crew*, both 1980), epic war movies (*Liberation*, 1971, *War and Peace*, 1966), as well as low-budget drama titles (*Afonya*, 1975 *Moscow does not believe in tears*, 1980) and comedies (*Gentlemen of Fortune*, 1971, *The Diamond Arm*, 1969).

Our research goal is to discover the sources of popular love of the above-mentioned movies and try to trace the shifts in their reception in times of their debuts compared to their modern-day receptions. Being the teachers of Russian culture and Russian art history for Chinese graduate and postgraduate students, we also aim to highlight the significance of Soviet-era popular movies for that kind of audience and the specifics of their reception by Chinese younger viewers.

2. Soviet-era comedy: various genres, various backgrounds

Among top 10 Soviet-era smash hit movies there are four comedies. The renowned author of eccentric comedies, Leonid Gaidai, was the most successful

Soviet-era film director: six of his movies became hits, scoring over 50 million viewers each, which makes Gaidai's legacy unique both in historic and modern-day aspects.

Gaidai's comedies are well researched by modern Russian authors in all fields, including their linguistic, social and philosophic specificity. E.V. Muryukina¹ believes that the secret of Gaidai's box-office success lies within the very essence of the subgenre of eccentric comedy, citing the great success and influence of Charlie Chaplin and other Gaidai's predecessors. That opinion can be supported by a huge success of other Soviet-era hits of that subgenre: *Gentlemen of Fortune* by A. Seriy, *Striped trip* by V. Fetin, etc. On the other hand, Gaidai's movies are generally perceived as a unique phenomenon, clearly distinct from other comedy hits. We suppose that Gaidai's comedies became hits due to three inter-related reasons: first, they are very life-like, his humor is very realistic, second, they show a strong cultural connection with Russian satire of the 1920-1930s (Zoschenko, Ilf and Petrov, etc.), third, Gaidai created his own universe with recurrent characters, acting style and music but innovative in every movie.

Gaidai movie universe is closely-knit to Soviet social reality of 1960-1970s, but nevertheless is popular among present-day Russian language and culture learners in China. The socio-culture background of Gaidai movies poses many interpretational difficulties by Chinese viewers, but, at the same time, it provides a plethora of options for the teacher to explain the peculiarities of Russian humor and satire, preparing ground for understanding the humorous essence of Gogol, Bulgakov, Ilf and Petrov works.

Another popular subgenre was musical comedy which developed the great tradition of 1930s hits by G. Alexandrov and I. Piryev. Musical comedy movies (*Kuban Cossacks*, 1950, *Bride with a Dowry*, 1953) were especially popular in 1950-1960s, and it was the subgenre that gave start to Eldar Ryazanov's career (*Carnival in Moscow*, 1956, *Hussar Ballad*, 1962, over 45 million viewers each). The most popular movie of this subgenre was A. Tutyshkin's *Wedding in Malinovka* (1967), grossing over 75 million viewers. In late period of the Soviet-era musical comedy became a dominant subgenre on TV, while in movies its musical elements successfully blended into various genres: from cartoons to a classic drama, e.g. Ryazanov's *Office Romance*.

Soviet-era musical comedy has lost much of its visual and audial appeal for the modern-day viewers. The reason is a vast gap between Soviet-era musical aesthetics, based on blending Russian folk music and classical music appeal and modern-day musical aesthetics, based on the principles of Western pop-music. The same applies to the aesthetics of dance routines. Soviet-era musical comedy for Chinese students is not appealing in terms of cinematography, but still very appealing in

¹Мирукина Е.В.. Комедии Л.И. Гайдая как культурный феномен. /Медиаобразование №1, 2011 – с. 85 – 89.

terms of learning singing and dancing routines and understanding the ways that subgenre still influences modern Russian culture.

The 1970s gave rise to a new kind of comedy subgenre which is often called “lyrical comedy” or “drama comedy” and which is essentially a kind of psychological drama spiced with comic elements. This subgenre was largely shaped by the works of Georgy Danelia, but it is worth mentioning that among his masterpieces only *Afonya* was a smash-hit with over 50 million viewers.

Russian lyrical comedies of 1970s are the result of merging the story-telling narrative, a set of psychological or moral conflicts and a light touch of comedy flavor into a single artistic entity. Both G. Danelia and E. Ryazanov seemed to find a perfect balance between lightheartedness of narration and seriousness of conflict. That balance made them possible to obtain classic quality. But the viewers’ perception of such comedies transformed: their subtle satirical messages are missed by modern audiences, while their lyrical narrative and, more importantly, humanistic nature are well-appreciated by XXI century viewers because of the deficit of those qualities in modern cinematography. Modern viewers, both Russian and Chinese, see Soviet-era lyrical comedies as masterpieces, vividly portraying social interactions and psychological conflicts, as movies “of a human soul”, while mostly ignoring their social background. *Office Romance* by E. Ryazanov is arguably the most popular Soviet-era movie among Chinese younger Russian-learners who are a world away of Soviet social phenomena and mentality.

3. Action and suspense in Soviet-era movies: the outer and inner dimensions

Among top 10 most successful Soviet-era movies four positions are occupied by action movies: Boris Durov’s *Pirates of the XX century*, Alexander Mitta’s *Air Crew* and two first episodes of a mini-series *The Sword and the Shield* by Vladimir Basov shown in cinemas as separate movies. Those titles are very different both in terms of subgenre and content specifics. Durov’s blockbuster is essentially an experiment of introducing a “pure action” subgenre while minimizing its political and patriotic message. *Air Crew* is also an experiment, but of a different nature: often cited as a “first Soviet catastrophe movie” it is indeed a human drama in an action setting. *The Sword and the Shield* is not a typical (in a Hollywood sense) spy movie but a heroic saga of character and value clash, of an eternal strife of selflessness and selfishness. Such a great variety of features within the Soviet-era smash hit action movies suggests that there should be at least several subgenres of action movies. Action movie was defined as “a group of genres” by the most respected dictionary of the field². We suggest separating genre-specific action movies subtype (outer dimension) and movies where the intensity of narration lies in the psychological dimension (inner dimension). Many Soviet-era smash hit mov-

²Кино. Энциклопедический словарь. /Под ред. С.И. Юткевича. М.: Советская энциклопедия, 1987 – с. 443

ies with long dialogues but without intense visual action sequences became major hits (including *The Shield and The Sword*, *Teheran-43*, *The Road to "Saturn"* and many others)

A number of Soviet-era movies managed to blend action intensity in their form and psychological suspense in their content (V. Ivchenko's *Extraordinary Accident*, A. Faintsimmer's *The Eating-house on Pyatnitskaya*, etc.) While retaining high-level of plot suspense, such movies manage to highlight the motives and values of characters and are remembered not by their plot twists but by vivid portraits of their personages. Such movies are often based on the social ideal of fighting for justice, which, in its turn, "was based on the ideological faith in human and in success of social transformation"³. Modern Russian mentality find this social ideal obsolete and often see it as an Soviet ideology cliché but that does not devalue the popularity of Soviet-era action and suspense movies among present-day audiences. Their genre-specific features (plot twists, suspense atmosphere, stunts, etc.) are much more elaborate in present-day movies, so the source of their popularity lies in a different dimension. Modern-day viewers still look for deep psychological unveiling of the characters, co-experiencing their feelings, subvocal messages and other non-action features within the action-movies setting.

E. Keosayan's *The Elusive Avengers* were a great success among Soviet-era viewers and, along with its two sequels, became a part of a movie universe. Its success was created by the action-packed visuals, abundance of stunts and elements of American-style western movies. But Soviet-era cinema critics were ruthless on the movies, citing both sequels as complete failures⁴. Nevertheless, *The Elusive Avengers* trilogy is now a time-honored classic; while its modern-day popularity is no longer based on the compassion to young Red Guards risking life while fighting dangerous adversaries (the reason for such compassion is lost with the value system of the Soviet era). The present-day popularity of the trilogy relies on the genuine compassion to all of its characters, some of which were portrayed with tragic flavor which strikes a sharp contrast with a light-hearted atmosphere of the movie.

Chinese students audience show less than welcome reception for Hollywood-style action movies like *Pirates of the XX century*, citing their obsolete action sequences and dull visuals. On the contrary, they positively receive and praise the patriotic pathos and deepness of emotions in movies like *The Sword and The Shield*, *Air Crew* and TV-series *Seventeen Moments of Spring*. War movies like Y. Ozerov's *Liberation* are widely used by Chinese educators both because of their historic accuracy and patriotic message.

³Хилько Н.Ф. Развитие социальных идеалов кинозрителей в содержании экранных произведений доперестроечного и постперестроечного периодов. //Вестник Омского университета. Культура, культурология. – 2011, №4. – стр. 333.

⁴Советское кино. 70-е годы. М.: Искусство, 1984. – с. 121.

4. Cinema and literature: love for reading and literature taste as social values of Soviet culture

The problem of reading habit as a phenomenon of Russian culture is a hot topic among present-day culture studies experts, educators and journalists. It is a widely accepted idea of Russian culture that reading is “a way of forming a human who is thinking, free, understanding true meaning of human relationships, and seeing the literary text as the dimension of human spirit”⁵. Such concept was dominant in Soviet culture and influenced Soviet-era cinematography, which produced a wide array of screen adaptations of literary classics. Many of such movies were smash hits, like S. Bondarchuk’s *War and Peace* (its first part *Andrey Bolkonsky* shown as a separate movie attracted over 60 million viewers), S. Gerasimov’s *Quiet flows the Don*, A. Zarkhi’s *Anna Karenina* and many more.

Soviet-era movies based on classic literature were never created as “costume dramas”. They always implied some meaningful connection to contemporary times, trying to bridge the gap between various cultures and epochs. As Soviet film critics put it: “Ideas and images of classical literature in Soviet movies were some kind of a mirror to reflect the spiritual life of contemporary society”⁶.

Some movies became smash hits because of the immense popularity of their literary sources. The most obvious examples are *The Amphibian Man* (1962) and *The Headless Rider* (1973), 13th and 8th among the most popular Soviet-era movies respectively. Both same-name books by A. Belyaev and Thomas Mayne Reid were hugely popular, making two must-read books for any Soviet teenager, which boosted the success of the screen adaptations. In present-day Russian cultures both books are now shifting towards the periphery of readers’ attention which also drastically reduces the popularity of the respective movies. *The Headless Rider* is arguably the least remembered Soviet cinema hits; *The Amphibian man* is still cognizable yet it experienced a major transformation of viewers’ perception, namely due to the breaking the connection with the literary source. The movie as a complex artistic unity implied the viewers’ profound knowledge of literary source; without such knowledge it breaks into a modernist mosaic of strange images and ideas. A present-day researcher V. Savushkina sees the main message of *The Amphibian Man* in carnal love between sexes while seeing the protagonist as “a certain installation, an artistic experiment of anomaly”⁷. The high-flown pathos of faith in human reason and human heart, praised by Soviet-time critics, Belyaev’s dream of “a better human”, the clash of humanity and inhumanity seem to escape modern-day audience.

⁵Лурье Л.И. Что значит быть «самой читающей страной в мире»? //Иновационные проекты и программы в образовании, 2012 - №4. – с. 66.

⁶Советское кино. 70-е годы. М.: Искусство, 1984. – с. 99.

⁷Савушкина В.И. Ценностные основания в кинематографе второй половины XX века с точки зрения постиндустриальной культуры (на примере категории «Счастье») //Вестник МГУКИ, 2013 - №3 (май-июнь), - с. 232.

Soviet-era screen adaptations are still very popular and timely because they do not just preserve the ideas of classical literature but try to develop them in a more complex artistic context of cinematography. The director of Hollywood screen adaptation of “War and Peace” (1956) King Vidor wrote: “The Hollywood version drew the audience’s attention towards the love story and the characters’ private lives whereas Bondarchuk’s version is much more complex and ambitious. It provides a documentary and thorough recreation of the social life of early XIX century while aiming to highlight Tolstoy’s major implication of love for life in all its forms”⁸.

The problem of interaction of literature and cinematography was a full-scale research problem since 1960s (I.M. Manevich⁹ and others). Well-developed reading habits help audience to reach deeper and more tasteful perception of any artistic text, including intellectual movies with their complex language. Contrariwise, screen adaptations are a popular channel of learning the Russian literary classics for younger audiences.

Soviet-era screen adaptations are generally welcome by Chinese audiences who often find them a more convenient way to understand Russian classical literature. Provided that the movies are translated into Chinese they do not usually evoke the feeling of “epoch gap” or “costume party” among the Chinese audience, while E. Ryazanov’s *A Cruel Romance* and E. Loteanu’s *A Hunting Accident* are generally commented upon as “modern and true-to-life”. But it is worth noting that relatability of those movies in China is largely restricted by the sphere of learning Russian.

5. Perestroika-time smash hit movies: crossing borders and crashing ideals

“Cinematography of Perestroika” is a unique cultural phenomenon, the manifestation of mass destruction of Soviet-era meanings, symbols and artistic principles. The movies of that period are constructed of aesthetic elements opposite to the Soviet-era cinematography of previous decades: violence, humiliation, despair, carnality, impulsiveness. That sort of “new aesthetics” seemed to shock cinema-goers with its boldness and extravagant novelty. The smash hit movies of perestroika include *Little Vera* (1988), *Intergirl* (1989), *My name is Harlequin* (1988) which attracted over 40 million viewers each. The stunning success of those movies despite their questionable artistic value is usually explained by the novelty of their topics and settings, but it should be also noted that the “negative appeal” of perestroika movies is a complex socio-psychological phenomenon with strong meaning and artistic principles of its own. We believe that “perestroika movies” originated from chaotic social shifts of late Soviet era but continue beyond those temporal boundaries:

⁸Аннинский Л.А. Лев Толстой и мы с вами //Советский экран, 1966. №22

⁹Маневич И.М. Кино и литература. М.: Искусство, 1966 – 240 с.

such movies, based on irrational despair, aesthetics of decay and destruction and exaggerated inhumanity, are still produced in Russia almost 30 years after the Soviet Union collapsed (A. Krasovskiy's *Prazdnik*, K. Balagov's *Beanpole*, etc).

Yet it would be wrong to assume that all popular perestroika-time movies share the same ideology and aesthetics. Early perestroika movies like A. Brenes' *Double trap* and M. Tumanishvili's *Solo voyage* (both 1986) included multiple innovative visual and plot elements, acquired from Western action and suspense cinematography, yet managed to adapt them to typical Soviet-style ideological and moral messages. Another example is A. Proshkin's masterpiece *The Cold Summer of 1953* (1987) which was produced in the format of "new aesthetics" with elaborate scenes of violence but essentially is an antagonism against inhumanity, a strong call for compassion and humaneness.

Tsunami of "new aesthetics" in turbulent times of perestroika greatly influenced the perception patterns of that-day audience. Movies like R. Nugmanov's *The Needle* or K. Shakhnazarov's *Zero City* could not become smash hits in late 1980s and they cannot be labeled "perestroika movies". In modern times these movies are perceived as the best examples of late Soviet cinematography and can still be referred to while teaching the history of Russian art for foreign students. While younger Chinese audiences never experienced the perestroika-style flavor of social deconstruction they can still relate to the core humane values within the best movies of the period (including both acknowledged masterpieces as V. Bortko's *Heart of a Dog* and less cognizable titles, like N. Dostal's *Cloud Heaven*)

We believe that understanding the heritage of Soviet-era popular movies, their conceptual and moral principles, their links to classical and modern Russian culture, is essential for both preserving Russian cultural identity and translating that identity to foreign learners. While modern Russian cinematography is still at search of its social ideals and representative characters, popular Soviet-era movies are able to unite various age and social groups of Russian-speakers.

UDC 618.1-053.6/.7:618.175:611-018.2-007.17

在未分化结缔组织发育异常的情况下优化经常和长期生病的月经不调少女的治疗方法

**OPTIMIZATION OF THE TREATMENT OF OFTEN AND
LONG-TERM SICK TEENAGE GIRLS WITH MENSTRUAL
IRREGULARITIES IN THE PRESENCE OF UNDIFFERENTIATED
CONNECTIVE TISSUE DYSPLASIA**

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抽象。在未分化的结缔组织异常增生综合症的存在下，月经不调的经常和长期生病的少女会增加躯体，心理和生殖健康受损的风险。本文讨论了对经常和长期患病的月经不调的少女（如果患有未分化的结缔组织发育异常综合症）进行最佳治疗的结果。在少女康复过程的影响下，健康状况显着改善，为77.6%，而没有变化-为12.4%。心理诊断研究显示，月经不调的青春期女孩存在未分化的结缔组织异常增生综合症，虚弱反应占24.4%，高焦虑症占33.3%，情绪不佳者占17.8%。睡眠障碍占15.5%。全面优化治疗方法将有助于维持生殖潜力，身体和精神健康。

关键词：少女，病毒和细菌感染，月经周期，未分化结缔组织发育异常综合症。

Abstract. *Often and long-term sick teenage girls with menstrual irregularities in the presence of undifferentiated connective tissue dysplasia syndrome form an increased risk group for impaired somatic, mental and reproductive health. The article discusses the results of optimizing the treatment of often and long-term sick teenage girls with menstrual irregularities, if they have the syndrome of undifferentiated connective tissue dysplasia. Under the influence of the course of rehabilitation in adolescent girls, a significant improvement in health was noted in 77.6%, without changes - in 12.4%. Psychodiagnostic studies revealed in adolescent girls with menstrual irregularities, in the presence of syndrome of undifferentiated connective tissue dysplasia, asthenic reactions in 24.4%, high anxiety in 33.3%, emotional lability in 17.8%; sleep disturbance in 15.5%. Comprehensive optimization of therapy will help maintain reproductive potential, somatic and mental health.*

Keywords: *adolescent girls, viral and bacterial infections, menstrual cycle, syndrome of undifferentiated connective tissue dysplasia.*

The problem of improving the health of adolescent girls with somatic and mental health disorders in combination with the pathology of the reproductive system is one of the priority directions in the development of social policy of states at the present stage [1, 6, 10]. In the adolescent period, intensive growth of adolescent girls occurs in combination with a decrease in the mass of lymphoid organs, with the suppression of the cellular immunity link and the stimulation of the humoral link. In this regard, increased sensitivity to viruses and bacteria, increases the frequency of development and relapse of diseases of organs and systems [3, 11, 12]. Moreover, often and for a long time sick teenage girls can develop various psychological problems (complexes) that lead to social maladaptation with manifestations of psychogenic disorders, which is an unconditional risk factor for psychosomatic diseases and reproductive dysfunctions [6, 7, 8]. Therefore, the optimization of the rehabilitation of often and long-term sick teenage girls with menstrual irregularities in the presence of undifferentiated connective tissue dysplasia syndrome in sanatorium-resort conditions remains an urgent problem.

Purpose of the work was to evaluate the effectiveness of the treatment of often and long-term sick teenage girls with menstrual irregularities in the presence of undifferentiated connective tissue dysplasia syndrome in sanatorium-resort conditions.

Materials and research methods.

We observed 80 frequently and long-term ill teenage girls with menstrual irregularities, in the presence of undifferentiated connective tissue dysplasia syndrome (main group of 45 people) and without undifferentiated connective tissue dysplasia syndrome (comparison group of 35 people).

During the psychodiagnostic examination of teenage girls, the Eysenck personality questionnaire was used (teenage variant); anxiety scale MDLTU; Zakharov's fears questionnaire; Luscher color picker. Methods were used to study memory, attention and thinking - memorizing 10 words, memorizing figures, test for associative memory, Schulte tables, "Generalization of concepts". Wexler's test was used to measure intelligence.

Quantitative data were evaluated for normal distribution (Shapiro – Wilk test). We calculated: arithmetic mean (M) and its standard error (m), relative value (P) in% and its representativeness error (m). For comparison of means, the Student's parametric criterion was used, since the data were described by the law of normal distribution, and for comparison of frequencies (in %), the exact Fisher test.

Results and discussion.

Among the often and long-term ill teenage girls with menstrual irregularities in the presence of undifferentiated connective tissue dysplasia syndrome, hypertrophy of palatine tonsils I-II degree 37.7% was most often detected 1.3

times (28.5% of cases in the control group) chronic compensated tonsillitis in 1.6 (28.8% and 22.8% of cases in the control group), chronic decompensated tonsillitis in 1.6 (17.7% and 14.2% of cases in the control group), adenoid vegetation - in 1.9 (26.6% and 17.1% of cases in the control group). In addition, these teenage girls had more often syndromes: 2.8 times vegetative-vascular dysfunction in 24.4% (11.4% of cases in the control group); in 1.8 dysplastic cardiopathy and asthenoneurotic syndrome in 20.0% (14.2% of cases in the control group) There was also a strong direct relationship between the pathology of the oropharynx and syndromes of undifferentiated dysplasia of the connective tissue ($r=0.89$).

The results indicate a high incidence of syndrome of undifferentiated connective tissue dysplasia in often and long-term sick teenage girls with chronic inflammatory processes of the oropharynx. This suggests that the syndrome of undifferentiated dysplasia of the connective tissue predisposes to the formation of chronic foci of infection in the body, which probably contributes to the development of menstrual irregularities in adolescent girls and requires adequate rehabilitation in sanatorium-resort conditions.

Chronic tonsillitis and adenoiditis in all adolescent girls developed as a result of repeated acute inflammation of the pharyngeal and palatine tonsils with viral and bacterial infections and were characterized by the presence of general intoxication, the spread of the infection process to the sinuses. All children with chronic adenoiditis had a characteristic appearance: nasal congestion, breathing through the mouth, pallor of the skin and visible mucous membranes was expressed, a moderate increase in the submandibular and occipital regional lymph nodes was noted. With anterior rhinoscopy, hyperemia and swelling of the mucous membrane of the nasal concha, the presence of mucopurulent discharge in the nasal passages were revealed; with posterior rhinoscopy - hyperemia and swelling of the pharyngeal tonsils, as well as a "strip" of mucopurulent discharge on the back of the pharynx. Chronic tonsillitis was characterized by hypertrophy and congestive hyperemia of the anterior and posterior palatine arches, palatine tonsils were fused with arches, caseous plugs stood out from the tonsil lacunae during rotation, and hypertrophy of regional cervical lymph nodes was noted.

The volume of medical care at the sanatorium-resort stage provided for the organization of a therapeutic, prophylactic and health-improving process. The complex of health measures included good nutrition, aërotherapy (maximum stay of teenage girls in the open air). Climatic and balneological procedures were widely used, in particular: air, salt-coniferous, pearl baths. In the summer, sea bathing was carried out. In the cold season, children bathed in a pool at a water temperature of at least + 28°C, lasting up to 30 minutes, course of up to 20 procedures.

Physiotherapeutic treatment was carried out by using a UV dose of the nose and nasopharynx 1 dose daily with a course of up to 8 procedures, inhalation through the nose with sea water, and a solution of furatsilina (1: 5000). In connection with the presence of concomitant allergic rhinitis, electrophoresis with calcium chloride was used, as well as hydrophonophoresis of hydrocortisone to the nose with an intensity of 0.2 W/cm², lasting 5 minutes, course of up to 10 procedures.

Mud therapy for adolescent girls was carried out using marine mud, which by its qualities refers to silt with a high content of colloids, which cause a “greasy” consistency and alkaline reaction (pH 0.75–0.8), which has high viscosity, ductility, and a fine granular structure, gray-black color and a peculiar smell. A valuable balneological property of this mud is its clay base. The most effective are surface layers with a thickness of 1 to 3 cm. Mud therapy was carried out in the form of dirt - electrophoresis of the nose, dirt temperature + 38-40°C for 10-15 minutes, every other day or two in a row, day 3 - a break.

Balneotherapy was prescribed taking into account the individual characteristics of adolescent girls, the degree of physical development, the presence of background diseases. Regular medical monitoring was carried out for the body's reaction to the procedures, which included taking into account general well-being, heart rate, and blood pressure.

During the stay of teenage girls at the sanatorium-resort stage of treatment, the formation of processes of social adaptation is inevitable [2,5]. Expressed psycho-emotional reactions are possible, which often contribute to a violation of general well-being, the development of anxiety and emotional instability. Therefore, to reduce the negative manifestations of emotional and behavioral reactions, to prevent adverse changes in the state of the body, a psycho-emotional unloading was recommended by a psychologist.

During the initial survey, a significant part of adolescent girls with menstrual irregularities (46.2%) had complaints of fatigue, emotional lability, general weakness, weather sensitivity, sleep disturbance, excessive sweating, a feeling of lack of air, which made us suspect in them an autonomic dysfunction.

Adolescent girls with menstrual irregularities in the syndrome of undifferentiated connective tissue dysplasia and without it were characterized by adaptive disorders in the form of autonomic disorders, manifested immediately after physical and mental stress: tachycardia (62.2% and 22.2% of cases in the control group); hyperhidrosis (35.5% and 8.8% of cases in the control group); dizziness (42.2% and 17.1% of cases in the control group); a feeling of heaviness in the head (6.5% and 5.7% of cases in the control group).

Psychodiagnostic studies revealed in adolescent girls with menstrual irregularities in the syndrome of undifferentiated connective tissue dysplasia the high-

est scores: asthenic reactions in 24.4% (14.2% of cases in the control group); high anxiety in 33.3% (11.1% of cases in the control group). Emotional lability was observed in 17.8% (8.6% of cases in the control group); sleep disturbance in 15.5% (8.7% of cases in the control group). The neurotic index in 57.7% (17.7% of cases in the control group) reflects the lability of the central nervous system. It was noted that the indicator “behavioral disorders” does not have significant differences between the groups, which is associated with the age characteristics of the examined population.

The complex of medical and psychological characteristics of often and long-term sick teenage girls with menstrual irregularities in the presence of undifferentiated connective tissue dysplasia syndrome in the initial state allows them to be divided into three groups: prognostically safe (they do not have pathological clinical, laboratory, autonomic, psycho-emotional abnormalities); increased risk (deviations are determined by clinical and laboratory parameters and psycho-emotional status, the presence of psycho-vegetative stress syndrome); dynamic observation - (deviations of these indicators having a borderline character). It is necessary to evaluate the latter as a high-risk group and carry out rehabilitation using spa treatment. The direct effect of staying at the resort was assessed taking into account the dynamics of clinical and psychological indicators.

Under the influence of the course of sanatorium-resort rehabilitation in adolescent girls, a significant improvement in health was observed in 8.7% of children, improvement in 77.6%, and no change in 13.7%.

All adolescent girls with menstrual irregularities showed a positive dynamics of indicators of autonomic and psycho-emotional disorders. For teenage girls with menstrual irregularities amid undifferentiated connective tissue dysplasia, more pronounced autonomic disorders (tachycardia, dizziness) and changes occurring at the psycho-emotional level, leading among which were asthenia and anxiety, are characteristic. In all frequently ill teenage girls with menstrual irregularities, these indicators decreased by 3.0 times compared with the initial level.

Therefore, the psychological characteristics of this contingent of children in most cases indicate a high level of neurotization and maladaptation, anxiety and asthenic manifestations. In the system of comprehensive medical and psychological rehabilitation, psychotherapy should be an integral part of the treatment and prevention of neurotic symptoms in frequently ill teenage girls with menstrual irregularities in the background, especially undifferentiated connective tissue dysplasia. Taking into account the personality characteristics of this contingent of teenage girls will make it possible to more effectively solve the problems of their rehabilitation in sanatorium-resort conditions. Comprehensive medical sanatorium and resort rehabilitation will help maintain reproductive potential, somatic and mental health.

Thus, among the often and long-term ill teenage girls with menstrual irregularities against the background of the syndrome of undifferentiated connective tissue dysplasia, hypertrophy of the tonsils of the I – II degree was detected 1.3 times more often; 3.2 - chronic compensated and decompensated tonsillitis; in 2.0 - adenoid vegetation. Teenage girls with menstrual irregularities in the presence of undifferentiated connective tissue dysplasia syndrome are an increased risk group for the formation of chronic foci of infection, as well as adaptive disorders and emotional-volitional spheres. Under the influence of optimization of therapy, including a complex of drugs and physiotherapy, in adolescent girls with menstrual irregularities in the presence of undifferentiated connective tissue dysplasia syndrome, a complete restoration of health was noted in 8.7%, a significant improvement in 77.6% and remained unchanged in 13, 7%. The psychological rehabilitation of adolescent girls with menstrual irregularities in the presence of undifferentiated connective tissue dysplasia syndrome contributed to a 3–4-fold decrease in the rates of autonomic disorders, and a 3.0-fold decrease in the levels of anxiety and asthenic manifestations compared to the initial level.

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UDC 597.554.3+57.017.64

阿穆尔白鲌 (*Parabramis pekinensis*) 世代的群体生长和生物量的变异性
(Basilewsky, 1855年)

**VARIABILITY OF GROUP GROWTH AND THE BIOMASS
OF THE GENERATIONS OF AMUR WHITE BREAM *PARABRAMIS
PEKINENSIS* (BASILEWSKY, 1855)**

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抽象。 在1961年至2016年期间, 对生活在Nizhneleninsky村附近的阿穆尔河中的阿穆尔白鲌*Parabramis pekinensis*的生长进行了调查。 已经确定, 同一种群的不同世代的鲌鱼的生长速率是不同的。 世代增长的种群内变异性的原因是春季和秋季的水温。 春天来得越早, 阿穆尔河中的水变暖, 夏秋季期间水的高温维持的时间越长, 鱼的青春期生长的越大, 产生的最大生物量就越大。

关键词: 生长, 生长变异性, 生物量产生, 阿穆尔河。

Abstract. *In the period from 1961 to 2016, the growth of the Amur white bream *Parabramis pekinensis*, which lives in the Amur River near the village of Nizhneleninsky, was investigated. It was determined that the growth rates of breams of different generations of the same population are different. The reason for the intrapopulation variability of the growth of generations is the water temperature in the spring and autumn months. The earlier spring comes and the water in the Amur River warms up and the longer the high temperature of the water is maintained in the summer-autumn period, the larger the fish grows by puberty and the greater is the maximum biomass of generation.*

Keywords: *growth, growth variability, biomass generation, Amur River.*

Introduction

It is known that the growth of fish in one population can change due to changes in environmental conditions, the presence or absence of food objects, etc. (Nikolsky, 1974; Zykov, 2005). A change in the rate of linear and weight growth leads to a change in the timing of puberty of fish, as a result of which the age structure, number and biomass of fish populations change.

The goal is to determine, on the basis of indicators characterizing the group growth of the Amur white bream of different generations, what environmental factors affect the growth and biomass of generations of fish in one population.

Material and methodology

The material was collected from 2002 to 20016 in the floodplain system of the Middle Amur in the area of the village of Nizhneleninsky. Also used scale preparations of fish stored in the archive of the Institute. A total of 331 specimens. Age was determined in all breams. The method for determining the age of fish by scales is described in the works of I.F. Pravdin (1966), N.I. Chugunova (1959) and others. When determining age, the front radius of the scales and the radius of each annual ring were measured. Determination of age and measurement of the radii of fish scales was carried out by the author under the MBS-10 binocular using a digital camera-eyepiece for a microscope, model DCM500. To describe the linear growth of bream, the body length of fish of different ages was used, obtained by the method of inverse calculation along the length of the front radius of the scales (Semenchenko, 2018). The dependence of the length and body weight of fish on age was described by the power equations of I. Schmalhausen (Mina, Klevezal, 1976; Zykov, 2005 and others). The values of the constants of the equations of linear and weight growth were calculated by the least squares method based on the calculated values of the length and body weight of fish at different ages. Differentiated by age estimates of natural mortality were calculated using the method developed by L.A. Zykov (2005). Sexual dimorphism was revealed in the growth indices of females and males of the Amur white bream (Semenchenko, 2018). In order that differences in the growth of males and females do not affect the results of the analysis of growth variability of fish of different generations, all calculations were performed only on females. For calculations, we used the software packages STATISTICA 10 (license AXAR406G379112) and Microsoft Excel.

Results and discussion

The following linear growth indicators were used to characterize the growth of Amur white breams, such as the body length of fish at the age of one year, the body length of fish at the age of six (the age of mass maturation) and the specific growth rate of fish in the first 6 years of life (Table 1). The specific growth rate was calculated by the formula of Schmalhausen and Brody (Mina, Klevezal, 1976):

$$c = (lgL_n - lgL_o)/0,4343 \times (t_n - t_0),$$

where L_n — size of fish at a finite point in time t_n ;

L_o — initial fish size t_0 .

Table. 1

The average length (cm) of female Amur bream at the age of one and six years and the specific growth rate of fish in different years of the study

Year of birth	Body length, cm (age 1 year)	Body length, cm (age 6 years)	Specific growth rate	N, ind.
	Average ± error	Average ± error	Average ± error	
1961	6,9 ± 0,210	26,8 ± 0,313	0,272 ± 0,005	12
1965	6,2 ± 0,429	25,7 ± 0,788	0,287 ± 0,011	8
1967	6,5 ± 0,198	27,1 ± 0,471	0,285 ± 0,005	13
1969	7,4 ± 0,246	27,3 ± 0,372	0,263 ± 0,006	12
1990	6,8 ± 0,133	27,7 ± 0,620	0,280 ± 0,007	12
1991	6,6 ± 0,254	27,4 ± 0,478	0,286 ± 0,006	14
1993	6,3 ± 0,218	26,1 ± 0,292	0,286 ± 0,007	22
1994	6,5 ± 0,162	26,8 ± 0,189	0,284 ± 0,005	28
1995	6,8 ± 0,142	27,4 ± 0,318	0,280 ± 0,004	48
1996	6,9 ± 0,133	28,6 ± 0,288	0,286 ± 0,004	55
1997	6,9 ± 0,259	27,7 ± 0,422	0,281 ± 0,006	33
1998	7,1 ± 0,176	28,8 ± 0,382	0,281 ± 0,004	34
1999	6,5 ± 0,291	26,8 ± 0,203	0,285 ± 0,010	8
2001	7,1 ± 0,407	25,5 ± 0,316	0,261 ± 0,013	14

The growth rate, as well as other characteristics of fish growth, are different not only in fish of different populations, but also in fish of different generations (Zykov, 2005; Semenchenko, Ostrovsky, 2008, etc.). Thus, in the population of Amur white bream living on the territory of the JAO, females of different generations statistically significantly differ in body length at the age of one year and at the age of 6 years (Table 2).

Table 2

Differences in average body lengths of females at the age of one and six years of Amur white bream females of different generations (results of the Kruskal-Wallis analysis of variance)

Indicator	Kruskal-Wallis N- criterion	p- level	The number of degrees of freedom and the number of ind.
Year-old body length	24,409	≤0,0276	13;313
Six year old body length	64,323	≤0,000	
Specific growth rate	17,757	≤0,167	

Note: *N- criterion* — calculated values of the *Kruskal-Wallis N-test*;
p- level — significance level for the N-criterion.

Fish growth, its indicators and speed are directly related to the living conditions of the individual. Based on growth indicators, productivity can be calculated (biomass growth rate), as well as the maximum biomass that a generation of fish can reach by puberty. The maximum biomass value depends on the initial number of fish. In order to exclude the influence of the main factor that affects the number and biomass of generations, all calculations were carried out on conditional generations, the initial number of which is equal to 10,000 individuals each year. Further formation of these generations was based on growth indicators, the values of which depend on the living conditions of individuals.

Biological indicators, natural mortality rates, and maximum biomass of some generations of Amur white bream females (Table 3) were calculated by the method of L.A. Zykova (2005). For calculations, we used the coefficient b — the degree in the equation of weight growth of females of the Amur white bream ($W_t = a \times t^b$) (Semenchenko, 2018). We calculated the coefficients of the linear growth equations of I. Schmalhausen ($L_t = q \times t^k$), as well as the value of the asymptotic length (L_∞) of the fish, which was determined using the construction of the Ford-Walford diagram based on the calculated body lengths of females of each age. The length of fish at the age of mass maturation was determined by the ratio of Fulton-Dryagin: $L_n = 0,5 \times L_\infty$, where L_∞ — asymptotic length. Ripening age $t_n = (Ln/q)^{1/k}$, where q and k — coefficients in the Schmalhausen equation of linear growth.

Maximum estimated age of fish in a population $T = t_n \times 2^{(1/k)}$, where t_n — ripening age; k — coefficient in the Schmalhausen equation of linear growth.

Instantaneous coefficient of natural mortality of fish in the age of mass ripening $M_n = b/t_n$, where b — value of the degree in the weight growth equation ($W_t = a \times t^b$); t_n — puberty age.

Conditional rate of natural mortality at the age of mass ripening —

$$\varphi_M = 1 - e^{-Mn}.$$

Table 3

The main indicators of growth, natural mortality and the maximum biomass of females of the Amur white bream of some generations from 1961 to 2001

Generation Year of Birth	L_{∞}	q	k	L_n	t_n	ϕ_{Mn}	T	W_{max} (kg)	ind.
1961	43,5	7,893	0,676	21,8	4,5	0,302	12,5	193,0	12
1965	47,7	7,632	0,665	23,8	5,5	0,252	15,7	207,2	8
1967	46,0	7,872	0,665	23,0	5,0	0,276	14,2	202,1	13
1969	47,9	7,861	0,685	24,0	5,1	0,276	14,0	193,3	12
1990	52,4	8,710	0,614	26,2	6,0	0,236	18,6	239,9	12
1991	50,8	8,479	0,630	25,4	5,7	0,246	17,1	222,4	14
1992	43,8	8,762	0,624	21,9	4,3	0,310	13,2	210,6	18
1993	52,8	7,843	0,650	26,4	6,5	0,220	18,8	213,2	22
1994	46,3	7,749	0,671	23,2	5,1	0,271	14,3	203,9	28
1995	43,0	8,767	0,610	21,5	4,4	0,309	13,6	215,1	48
1996	49,6	8,789	0,639	24,8	5,1	0,272	15,0	211,4	55
1997	44,3	8,758	0,618	22,2	4,5	0,302	13,8	210,8	33
1998	42,2	9,016	0,619	21,1	3,9	0,336	12,1	200,7	34
1999	47,1	7,451	0,696	23,5	5,2	0,266	14,1	194,4	8
2001	39,5	7,616	0,672	19,7	4,1	0,323	11,6	191,4	14

Note: L_{∞} - asymptotic body length; q and k – power-law linear growth constants; $L = q \times t^k$;

L_n – ripening lengths of fish; t_n – ripening age;

M_n - instantaneous rate of natural mortality in the age of mass ripening;

ϕ_{Mn} - puberty natural mortality rate;

T - maximum estimated age of fish in a population,

W_{max} (kg) – biomass of fish in the age of puberty.

The biomass of generations of fish during the life cycle varies according to domed single-peak curves, the maximum of which falls on average at the age of puberty (Kudersky, 1983, 1988, 1991). The maximum biomass or maximum production of a population (W_{max}), is the total weight gain of all individuals in a population by the time of mass maturation. In order to determine the maximum production of bream of different generations, caused only by growth indicators in different years, we assumed that the number of fish in these conditional populations will decrease only from natural causes. In order to determine the number of fish of each age group, the coefficients of natural mortality of fish of each age were calculated using the Zykov formula (2005):

$$\phi M(t) = 1 - (a \times t^k) \times (T^k - t^k),$$

where $\varphi M(t)$ — conditional natural mortality rate t ; T — maximum estimated age of fish in a population; k — exponent in the equation of linear growth of Schmalhausen; coefficient $a = (A \times q^2)$, where $A = (1 - \varphi Mn)/Ln^2$, q — coefficient in the Schmalhausen linear growth equation, φMn — conditional rate of natural mortality at the age of mass maturation and Ln — the length of the fish at the age of mass ripening.

The number of females of each age group of the Amur white bream was calculated taking into account the decrease in the number of fish under the influence of only natural mortality. Using the average body mass of females of the Amur white bream of each age (Semenchenko, 2018), we calculated the dynamics of biomass and the maximum biomass (W_{max}) of generations of conditional populations of Amur white bream, consisting of only females (Table 3). The maximum biomass by the age of puberty was reached by fish from spawning in 1990, the minimum biomass from the studied generations was reached by fish from spawning in 2001.

The hydrological regime of the reservoir is one of the main factors affecting the number of freshwater fish. In this regard, the influence of hydrological conditions on the maximum generation biomass was investigated using regression analysis, based on step-by-step regression. The value of maximum generation biomass was used as a dependent variable, and data on the state of the environment, such as the Amur level and water temperature in different months of the year and in different years, were used as independent variables. The best set of predictors was determined by the value of the partial coefficients of determination. In the above equations, the factors are ordered as their prognostic value decreases. Methods and techniques of a step-by-step procedure for compiling multiple regressions are described in detail in the work of Afifi, Eisen (1982). Of the 37 factors at our disposal, the maximum biomass of bream generation turned out to be most closely related to the average water temperature in August-September for the first 4 years of fish life (Table 4), as well as to the water temperature in May in the year of spawning.

Table 4

Coefficients of the equation ($W_{max} = ((T_{8-9} - a)/b)^2 + c$) the dependence of the maximum biomass of the Amur white bream (W_{max} , kg) of the water temperature in the Amur River in August-September (T_{8-9} , °C)

Coefficients	Average	Error	t-criterion - ss = 12	p-level	R2
a	16,815	0,435	38,680	<0,000	0,633
b	0,392	0,093	4,199	<0,001	
c	195,280	3,563	54,804	<0,000	

Note: In Tables 4 and 5, - t - criterion - calculated value of the Student t -test for the coefficients of the regression equation; cc = number of degrees of freedom ; p -level - level of significance for t - criterion, R^2 – coefficient of determination

The value of the adjusted determination coefficient (R^2) of the equation (Table 4) was 0.633, the equation with high probability was significant ($F = 3025,462$; $P < 0,0001$).

Of the remaining factors, the influence of such a factor as the water temperature in May in the year of spawning (T_5), still remained. Its inclusion in the model reduces the residual dispersion by almost half (by 43.1%), the determination increases to 0.791 (Table 5).

Table 5

Coefficients of the equation ($W_{max} = ((T8-9-a)/b^2)^2 + ((T5-c)/d^2)^2 + e$) the dependence of the maximum generation biomass (W_{max} , kg) on water temperature (oC) the average over 4 years in August-September (T8-9) and the temperature in May in the year of spawning

Coefficients	Average	Error	t-criterion - ss = 10	p- level	R2
a	16,089	1,394	11,545	<0,000	0,791
b	0,742	0,164	4,515	<0,001	
c	9,312	2,368	3,932	<0,003	
d	0,976	0,277	3,519	<0,005	
e	187,884	8,887	21,141	<0,000	

Fish are poikilothermic animals. Their body temperature changes with changing water temperature. The temperature of the water in which the fish are located is a powerful limiting factor in their growth, as it affects the rate of metabolic reactions, the overall intensity of metabolism, and thereby growth, its speed (Shatunovsky, 1980; Ivleva, 1981).

The minimum average monthly water temperature in May during the study years was 9.4°C, the maximum - 13.3°C. The terms of spawning of bream depend on the readiness for spawning of sexual products. Gonad ripening begins with a rise in water temperature in the river. The first females ready for spawning in especially warm years occur already in May (Semenchenko, Ostrovskaya, 2010). Thus, the earlier the water in the Amur River warms up, the earlier spawning begins and the hatching of juveniles occurs earlier. The time for growth and feeding of fish is significantly increased.

In the Amur River, the maximum monthly average water temperature is in July, and in August and September, the temperature begins to fall, which apparently leads to a decrease in growth rates due to a decrease in the metabolic rate. The higher the water temperature in the autumn months, the longer the period of feeding and growth of fish are. In fact, the water temperature in May and August-September limits the period of active growth of the Amur white bream.

Conclusion

The reason for the intrapopulation variability of growth is the water temperature in the spring and autumn months, which reduces or increases the duration of fish growth during the year, and thereby affects the value of the maximum generation production.

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UDC 597.431

在阿穆尔河中首次发现the白tract (Lacepède1803) (Actinopterygii, Lepisosteiformes, Lepisosteidae) 的发现

**THE FIRST FINDING OF THE GAR *Atractosteus spatula*
(LACEPÈDE 1803) (ACTINOPTERYGII, LEPISTEIFORMES,
LEPISTEIDAE) IN THE AMUR RIVER**

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抽象。 报告首次在哈巴罗夫斯克市附近的阿穆尔河捕获了密西西比甲壳白术刀 (Lacepède1803) (Actinopterygii, Lepisosteiformes, Lepisostedae)。 给出了40个塑性特征和21个特征特征, 给出了阿穆尔河密西西比壳的形态特征。 给出了属和种的特征。

关键词: 阿穆尔河, 俄罗斯, 入侵, 装甲长矛, 白术铲。

Abstract. Report on the first capture of the Mississippi carapace *Atractosteus spatula* (Lacepède 1803) (Actinopterygii, Lepisosteiformes, Lepisostedae) in the Amur River near the city of Khabarovsk. The morphological characteristic of the Mississippian shell of the Amur River is given for 40 plastic and 21 meristic characters. Characteristics of the genus and species are given.

Keywords: Amur River, Russia, invasive, armored pike, *Atractosteus spatula*.

The fossil ancestors of the carapace, known from the Late Cretaceous, were widespread in Europe, in South and North America. Now these fish inhabit mainly the rivers and lakes of North and Central America. However, there are frequent cases of the capture of shellfish in bodies of water very different from their habitats. So, in November 2014, an instance of an atypical species for the local fauna was caught in the Korsakovskaya channel, not far from the city of Khabarovsk

(Nizhny Amur, Russia). The caught specimen bore the characteristic features of the fish of the carapace or cayman (*Lepisosteidae*) family: the overlying rhomboid ganoid scales cover the elongated body of the fish with a continuous carapace, the elongated snout resembles a crocodile snout, a shortened heterocercal caudal fin, abdomen and anatomical dorsal fin, opposite one another (fig. 1). The body color is olive green, turning on the belly in white. On the caudal, anal and dorsal fins there are spots. Also, spots were located on the tail stalk of the fish above the lateral line.

A specimen of the carapace pike caught in the Amur River is Ad 63 cm long and weighing 2800 g, male, gonad maturity stage III, gonadosomatic index 2.4. The stomach of the fish is empty, there were remnants of digested food in the intestines. The amount of intracavitary fat was estimated at 3 points. The factor of fatness according to Fulton is 1.120.

Morphometric analysis was carried out according to the method of I.F. Pravdina (1966) for the pike family (*Esocidae*). A total of 62 features were studied, 41 of which are plastic and 21 are meristic. Signs of the *Lepisosteidae* family found during morphometric analysis include: the number of scales in the lateral line - 63 (usually 50-65); olfactory sacs and nostrils are located on the tip of a long snout (Fig. 2); there are three rays on the gill membrane; there are no gular plates (Fig. 3); on the integumentary bones of the head, as well as on the trunk, there is a ganoid shell; on the upper jaw there are two rows of conical teeth - on the preorbital bone and on the palatine bone (Fig. 4); the formation of the upper jaw involves the preorbital bone, divided into 6 bones (usually 6-8), most of which have strong conical teeth (Fig. 5); the joint of the lower jaw (consisting of 6 paired bone elements) with the skull is located in front of the eyes; the spine is ossified; the vertebrae are opistostal; there is an underdeveloped spiral valve in the intestine (Fig. 6); the arterial cone has 8 transverse rows of valves (from 6 to 8 valves in each row) (Fig. 7); cellular bladder, connected to the pharynx from above.



Fig. 1. Carapace pike caught in Amur River in 2014



Fig. 2. Snout of the carapace pike caught in the Amur river



Fig. 3. The head of the armored pike



Fig. 4. The location of the teeth on the upper jaw of the armored pike



Fig. 5. The infraorbital bone of the armored pike



Fig. 6. The spiral valve in the intestines of the carapace pike (cut).



Fig. 7. Arterial cone of armored pike.

Tables 1 and 2 present the results of a morphometric analysis of the armored pike caught in the Amur river.

Table 1
The main plastic indicators of the carapace (Lepisosteidae)
from the Amur River

№	Feature	Length, mm
1	Body length, <i>l</i> (<i>Ad</i>)	668
2	Smith body length (<i>Ab</i>)	752
3	Torso length (<i>Ac</i>)	460
4	Snout length, <i>ao</i>	116.5
5	Horizontal eye diameter, <i>o</i>	16.7
6	Postorbital distance, <i>f</i>	70.7
7	Head length, <i>c</i>	205.0
8	Head height at nape, <i>lm</i>	60.9
9	Head height through the middle of the eye	41.4
10	Forehead width, <i>k</i>	55.5
11	Upper jaw length, <i>lmx</i>	84.1
12	Distance from the upper jaw <i>lmx</i> to <i>A</i>	8.8
13	Lower Jaw length, <i>lmd</i>	102.1
14	Antedorsal distance, <i>aD</i>	536
15	Post-dorsal distance, <i>pD</i>	70.9
16	Caudal stem length, <i>pl</i>	83.5
17	Dorsal fin height, <i>hDI</i>	47.7
18	Dorsal fin base length, <i>lDI</i>	70.5
19	Anal fin height, <i>hA</i>	41.7
20	Anal fin base length, <i>lA</i>	81.6
21	Ventral fin height, <i>hP</i>	91.1
22	Ventral fin base length, <i>lP</i>	19.7
23	Pectoral fin height, <i>hV</i>	78.7
24	Pectoral fin base length, <i>lV</i>	15.1
25	Anteventral distance, <i>AV</i>	203.9
26	Ventroanal, <i>VA</i>	330
27	Antepectral, <i>AP</i>	355
28	Spectroanal, <i>PA</i>	180.3
29	Pectoventral, <i>PV</i>	164.4

№	Feature	Length, mm
30	Anteanal, <i>AA</i>	538
31	Greatest body height, <i>H</i>	104.6
32	Body height at the beginning of the anal fin, <i>HA</i>	82.4
33	Minimum body height, <i>h</i>	46
34	The length of the middle rays of the caudal fin, <i>C3</i>	91.1
35	Caudal fin base length, <i>IC</i>	60.6
36	Bladder length	277.9
37	Gastrointestinal tract length	570
38	Gonad length	330
39	Length of the upper branchial arch	26.2
40	Length of the lower branchial arch	63.6
41	Stamen height	3.5

Currently, the family of tortillata (*Lepisosteidae*) includes two genera: long-snouted tortoiseshell – *Lepisosteus* Lacepède, 1803 and short-winged tortoiseshell – *Atractosteus* Rafinesque, 1820 (Animal Life, 1983; Nelson, 2009).

The main sign that determines the generic affiliation of tortillaceous family is the number of rows of teeth in the upper jaw. While long-necked carapace (genus *Lepisosteus*) has only one row of teeth on the infraorbital bone, in short-chained carapace (genus *Atractosteus*), the upper jaw has two longitudinal rows of enlarged conical teeth. The first row is also located on the preorbital bone (unlike other fish species in shellfish, it enters the bones forming the upper jaw), and the second row is on the palatine bone (Sterba, 1962; Wiley, 2002; Boschung, Mayden, 2004; Froese et al., 2016; Monks, 2006, Salnikov, 2009). Carapace caught in the Amur River had all the characteristics of the genus *Atractosteus*.

Of the two species of this genus - *Atractosteus tropicus* (Gill) - the Mexican carapace has characteristic features in color, namely a longitudinal strip of brown color and spots on the back, sides and unpaired fins. However, as the fish grows, the spots disappear, the longitudinal strip breaks up into spots, and after that it also disappears. *Atractosteus spatula* (Lacepède 1803) - Mississippi carapace - has a dark olive color, closer to the back it can be almost brown and white or yellowish on the abdomen. Dark spots are present on the rays of the dorsal, anal and caudal fins. Dark spots may also be present on the body (Suttkus, 1963).

Having examined the features of phenotypic and morphometric characters, we came to the conclusion that the fish caught in the Amur River belongs to the genus *Atractosteus* and is a species of *Atractosteus spatula* - the Mississippi carapace.

Table 2

The main meristic indicators of the carapace (Lepisosteidae) from the Amur River

№	Feature	Amount
1	Gill rays	3
2	Vertebral vertebrae	37
3	Tail vertebrae	18
4	Rays, A1	9
5	Rays, D1	9
6	Rays, P1	7
7	Rays, V1	13
8	Gill stamens	58
9	Upper jaw dental formula	15-8-15
10	Upper jaw dental formula, second row	13-15
11	Lower jaw Dental Formula	11-4-9
12	Partition of the preorbital bone	6
13	The number of transverse rows of valves in the arterial cone	8
14	The number of valves in the arterial cone, 1 row	6
15	The number of valves in the arterial cone, 2 row	7
16	The number of valves in the arterial cone, 3 row	7
17	The number of valves in the arterial cone, 4 row	8
18	The number of valves in the arterial cone, 5 row	8
19	The number of valves in the arterial cone, 6 row	8
20	The number of valves in the arterial cone, 7 row	7
21	The number of valves in the arterial cone, 8 row	7

The structural features of the fish of this family allow them to survive in conditions that are unsuitable for most other fish species. For example, in bodies of water with stagnant warm water with a lack of oxygen, shells can emerge and breathe air due to the structure of the swimming bladder. The relatively large size of the eyes of the fish is due to the need to see in the muddy water in which it lives, and the greenish-silver color of the body allows them to be invisible. Shellfish are freshwater fish, however, some of their species are eurygal - able to enter brackish waters and even waters with sea salinity, but do not breed in them (Goddard, 2007).

It is difficult to say exactly how the representative of this species got to Amur, but quite often there is information about the presence of representatives of this family in unusual places and habitats. It is often suggested that aquarists release carapace into open water bodies. Indeed, this fish can be purchased at pet stores. At an early age, almost all species of the family are spotted in color and look attractive. However, over time, these spots disappear, and the fish itself

grows rapidly and has increased aggression towards other fish. In addition, as aquarists say, this fish leads an ambush lifestyle, is slow and calm, and “observing it in artificial reservoirs seems to be a rather boring task” (Riehl, Baensch, 1997; Aqa.ru). It is possible that the representatives of this family came to the Caspian Sea in the north of Esenguly, Turkmenistan (Salnikov, 2009), in the city ponds of Hong Kong (aquafanat.com.ua), in the Berezina river, Belarus (F.Gid.) and etc.

Representatives of the carapace family are large, aggressive and voracious ichthyophagous predators. Their settlement in the Amur River could well affect the state of its fish stocks. The conditions for the nutrition and growth of these fish in Amur are very favorable: a developed floodplain system, a large number of aquatic vegetation and extensive flooded areas, a large amount of food, etc.

Atractosteus spatula Mississippi carapace is a thermophilic species; the harsh climatic conditions of the winter period of the Far East are not suitable for it. Therefore, representatives of this species, who accidentally and singly entered the Amur River basin, are not able to survive in local waters and do not pose a threat to the local ichthyofauna.

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细胞治疗在c57b1 / 6诱导型糖尿病小鼠的胸腺退化中的应用
**THE USE OF CELL THERAPY FOR THYMIC INVOLUTION
IN C57BL/6 MICE WITH INDUCED DIABETES MELLITUS**

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抽象。干细胞能够在人体的各种病理状况下执行恢复功能；因此，细胞疗法（干细胞移植）可以替代某些现有的治疗方法，例如器官移植。这项研究的目的是在实验性1型糖尿病模型上对淋巴器官和非淋巴器官中的骨髓细胞迁移活动进行比较分析。在糖尿病患者的胸腺中未分化的骨髓细胞群的迁移，分布和积累，评估移植对胸腺与年龄相关的变化的影响。已经确定的是，未分割的骨髓干细胞群体不仅在胸腺中迁移，分布和积累，而且还影响其生理退化。

关键词：未分割的骨髓干细胞群，糖尿病模型，细胞治疗，胸腺的生理退化，C57Bl / 6小鼠

Abstract. *Stem cells are able to perform restorative functions in various pathological conditions of the body; therefore, cell therapy (stem cell transplantation) can be a potential alternative to some existing treatment methods, such as organ transplantation. The purpose of this study was to conduct a comparative analysis of the migration activity of a population of bone marrow cells in lymphoid and non-lymphoid organs on a model of experimental type 1 diabetes mellitus. Migration, distribution and accumulation of an undivided population of bone marrow cells in the thymus of recipients with diabetes mellitus, assessment of the effect of the transplant on age-related changes in the thymus. It has been established that an undivided population of bone marrow stem cells not only migrates, distributes and accumulates in the thymus, but also affects its physiological involution.*

Keywords: *undivided bone marrow stem cell population, diabetes mellitus model, cell therapy, physiological involution of the thymus, C57Bl / 6 mice*

Introduction. The increased interest in bone marrow cell transplantation is largely due to their plasticity [3]. Stem cells have the ability to self-renew, proliferate, and differentiate into different cell lines. Due to their regenerative potential, deviations in the functioning of tissues and organs are compensated [1]. Bone marrow hematopoietic stem cells have been known since the 1960s [2]. However, experimental and clinical work in the field of stem cell properties research continues to develop rapidly in veterinary medicine. Moreover, the success of cell therapy depends not only on the ability of stem cells to repair damaged tissues, but also on the ability of transplanted stem cells to migrate to the lesion site. Hematopoiesis in the bone marrow starts immediately after birth. During hematopoiesis, three main types of cells are formed: white blood cells, red blood cells, and platelets [4]. Hematopoietic stem cells are characterized by pluripotency and the ability to self-renew. In the bone marrow, there is a specific microenvironment for hematopoietic stem cells called the hematopoietic stem cell niche. Due to the identification of specific niches in the bone marrow (endostal and endothelial), close interactions between hematopoietic stem cells and regulatory components of the bone marrow microenvironment that determine the proliferative status of hematopoietic stem cells, pool size, differentiation, and mobilization have been established [5]. T cells complete their development in a specialized thymus environment, where hematopoietic stem cells with their long-term ability to self-renew are absent. As a result, for the continuous development of T cells, it is necessary that the progenitor cells from the bone marrow penetrate the thymus throughout life. The process of migration of precursor cells from the thymus to the bone marrow and vice versa (remigration of precursor cells) begins with their mobilization in the bone marrow, then they continue to circulate continuously in the bloodstream and partially settle in the thymus [6].

Materials and methods. We used healthy female C57BL/6 mice from 4 to 6 months old, male C57BL/6 mice and male C57BL/6-Tg (UBC-GFP) 30Scha/J mice from 8 to 12 weeks old (n = 110) The animals were kept in individual cages and were on a standard balanced diet in the vivarium and vivarium SPF-standard. The experiments were carried out in accordance with the principles of the Helsinki Declaration BMA (2000); in compliance with the principles of humanity set forth in the directives of the European Community (86/609/EEC) and in accordance with the "Rules for the work using experimental animals." The study is approved by ethics committee. Experimental diabetes mellitus was caused by a single intraperitoneal injection of streptozocin

solution (Sigma, China) in 0.5 ml citrate buffer at a dose of 100 mg/kg body weight [1] to healthy female C57BL/6 recipients [7], [8]. The daily amount of drinking water and food taken, body weight, glucose level in blood and urine were recorded. Signs of the development of induced diabetes mellitus (type 1) were considered a prolonged increase in fasting blood glucose above 40.3 mmol/L and in the urine stably above 30 mmol/L. After confirmation of the main signs characteristic of type 1 diabetes mellitus (glycosuria, hyperglycemia, polydipsia, polyphagy and weight loss), the women underwent cell therapy. All female recipients with induced diabetes were divided into groups for cell therapy. Isolation and cultivation of an undivided population of bone marrow stem cells for transplantation was carried out according to standard methods. Bone marrow stem cells were isolated from the femur of the male C57BL/6-Tg (UBC-GFP) 30Scha/J in sterile conditions. The bone marrow stem cell population of donor mice was suspended in RPMI-1640 medium (Biolot, St. Petersburg) at room temperature [9]. Cell populations were transplanted into female recipient C57BL / 6 mice with induced diabetes mellitus into the tail vein at a concentration of 5×10^5 cells/ml/animal. Animals were removed from the experiment by decapitation at time intervals of 1 hour, 1 day, 7 days, 14 days, 20 days, 1 month. After stem cell transplantation, indicators were monitored. Before measuring the level of glucose in the blood and urine, each animal was examined for signs of diabetes mellitus, the amount of food eaten and water consumed were monitored and recorded. Measurement of body weight was carried out on the device Scout Pro (Ohaus Corporation, USA). Next, individually in each animal, fasting blood glucose was measured using glucometers (One Touch Select and One Touch Ultra Easy). To analyze the level of glucose in the urine, glucometers (One Touch Select and One Touch Ultra Easy) were used. Blood sampling from the tail vein of the animal was carried out strictly in compliance with the time intervals after transplantation of an undivided population of bone marrow stem cells (after 1 hour, 1 day, 7 days, 14 days, 20 days, 1 month), at one time: in the morning at 10⁰⁰ hours. In order to conduct a comparative analysis of the studied parameters after decapitation, we took from animals the thymus, lymph nodes, lungs, liver, pancreas, kidneys, brain for polymerase chain reaction (PCR) and histological examination. The polymerase chain reaction was used in the work to identify a marker of the Y chromosome (SRY gene) in cells of donor origin in the thymus of female recipients. PCR was performed on a 96-well BIS amplifier ("BISN" LLC, Russia). Amplification of DNA samples was carried out in a reaction mixture to which bidistilled water was added, as well as mus musculus primers specific for the Y chromosome, a set of DNTP (deoxynucleoside triphosphates) 100 mM, and the following primer sequences:

5'-TCCAGGCTGGTCGCAAACCTCATTT-3',
5'-ACATGAACAACGCCTTGGGCTTCA-3' [10].

Samples were brought to a single concentration (180 µg/ml). As a result of amplification, a 320 bp fragment was obtained. The DNA of intact males and females, respectively, was used as a positive and negative control. Semiquantitative determination of the label was carried out using the Quantity One software in a Geldok densitometer (Bio-Rad, Italy) in units of relative optical density of electrophoregram amplicons (OE). The obtained data were processed using the software package Statsoft Statistica 10.0. The results are reflected in optical density units ($M \pm \sigma$). Fluorescence microscopy was used to visualize the migration and distribution of the donor population of bone marrow GFP stem cells on sections of the studied organs after their intravenous transplantation to C57BL/6 recipients with diabetes mellitus (type 1). Sections of the thymus were made on a microtome-cryotome (Zeiss, Germany), 5–7 µm thick. Finished sections were fixed, followed by Sudan B treatment to eliminate autofluorescence in the study of GFP cells. The analysis was performed on a microscope (Axio) (Zeiss, Germany) using AxioVision video analysis software (Zeiss, Germany).

Results and discussion. Aging is a complex process of damage accumulation, which is currently considered insoluble. Recently, in veterinary practice, attention has been drawn to the number of patients with age-related diseases, such as diabetes mellitus, osteoporosis, atherosclerosis, cancer, etc. Diseases associated with aging are characterized by a deficiency of the immune system resulting from aging of the thymus and bone marrow cells. During physiological involution of the thymus associated with aging, there is a decrease in T-cell production and a decrease in the migration of naive T-cells to the periphery. There is more and more evidence in the literature that the tissue of the thymus is plastic, i.e. capable of regeneration, and the process of involution can be therapeutically stopped or reversed. In order to mitigate the processes characteristic of intractable diseases associated with aging, including diabetes mellitus, bone marrow transplantation is currently promising in experimental models: immune dysfunction, including defective T cells and B cells, can accelerate the aging process in mice with diabetes [11], [12]. We used an undivided population of bone marrow stem cells containing hematopoietic stem cells, transplanted to female recipients of the C57BL/6 line at a dose of 5×10^5 cells/ml/animal. It is known that hematopoietic stem cells in the bone marrow give rise to two main types of cells: myeloid and lymphoid lines. These include monocytes, macrophages, neutrophils, basophils, eosinophils, erythrocytes, dendritic cells and megakaryocytes or platelets, as well as T cells, B cells and natural killer cells, which facilitates the healing and regeneration process in damaged tissues. At the time of transplantation, the weight of animals with induced diabetes ranged from 9 to 13 g. But after 1 month, the weight of the experimental

animals corresponded to control values from 15.6 to 18.9 g. It is known that the mechanism of migration and homing of transplanted bone marrow stem cells into tissues and organs is their circulation through the large and small circles of blood circulation: bone marrow stem cells enter the thymus, where they differentiate into the lymphoid line of stem cells. A reflection of the migration of transplanted bone marrow donor stem cells are the results of the analysis of migration and / or distribution in the thymus using the polymerase chain reaction (Fig. 1).

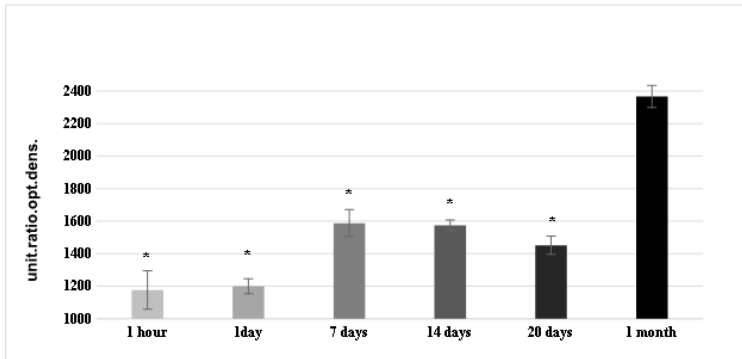


Figure 1. Results of analysis of the migration and/or distribution of an undivided population of bone marrow cells in the thymus by polymerase chain reaction
 * - significant differences in indicators relative to values after 1 month (with $\leq 0,01$)

According to the results of the study (Fig. 1), a gradual accumulation of bone marrow donor cells occurs in the thymus of female mice with induced diabetes. The maximum significant increase in their level occurs 1 month after transplantation (2367 OE), compared with other time intervals: 1 hour (1177 OE), 1 day (1200 OE), and 20 days (1452 OE). As mentioned above, accelerated migration and accumulation of bone marrow donor stem cells is associated with the involution of the thymus, since at that time the production of T cells and the migration of naive T cells to the periphery, as well as diabetes mellitus, decrease in the thymus, including the presence of defective T cells and B cells, accelerating the involution of the thymus. After entering the thymus, the progenitor cells are in different phases of differentiation, since they migrate through the cortex to the capsule, which suggests that the signals that cause these differentiation stages may be in the corresponding regions of the cortex [13]. The following are the results of the assessment of migratory activity, engraftment, and distribution of the transplanted undivided population of bone marrow stem cells into the thymus, and compared with other studied organs (lymph nodes, lungs, liver, kidneys, brain, and pancreas) of female recipient mice with induced sugar diabetes (Fig. 2).

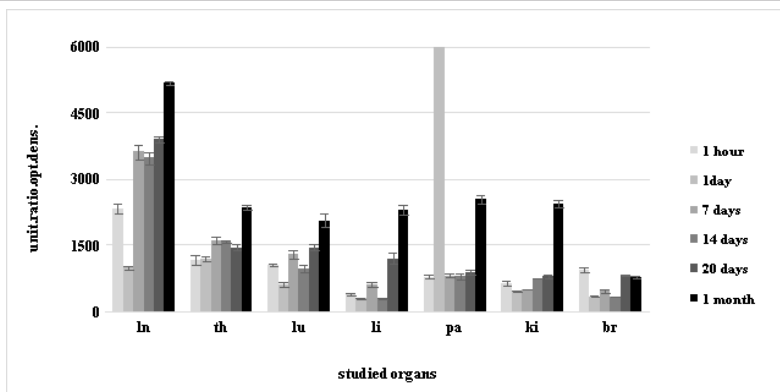


Figure 2. Comparison of migration activity and distribution of the transplanted undivided bone marrow stem cell population in the lymphoid and non-lymphoid organs of female recipients with induced diabetes mellitus

* - significant differences in indicators relative to values after 1 month (with $\leq 0,01$)

ЛН- lymph nodes; *ТИМ* – thymus; *ЛЕГ* – lungs; *ПЕЧ* – liver; *ПЖ* – pancreas; *ПОЧ* – почки; *ГМ* – brain

As can be seen in Figure 2, the accumulation of cells occurs gradually in each of the studied organs. Moreover, bone marrow stem cell accumulation was significantly higher in the thymus: 1 hour (1177 OU) after intravenous transplantation, compared with the liver (401 OE) and kidneys (625 OE); after 1 day (1200 OE), compared with the liver (302 OE), kidneys (483 OE), brain (354 OE) and lungs (603 OE); after 7 days (1588 OE), compared with the brain (472 OE), kidneys (520 OE) and the liver (598 OE); after 14 days (1575 OE), compared with the liver (302 OE), the brain (337 OE) and the kidneys (735 OE); after 20 days (1452 OE), compared with the kidneys (789 OE); after 1 month (2367 OE), compared with the brain (762 OE). An undivided population of bone marrow stem cells migrates and accumulates in the thymus at all time intervals (1 hour, 1 day, 7 days, 14 days, 20 days and 1 month) after transplantation.

To assess the accumulation of donor cells in the thymus of females with diabetes, we conducted a histological study. By visualizing the accumulation of bone marrow stem cells in the thymus at certain time intervals, they proved that with diabetes mellitus, regeneration of pathologically changed organs or tissues is possible, or the reverse process of aging of the thymus is started (Fig. 3). Figure 3 clearly shows the process of slow accumulation of bone marrow donor stem cells at time intervals, after cell therapy - after 1 hour (Fig. 3-A), 1 day (Fig. 3-B), 7 days (Fig. 3- C), 14 days (Fig. 3-D), 20 days (Fig. 3-D). After 1 month, bone marrow stem cells are distributed throughout the structure of the organ under study (Fig. 3-E); mag. X 100.

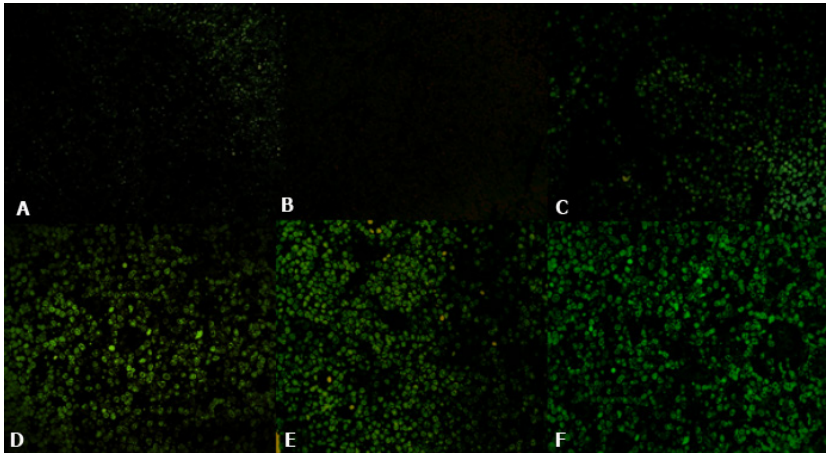


Figure 3. Evaluation of the accumulation of donor cells in the thymus of female mice with diabetes mellitus using fluorescence microscopy

This study provides evidence that transplantation of an undivided population of bone marrow stem cells leads to a significant, reliable decrease in blood and urine glucose levels, normalization of the weight of mice with streptozocin-induced diabetes mellitus. It was found that transplanted bone marrow donor stem cells not only migrate to the thymus, but also other tissues affected by the pathological process, replacing and repairing damaged niches. Therefore, the use for transplantation of an undivided population of bone marrow stem cells containing hematopoietic stem cells has an advantage over other stem cells.

Conclusion. The evidence presented in this study of the possibility of regeneration, reverse involution of pathologically altered organs or tissues in diabetes mellitus can contribute to the implementation of this technique in veterinary practice. Namely, it was established that an undivided population of bone marrow stem cells not only migrates, is distributed and accumulates in the thymus, but also affects its regeneration. An undivided population of bone marrow stem cells not only migrates, is distributed and accumulates in the lymphoid organs (thymus), but also affects physiological involution. In addition, bone marrow stem cells not only migrate to all organs under investigation, but also continue to circulate in the bloodstream, accumulating in pathologically altered tissues, thereby accelerating regeneration. Based on the results obtained, we believe that the use of transplantation of an undivided bone marrow stem cell population in veterinary medicine can be used to treat old animals with diabetes mellitus.

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西伯利亚地震活动区冻融地面系统中地面行为的研究
**STUDY OF GROUND BEHAVIOR IN THE FROZEN/THAWED
GROUND SYSTEM IN SEISMICALLY ACTIVE REGIONS
OF SIBERIA**

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抽象。 这篇文章概述了多年冻土发展地区在设计和工程研究过程中土壤复合物的地震波速度数据。 考虑了为冻结和解冻的土壤表层的变化对强地震的地震信号强度的影响形成通用基础的可能性。

关键词：地震灾害，工程地震学，土壤模型，土壤。

Abstract. *The article provides an overview of seismic wave velocity data for soil complexes during design and engineering research in permafrost development regions. The possibility of forming a generalized basis for the influence of changes in the surface layers of frozen and thawed soils on the intensity of seismic signals from strong earthquakes is considered.*

Keywords: *seismic hazard, engineering seismology, soil models, soils.*

The relevance of studying the peculiarities of soil behavior in various climatic conditions of an increased level of seismic hazard is closely related to the problems that arise during design and engineering research in the regions of frozen soil development.

The main factors affecting the change in seismic signals can be classified as natural and man-made. Man-made causes caused by human activities are usually limited in space and have boundaries. Natural circumstances can be caused by changes in climatic conditions on the territory of vast areas over both long and relatively short intervals. The result of the influence of any of the above factors on soils in various climatic zones will lead to a possible change in their seismic and physico-mechanical parameters. This possibility is indicated by both historical facts and data from recent soil studies in areas with different climatic conditions.

Studies of the features of the transformation of the state of soils in the environment “frozen soils - thawed soils” presented in the article are based, first of all, on the analysis of a large volume of geophysical measurements of the surface distribution zone of engineering and geological complexes in frozen and thawed conditions. It is possible for the authors to make a forecast of changes in the initial seismic signals in different geological associations under the influence of technogenic and extreme cryospheric phenomena.

The transition to estimates of the main parameters of seismic effects for soils in natural conditions can be carried out by studying the main parameters of geophysical fields in the areas of transition of all kinds of combinations of loose soils from frozen to thawed.

When performing theoretical calculations, the significant variability of the influence of the surface layers of frozen and thawed deposits on the intensity and frequency composition of seismic signals from strong earthquakes is shown. Such an assessment is carried out through the calculation of spectral characteristics, accelerograms and acceleration spectra, which are used to determine the prevailing periods, duration of seismic impacts and maximum accelerations [1,2,3].

The results of seismicity studies in the design, construction and operation of infrastructure facilities are largely determined by the interaction of the soil-seismicity-structure system. If, when considering the last two provisions of this triad, you can take it to the account of regulatory documents, then the “ground” position is the basis of the future construction project.

The task of predicting the degree of seismic risk transformation for specific conditions of individual territories and sites can be solved by studying seismicity, practical and experimental geophysical measurements, theoretical calculations and modeling [4,5,6].

To accomplish this task, a number of measures have been taken to match the theoretical constructs, experimental data (polygons) and field measurements. This set of works allows us to imagine the transformation of the resonance properties of thawed and frozen soils of various particle size distribution in the near-surface zone.

The performed geophysical measurements are summarized and presented in the form of tables of the state of soils in natural and artificial environments.

To forecast changes in engineering and geological conditions, the experience of development in similar environmental conditions is of great importance. Currently, the experience in the design, construction and operation of railways and roads, civilian infrastructure provides an opportunity to forecast changes in the geological environment and improve existing approaches for predicting changes in seismic (man-made) hazards on the territory of permafrost development [5,7].

The method of zoning of seismic and technological hazards within the development of the permafrost zone is based on the implementation of phased studies. The main ones are the following: the division of territories according to the level of technogenic danger; seismicity analysis, study of seismic properties of frozen and thawed soils; formation of a model of reference soil. The experience of studying objects makes it possible to carry out seismic prediction of soil behavior in frozen and thawed conditions. Table 1 presents the seismic parameters of loose and rocky soils.

Table 1
Seismic parameters for typical sections in the complex “frozen - thawed soils”

Thawed air dry soils	Thawed water saturated soils	Frozen ($t < -2^{\circ}$ C) soils
1 $V_p=500-700$ m/s $V_s=200-340$ m/s	1 $V_p=1500-1800$ m/s $V_s=340-580$ m/s	1 $V_p= 3000- 3600$ m/s $V_s= 1650-2100$ m/s
2 $V_p=600-1100$ m/s $V_s=280-510$ m/s	2 $V_p=1700-2100$ m/s $V_s=470-700$ m/s	2 $V_p= 3200-3900$ m/s $V_s= 1770-2200$ m/s
$V_p=2100-2800$ m/c 3 $V_s=1000- 1600$ m/s reference	$V_p=2500-3200$ m/s $V_s=1200-1800$ m/s rocky	$V_p= 3000 -4400$ m/s $V_s= 1700-2400$ m/s soils

An assessment of the technogenic hazard depends on all kinds of surface deformations accompanying the inevitable degradation of the permafrost, on the types of rocks that compose the main morphostructural elements of the studied territories (Table 2).

Table 2

The boundaries of the shift of frozen soils for generalized typical sections

Type and condition of soil	h(m)	Vp (m/s)	Vs (m/s)	r	ΔI (score)	A _{MAX} (cm/s ²)	Resonance frequency F (Hz)
Bedrock (frozen)	10	2700	1450	2,5	-1	208	>20
	∞	3000	1600	2,6			
Soil state in natural conditions							
Loose thawed up to 10m. Below are frozen with a 20m reference	2	600	300	1,8	0	434	10,4
	8	800	400	1,9			
	10	2500	1300	2,1			
	10	2700	1450	2,5			
	∞	3000	1600	2,6			
Friable thawed up to 20m. Below are reference	2	600	300	1,8	0	480	5,8
	8	800	400	1,9			
	10	900	450	2,0			
	10	2700	1450	2,5			
	∞	3000	1600	2,6			
Friable frozen (T<-2°C) bedrock	10	2500	1300	2,0	0	230	15,7
	20	2600	1360	2,1			
	10	2700	1450	2,5			
	∞	3000	1600	2,6			
Friable water saturated frozen (-1°C) bedrock	14	1700	520	2,1	+1	820	0
	20	2600	1360	2,1			9
	10	2700	1450	2,5			
	∞	3000	1600	2,6			
The predicted state of soils with a change in the environment							
Friable frozen (-1°C) frozen (-2°C) bedrock	4	800	400	1,9	-1	248	14
	12	2500	1300	2,0			
	22	2600	1360	2,1			
	10	2700	1450	2,5			
	∞	3000	1600	2,6			
Friable water saturated frozen (-1°C) bedrock	9	800	400	1,9	0	510	7
	12	1700	520	2,1			
	18	2600	1360	2,1			
	10	2700	1450	2,5			
	∞	3000	1600	2,6			
Friable water saturated frozen (-1°C) bedrock	3	800	400	1,9	+1	860	0
	18	1700	520	2,1			6
	20	2600	1360	2,1			
	10	2700	1450	2,5			
	∞	3000	1600	2,6			

With all the diversity of the engineering and geological situation at the sites at the design and construction stage of industrial and civil facilities, even taking into account changes in external natural and artificial factors, an average (generalized) geological section can be distinguished. The adoption of such a typical section is based, as a rule, when analyzing the development of territories taking into account the morphostructural situation (topography). The format of the transformation of seismic velocities, taking into account the density characteristics of the main soil associations, is presented in table №3.

Table 3
Generalized results for the main complexes of engineering and geological formations in the thawed condition of soils

Typical section	h(m)	Vp(m/s)	Vs(m/s)	r	ΔI(I)(score)
Rocky soils (reference)	10	2400 3000	1300 1600	2,5 2,6	0
Unsaturated friable soils					
Sands, loam, crushed stone, block deposits	to 10 to 40	700-800 3000	350-400 1500	1,9-2,0 2,5-2,6	+1,1
Coarse deposits, sands, loams.	to 10 to 20 to 40	700 800-900 2400-3000	350 400 1300-1600	1,8 1,9 2,5-2,6	+1,1
medium soils (reference)	to 10 to 40	720 2400-3000	360 1300-1600	1,9 2,5-2,6	+1,0
Water-saturated friable soils					
Friable, GWL in 5m	5 10	1600 2400-3000	380 1300-1600	2,0 2,5-2,6	+1,36
Friable, GWL in 3m	3 7 10	720 1600 2400-3000	360 380 1300-1600	1,8 2,0 2,5-2,6	+1,69
“Middle soils” in composition, waterlogged	to 10 to 40	1700 2400-3000	420 1300-1600	2,0 2,5-2,6	+2,00

Variants of changing seismic parameters on the state of the surface layers of frozen and thawed deposits (natural and man-made factors) on the intensity and frequency composition of seismic signals from strong earthquakes provide the opportunity to form a generalized database of seismic wave velocities for soil complexes for a preliminary estimate of the increment in the seismic zoning in the future .

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UDC 664.651

基于面包酵母酶生产蛋白质氨基酸食品成分
**PRODUCTION OF PROTEIN-AMINO ACID FOOD INGREDIENTS
ON THE BASIS OF BAKER'S YEAST ENZYMES**

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抽象。基于对微生物生物质进行定向生物催化破坏的已开发原理，选择了用于水解酵母酵母酿酒酵母亚细胞结构的酶体系。选择用于酵母生物质转化的酶复合物，并开发了生产新食品成分的算法。

关键字：面包酵母，发酵发酵产物，氨基酸，蛋白质，食品成分

Abstract. *Based on the developed principles of directional biocatalytic destruction of microbial biomass, enzyme systems for the hydrolysis of subcellular structures of baker's yeast *Saccharomyces cerevisiae* were selected. An enzymatic complex for the conversion of yeast biomass was selected and an algorithm for producing new food ingredients was developed.*

Keywords: *baker's yeast, fermentolizate, amino acids, proteins, food ingredients*

One of the promising methods for increasing the biological usefulness of food products aimed at optimizing the human nutrioma and microbiome is to involve functional ingredients in food products based on the biocatalytic conversion of microbial biomass [1-3].

Microbial biomass is a promising source of protein, polyaminosaccharides, vitamins, essential amino acids, and other essential nutrients [3]. The work of a large number of foreign and domestic researchers is devoted to the problem of increasing the efficiency of processing of raw materials of microbial origin [3-6]. At the same time, a rational approach to the selection of a method of influencing the subcellular structures of microbial raw materials is an important aspect for the extraction of biologically active components and the preservation of their natural value. It is obvious that the enzymatic method allows for the directed conversion of high molecular weight polymers into forms that are bioavailable for digestive enzymes to produce food ingredients with valuable biological properties [3,5].

A number of authors have selected and characterized enzyme systems with different substrate specificity and mechanism of action for the destruction of microbial biomass, the use of which leads to an increase in the degree of conversion of intracellular biopolymers [3-6]; studied biotechnological methods and approaches for biocatalysis of polymers of processed raw materials [5,6]. However, there are many poorly studied methods for the enzymatic modification of yeast biomass to create new food ingredients enriched with biologically active substances, which determines the relevance of the chosen research area.

The purpose of the study - the development of scientific and technical groundwork for biotechnology of food ingredients based on microbial raw materials to create new types of food products.

The objects of study were strains of baker's yeast *Saccharomyces cerevisiae* Y-53, Y-3439, Y-581. Based on these strains, the yeast biomass was obtained, which was subjected to enzymatic hydrolysis. Cultivation of *Saccharomyces cerevisiae* yeast was carried out on a microbiological shaker for 20 hours at a temperature of 30 °C.

When carrying out enzymatic hydrolysis, the following enzyme preparations were used: Bruzheim - producer *Trichoderma longibrahium*, β -GCC activity of 1400 u/g, "DSM"); Amyloprotorizin (producer *Asp. Oryzae*, PS activity 800 u/g, VNIIPBT, Russia), Glucanofetidine (producer *Asp. Foetidus*, β -GCC activity 1100 u/g, VNIIPBT, Russia)

The content of polysaccharides and reducing sugars was analyzed in raw materials and fermentolysates according to the Shomody-Nelson method. The total protein content was determined according to the Kjeldahl method in a Vadopest automatic installation according to GOST 32044.1-2012.

The amino acid content in the fermentolysates was determined on a KNAUER EUROCHROM 2000 chromatograph, followed by the detection of components by a Smartline UV Detector 2500 spectrophotometric detector at $\lambda = 570$ nm (Germany). Spectral analysis of the composition of low molecular weight peptides was determined by HPLC on an Agilent 6120 quadrupole mass spectrometric system [7].

Preparation of Baker's Yeast Biomass Fermentolizates

Stage 1. The destruction of cell walls under the action of β -glucanase at a dosage of 50 u/g yeast. Fermentolysis mode: 40 °C for 2 hours.

Stage 2 Protein destruction under the action of proteases at a dosage of 30 units/g. Fermentolysis mode: 30-35 °C for 12 hours.

After fermentolysis, the samples were pasteurized at a temperature of 85 °C for 20 minutes in a water bath. Next, the yeast biomass was filtered in a laboratory centrifuge for 15 min at 6000 rpm.

Statistical processing of data obtained in 3 replicates was carried out by the method of univariate analysis of variance with the Tukey a priori criterion at $p < 0.05$ using the Statistica 6.0 program.

The studied strains of *Saccharomyces cerevisiae* are used in the industrial production of baker's yeast.

Strain Y-53 has a high level of enzymatic activity (generative, zymase and maltase), resistant to the influence of microflora molasses.

Strain Y-3439 - triploid, obtained by hybridization, has a high specific growth rate in carbohydrate environments and high constitutive maltase activity.

Strain № 581 - producer of ergosterol, a triploid hybrid, has good lift and maltase activity.

Based on the developed principles of directed biocatalytic destruction of microbial biomass, enzyme systems were selected for hydrolysis of the subcellular structures of *Saccharomyces* yeast biomass (strains Y-53, Y-3439, Y-581). The results are presented in table 1.

Table 1 – The content of low molecular weight peptides in fermentolizates of yeast biomass

Indicators	Indicator value
Enzyme composition	β -glucanase, mannanase, proteinase, peptidase
Degree of destruction	deep destruction of the protein-polysaccharide matrix of cell walls and partial destruction of protein substances
Fractional composition of protein substances,%, not less	More than 1000 Yes –35 300-1000 Yes - 30 Up to 300 Yes - 20

The impact of the enzymatic system containing peptidases and proteinases contributed to a deeper destruction of the protein-polysaccharide matrix of the cell walls and partial hydrolysis of proteins with the formation of soluble protein substances containing free-form amino acids in 2 hours.

The content of free amino acids was determined in the obtained fermentolizates of yeast biomass, the results are shown in Fig. 1.

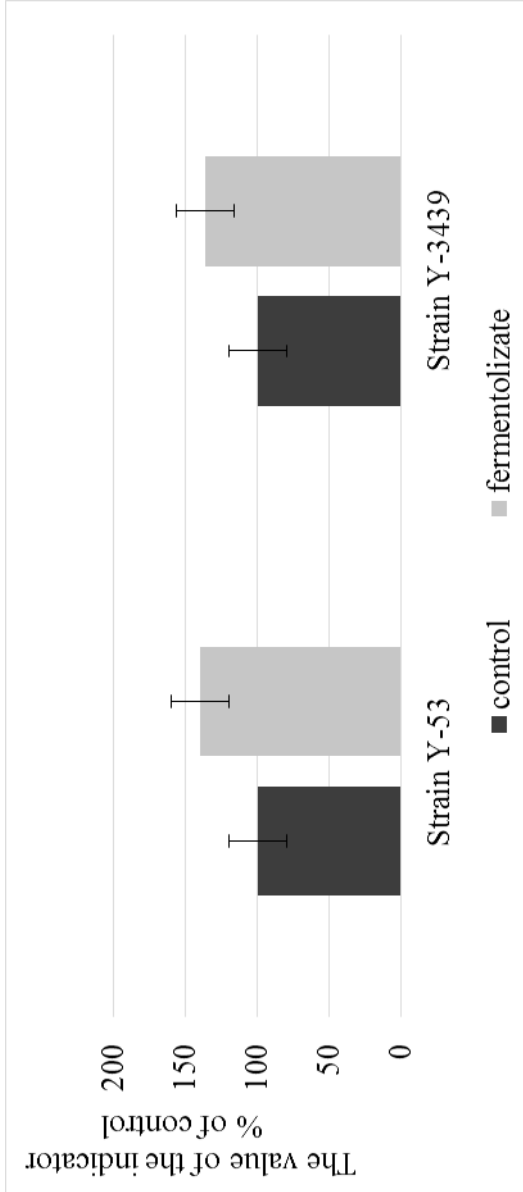


Fig. 1 Content of Amino Acids in Baker's Yeast Fermentolysates

It was found that the use of enzymatic treatment allows to increase the content of free amino acids in fermentolizates of the yeast strain Y-3439 - by 38.6%, the yeast strain Y-53 - by 42.6%. In strain Y-581, the content of free amino acids was at the control level, which indicates the specific features of the cell wall of this strain and requires an individual selection of the enzymatic complex.

As a result of the studies, an algorithm for producing protein-amino acid food ingredients based on yeast biomass was developed.

The studies were carried out in the framework of the project "Modern problems of personalized high-tech medicine" on the topic №0410-2019-0001 "Development of the optimal nutrition formula: justification of the composition of the nutrioma and human microbiome"

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中国天线-圆极化的“三叶草”获奖技术解决方案
**CHINESE ANTENNAS - "CLOVERS" OF CIRCULAR
POLARIZATION IN WINNING TECHNICAL SOLUTIONS**

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抽象。在这篇文章中,通过在创建有希望的各向同性“三叶草”天线设备领域中使用圆极化的研究结果,提出了一个半世纪以上的改进“三叶草”停滞状态。在“三叶草”天线的基础上,为圆极化各向同性天线的开发提出了新的科学和应用方向,同时确认了具有更高电气,技术和操作参数的竞争性创新技术解决方案,并使用了计算机仿真技术。

关键词: 情人天线, 各向同性圆极化天线, 极化变压器, 圆极化。

Abstract. *In the article, presented by the results of research on the use of circular polarization in the field of creating promising isotropic "clover" antenna devices, more than half a century of stagnation of improving "clovers" has been destroyed. New scientific and applied directions for the development of circular polarized isotropic antennas were developed on the basis of the "clover" antenna, while confirming the created competitive innovative technical solutions with higher electrical, technological and operational parameters, use of computer simulation.*

Keywords: *clover antennas, isotropic circular polarization antennas, polarization transformer, circular polarization.*

For antennas, as well as for other consumer products, there is a secret fashion, accompanied by an increased demand for “chosen” samples. Some time ago, confirmation of this, for example, the most popular of narrowly targeted television antennas were “Polish” grids, technically and economically optimally combined classic phased arrays, and their production was accompanied by successful marketing. Today, with the explosive development of unmanned aerial vehicles, due to their unpredictable spatial position, in order to increase the reliability of radio control channels and transmit information, preference is given to using isotropic “clover” antennas with circular polarization, which neutralizes the mutual mismatch of the location of the receiving and transmitting antennas. Chinese manufacturers responded in time to meet the increased demand, and now we can rightly say that “clover” antennas are mainly “Chinese clover antennas”. However, here, their designs are nothing more than adapted to the applicable frequency ranges of the Skew-Planar Wheel antennas by Robert H. Mellen and Carl T. Milner, who published their design developed for the 144 MHz band in 1961 [1]. In the article proposed for consideration, on the basis of theoretical assumptions, using computer modeling, innovative developments are proposed that open up new directions for the development of the aforementioned “clover” antennas with the possibility of increasing mechanical and electrical characteristics and with the prospect of their wider application. In the course of scientific research, features were noted that distinguish the direct transfer of classical technical solutions of antenna devices with linear polarization to isotropic antennas with circular polarization.

The design of the well-known “clover” antenna consists of three or four circuits connected to each other in the form of a “petal”, at the junction of which the power supply is connected by one pole to inclined segments and the other to horizontal ones. The length of the segments is 0.25λ , and the arc is 0.5λ , thereby the total length of the petal elements is equal to the wavelength λ . The distance from the power point to each point of the arc is 0.25λ . A computer model of a “clover” antenna with reflected electrical parameters in the MMANA-GAL 3 computer program is shown in Figure 1 [2]. The fundamental criterion for the antenna under consideration is circular polarization, which arises according to the classical principles, due to arcs placed at 45 degrees spaced apart by a factor of 0.25λ , thus forming a phased antenna array with oppositely orthogonal vibrators at the four-lobe antenna. The directivity pattern in the horizontal plane is isotropic, almost the same as that of a vertical half-wave dipole, but the maximum gain is 1.35 dBi, which is less than that of the classics, as well as low structural strength, justified by the weak rigidity of the skeleton of the carrying conductors of a real antenna.

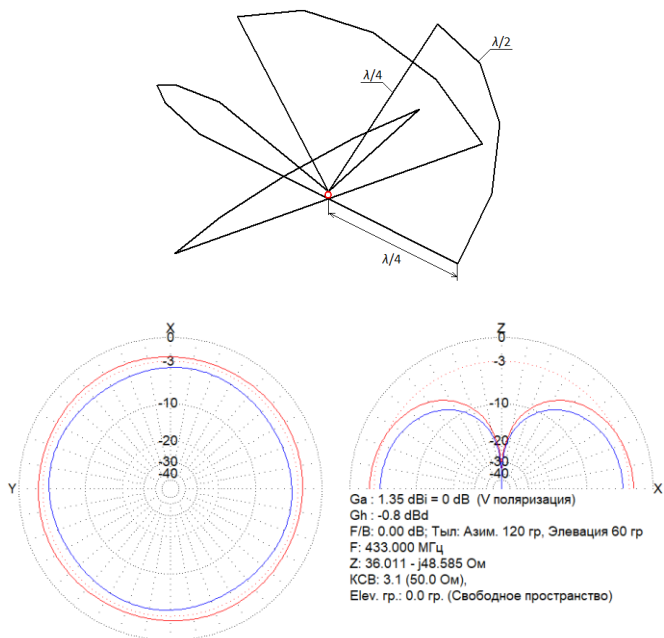


Fig. 1. A sketch of the “clover” antenna, its radiation pattern in the horizontal and vertical plane with reflection of the components of vertical and horizontal polarizations, the main characteristics

It is interesting that if you connect the opposite equipotential points of the contours with conductors, introducing a kind of electric quasi-shunts, and combine them on the longitudinal axis, nothing will change electrically, however, due to the "forced" mechanical shunting, the electrical balancing of the circuit improves, increasing the electrical and mechanical quality factor of the antenna device as in figure 2 [3]. The introduction of quasi-shunts, as well as in classical shunt vibrators, provides the possibility of changing the input impedance of the “clover” antenna, matching it with cables. In addition to this, the point of association of quasi-shunts located on the longitudinal axis of the antenna is a point of zero potential, which entails the possibility of its connection to any of the power terminals, without changing the electrical characteristics. This provides a more significant increase in the rigidity of the structure and opens up wide possibilities for the synthesis of new applied technical solutions based on the quasi-shunt “clover”.

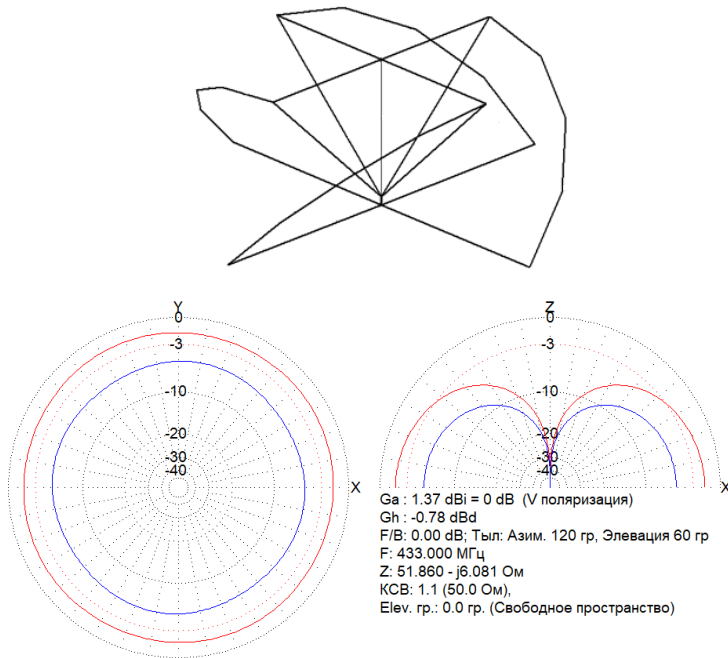


Fig. 2. A sketch of a quasi-shunt "clover", its radiation patterns in the horizontal and vertical plane, the main characteristics

Taking into account the developed universal, not only in polarization, but also in potential development, quasi-shunt "clover" antenna, a kind of mechanical and electrical "core", further modernization approaches inherent in linear polarized antennas, but with manifestation of usage features, are not excluded orthogonal polarization components, in the implementation of circular. First of all, as in classic director antennas, it is possible to study the increase in gain due to the surroundings of re-emitters in order to bring the gain of "clover" antennas to the level of the widely used antenna park. However, it will be more correct to designate here by expanding the aperture of the antenna, since the dimensions of the antenna device in the horizontal plane are increasing. It was in the direction of the directors, in the process of multiple versions, that the most optimal reemitters were found to be hexagonal frame contours spaced 0.3λ apart and placed parallel to the vertical axis of the antenna in the alignment of the horizontal segments of the contours forming the "petals". This technical solution provides an increase to the gain level of the classical vertical half-wave dipole, equal to 2.45 dBi. This makes the clover

antenna with frame re-emitters competitive in gain with the linear polarization antenna park used [4]. The sketch, radiation patterns in the horizontal and vertical plane, the main characteristics of such an antenna are shown in Figure 3.

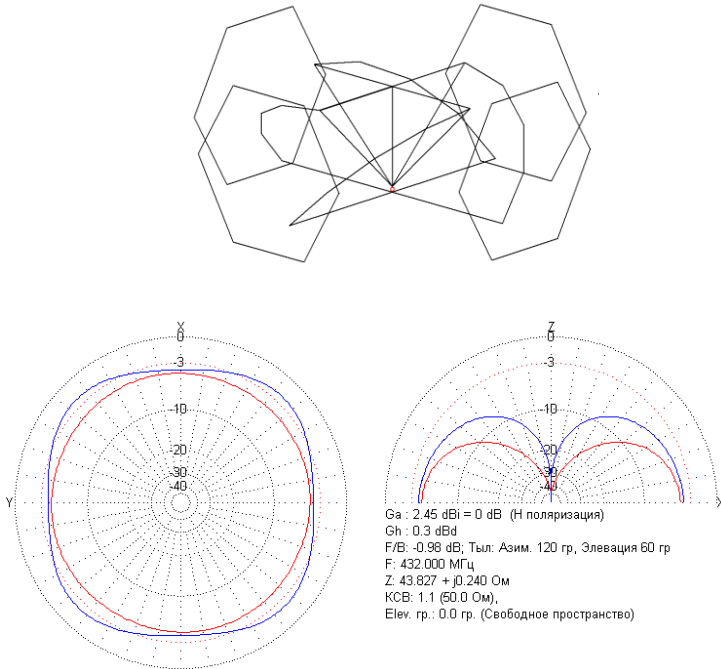


Fig. 3. Sketch of a circular polarization antenna "clover" with frame re-emitters, radiation patterns in the horizontal and vertical plane, main characteristics

In turn, in addition to using director re-emitters, in order to increase the antenna gain, a common way to increase the efficiency of their work is the use of col-linear structures, which is widely used to implement vertical polarization isotropic antennas when placing half-wave vibrators on one axis one above the other at a distance of 0.5λ their common-mode terminals. In the case of using "clover" antennas in this way, the predicted result is not obtained. However, when the distance between the "clover" multidirectional structures is 0.33λ , between the terminals with common-mode power, the effect gave the result, which is shown in Figure 4, realizing some contradiction of the classical theory of antennas. Thus, a circular polarized stand antenna was implemented with a gain of 4.11 dBi exceeding its level for "clover" antennas with frame reemitters [5].

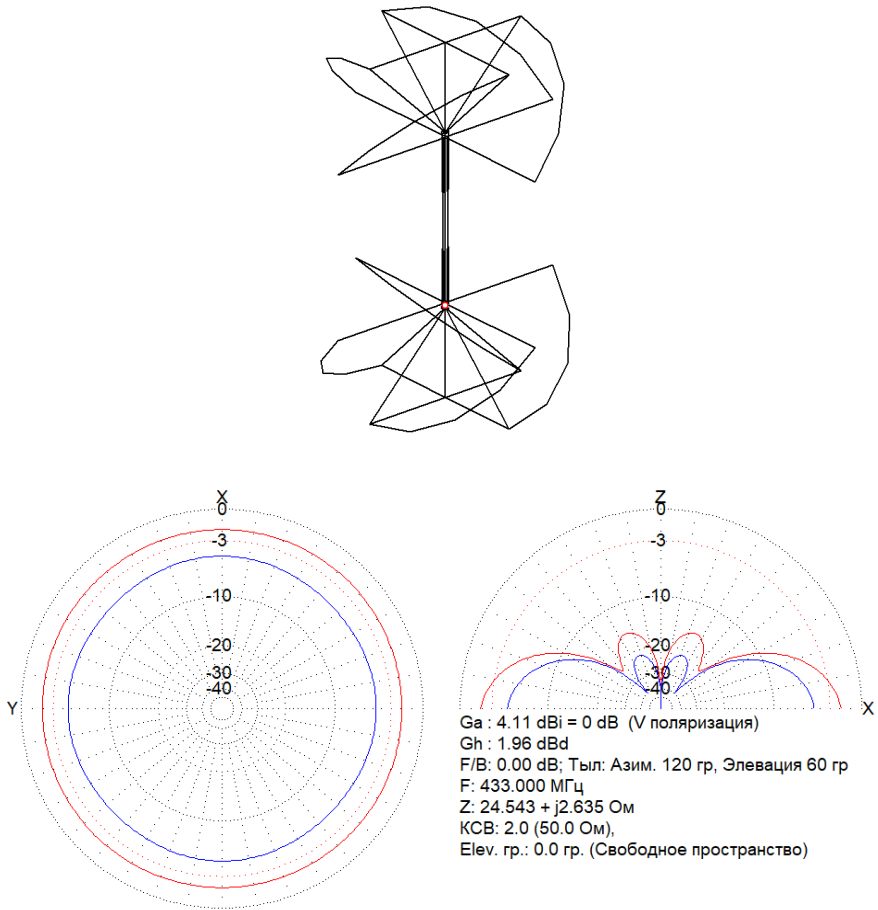
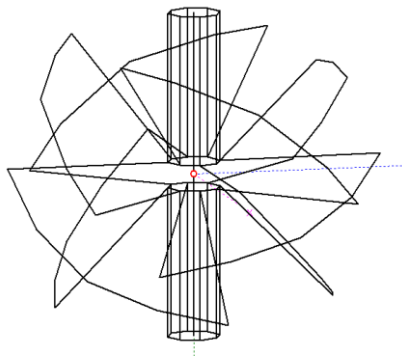


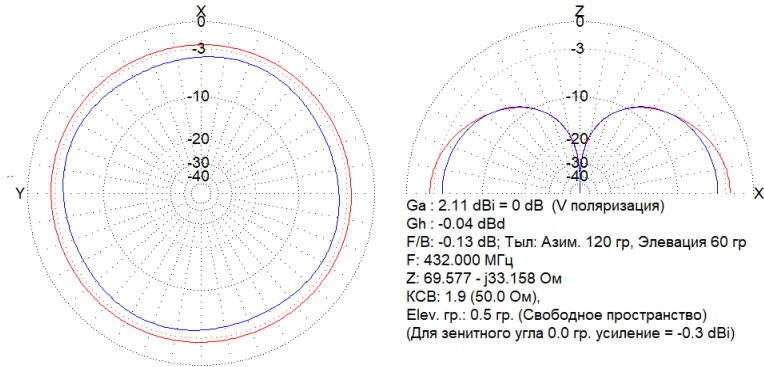
Fig. 4. A sketch of a rack-mount antenna of circular polarization, radiation patterns in the horizontal and vertical plane, the main characteristics

The considered designs of clover antennas have opened a new direction of their development, which involves other patentable technical solutions. For example, a “compressed stand” allows you to “transform” the radiation of a linearly polarized vibrator into an emitter of circularly polarized electromagnetic waves. This technical solution is also implemented on the basis of the principle embedded in the starting antenna “clover”, with the technology “stand”, as shown in Figure 4. This design makes it possible to adapt a particular technical object using

a radio system with a linear polarization antenna for maximum efficiency with radio systems using circular polarized antennas. For this, it is necessary to string a combination of two “clovers” placed on the linear half-wave emitter located in the area of the section of the tubular vibrator with the terminals in the gap. This is an adapter that transforms the linear polarization of the dipole into the circular polarization of “clovers”, shown in Figure 5. The presence of galvanic isolation of the initial vibrator with linear polarization and the adapter with circular polarization allows, without violating the integrity of the initial state of the antenna-feeder path, to fully use the described technical solution. The design of the adapter is similar to the above-described antenna with a multidirectional “clover” stand, but in this case the distance between the two basic elements is practically absent and, as was indicated earlier, the distance between the elements is much smaller than that applicable to the antenna with a “clover” stand, but it allows maintaining the functionality of this antennas with high operational characteristics, realizing an antenna adapter- “dipole” of circular polarization [5].

The presented results of studies on the use of circular polarization in the field of creating promising isotropic “clover” antenna devices destroy more than half a century of stagnation in improving “clovers”. The developed new scientific and applied directions for the design of circularly polarized isotropic antennas, while confirming the created competitive innovative technical solutions with higher electrical, technological and operational parameters, the use of computer simulation, give grounds for the future to widely use more efficient antennas adapted to work in difficult electromagnetic conditions. All the development articles mentioned in the content were implemented by full-scale mock-ups, field tests were carried out with the measurement of the main characteristics fully confirming the results of computer modeling.





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UDC 004.432.42

统一建模语言解决伏尔加河床调查的问题
**UNIFIED MODELING LANGUAGE TO SOLVE THE PROBLEMS
OF INVESTIGATION OF THE VOLGA RIVER BED**

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注解。 作者正在探索使用高性能信息技术处理器来计划和构建可靠的专用机器以研究河床的可能性。

特殊机器的现代创造的世界惯例是建立在上个世纪的经典方法之上的。 这些方法大多数都是计算机化和自动化的,但是它们没有共同的组织组成部分。

使用现代的面向对象语言统一建模语言和IBM Rational Rose Enterprise产品的使用,开发了用于从科学文章中的著名道路技术的数据计算搜索基础的通用方法的开发。

关键字: 特殊河床研究机, 面向对象的程序设计, 统一建模语言, IBM Rational Rose。

Annotation. *The authors are exploring the possibility of using high-performance information technology processors for planning and building reliable special machines for researching the river bed.*

The world practice of the modern creation of special machines is built on classical methods obtained in the last century. Most of these methods are computerized and automated, but they do not have a common organizational component.

The development of a general methodology for calculating the search base from the data of well-known road technology in a scientific article was obtained using the modern object-oriented language Unified Modeling Language and the use of the IBM Rational Rose Enterprise product.

Keywords: *Special riverbed research machine, object-oriented programming, Unified Modeling Language, IBM Rational Rose.*

1 Introduction

In today's circumstances, the establishment of settlement processes and databases of special vehicles can no longer do without the object-oriented technologies. The object-oriented paradigm divides the application into smaller elements that are then assembled into one large common interface to develop a special riverbed research machine [3].

Effective use of information technology in the task to ensure the best conditions of transport and technological complex of special machines - can not be underestimated at this stage of general mobilization. How to reduce time spent on the design process of dynamic loads of special machines using modern information systems (in particular the universal system of mathematical calculations MathCAD Plus) [1], while maintaining a given level vibronagruzhennosti, just focus on the development of the authors.

Thus, extensible, and scalable data base obtained with the object-oriented technology can then be supplemented with current design techniques.

2 Theoretical part

Previously it was thought that the creation of software - the creative process is completely dependent on the programmer. At the moment, this process can be put to industrial rails, releasing them from routine tasks and the errors in decision making.

Rational Rose Enterprise Edition - a package that was applied in this study will facilitate the development of complex software systems, has enabled easy and fast algorithms to describe relationships between objects and allowed on the basis of graphical diagrams to create the source code of programs [2].

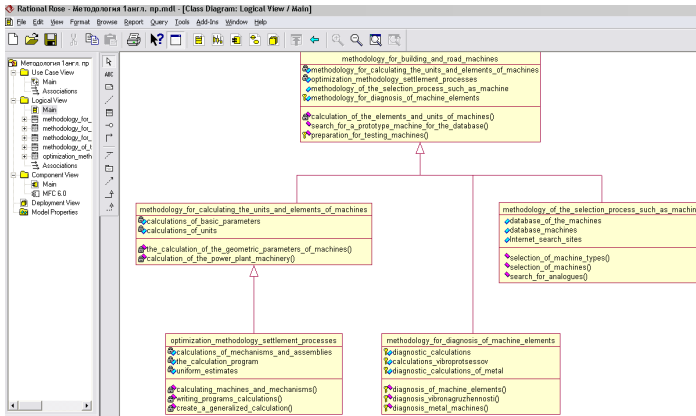
Created in the same style UML (Unified Modeling Language) class diagrams are clear to any programmer, who will study the resulting concept of the calculation base, go to code the program (in this case - to refine the code) [3].

The authors of this article conducted a study on the construction of an object-oriented system of research and the creation of special riverbed research machine. In this case, the software object-oriented approach is used to structure the application of the calculation base and visualization systems designed special riverbed research machine.

The first speaker unit Produce analysis system that provides:

- choice of tasks from the entire set of data describing the model;
- consistency problems in the form of diagrams for storing them in a repository;
- content of comments in the charts for fixing design solutions;
- for dynamic modeling in terms of events create the project.

Thus, building the first diagram - diagram of the problem-solving concepts Class diagram. Chart contains a list of operations that the projected system in the solution of the problem [3].



Pic. 1 The class diagram (Class diagram) to solve the problem of search and selection process automation in the design of a special riverbed research machine.

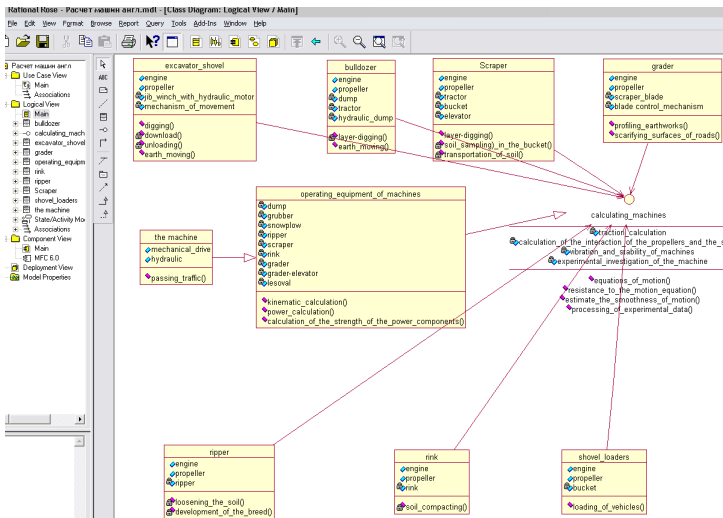
After defining the specific purpose of payment transactions is carried out from a chart, displayed in Fig. 1 and select a specific implementation road car, which will be calculated. For this we construct the following class diagram Selection. In Fig. 2 shows the class diagram, which is detailed, the basic types of road vehicles and their component parts and operations that perform installations of these machines.

Each class diagram as it is, is divided into attributes and operations are class. At the further conduct of the encoding diagram of one of the programming languages, each class member will take his position in the development of the code.

When modeling the behavior of designed or analyzed system there is a need not only to present the process of changing its states, but also detail features of algorithmic and implementation of the system's logical operations.

Modeling of processes of operations separate elements machines made using activity diagrams (Activity diagram) [2]. The primary purpose of the activity diagram is a visualization features of realization of operations of classes when necessary to present algorithms for their implementation. All of the states in the diagram of the car corresponds to the projected performance of an elementary operation, and the transition to the next state is only performed at the end of the operation.

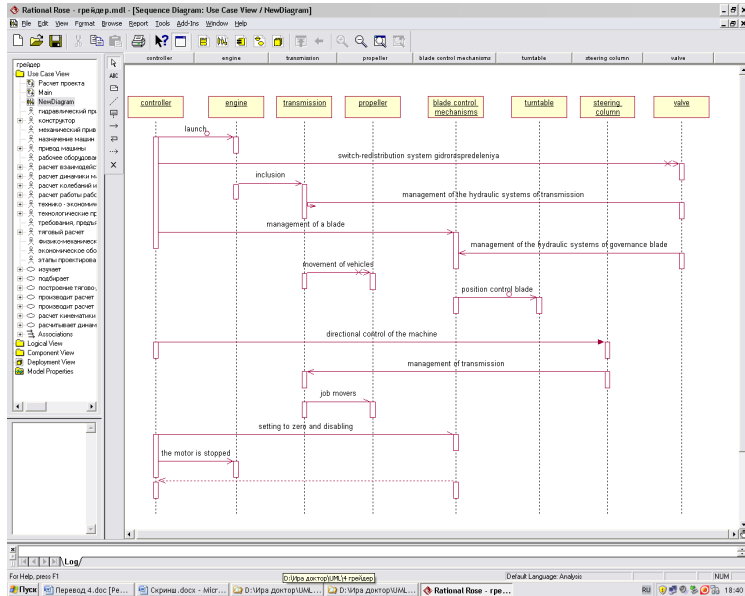
In the context of the UML activity (activity) is the process of separate calculations performed by the system, which lead to a certain result or action (action). The diagram shows the activity of the logic and algorithmic transitions from one activity to another, and the analyst's attention is focused on results. Result of the activity can lead to changes in system status or return some value.



Pic. 2 The class diagram (Class diagram) to select the type of special riverbed research machine

The chart shows the behavior patterns of activity objects, but, just as important, to accurately represent the sequence of object interactions with each other. The exchange interaction takes place in a specific sequence, and this process beautifully displayed using sequence diagrams (Sequence diagram) [2]. Obtained by the process of displaying the relationship of objects in time.

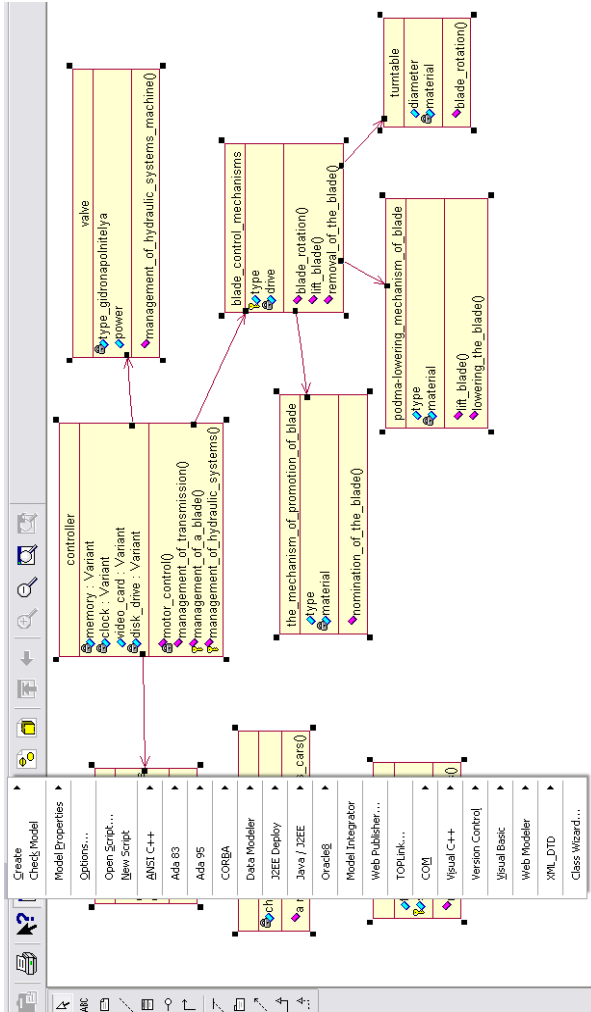
The main emphasis of a sequence diagram, displayed in Fig. 4 - the order and dynamics of behavior, how and in what order events occur.



Pic.4 The sequence diagram (Sequence diagram)

Thus, building the necessary charts, it can be said that the main task of the information system being designed to create a special riverbed research machine is displayed. The next block design in the context of object-oriented approach - the coding of objects on one of the well-known algorithmic languages. In this case, we chose C++. To create your project, the key code diagram Rational Rose class diagram (Class diagram).

A class diagram is a graph whose vertices are the objects of the "classifier", connected by various types of structural relationships. The class diagram shows the relationship between the individual entities subject area, and describes the internal structure and the types of relationships.



Pic.5 The clas sdiagram (Class diagram)

Based on class diagrams created the internal structure of the system is described by inheritance, and the relative positions of the classes from each other. In the class diagram describes the logical view of the system. Classes - harvesting facilities, on which will be defined physical objects.

After the encoding on vybrvny programming language you are automatically taken to the program of Microsoft Visual C + +, create a template library Microsoft Foundation Classes [2].

Thus fulfilling the principles of object-oriented programming:

- full support of the design process the application;
- the opportunity to work with the libraries of MFC, search and selection;
- the possibility of the user interface;
- code generation in the algorithmic language of the charts;
- reengineering code and make changes directly to the system model;
- the presence of controls that allow you to identify errors during the design phase and the implementation phase of the project.

In Figure 6 shows an example of the final development of a general structured system: The calculation base of special rotor-screw machines for the study of the river bed. An underwater rotor-screw machine is able to carry out many operations to study and deepen the river bed. The development and rehabilitation of the Volga riverbed is the most important environmental task of our time.

Since UML methodology is fully scalable, the emergence of new techniques and visualize projects for Rational Rose is not a problem. Rational Rose allows you to create high-level and low-level models at the abstract or logical level, performs forward and reverse engineering. [3]

CASE-technology when used in the creation of special underwater rotor-screw machines provide all project participants, including customers, holistic stringent visual and intuitive graphical interface that allows to obtain clear notation with a simple and clear structure. Calculated and visualized diagram represent two-dimensional schemes (easier to use than the multiple-description), allowing the customer to participate in the development process, and developers - to communicate with domain experts, to distribute the work of systems analysts, designers and programmers, providing ease of maintenance and changes in the the system. Thus greatly increasing the speed to create projects of modern machines.

The study also considered the possibility of further expansion of problems to be solved to create special underwater rotor-screw machines.

A diagram of classes - Fig. 7 for diagnosing packet units already established machines.

Исбражени и тип машини

Изображение и тип машины

Выбор рисунка

Панель поиска

Тип машины

Масса машины от до кг

Мощность от л.с.

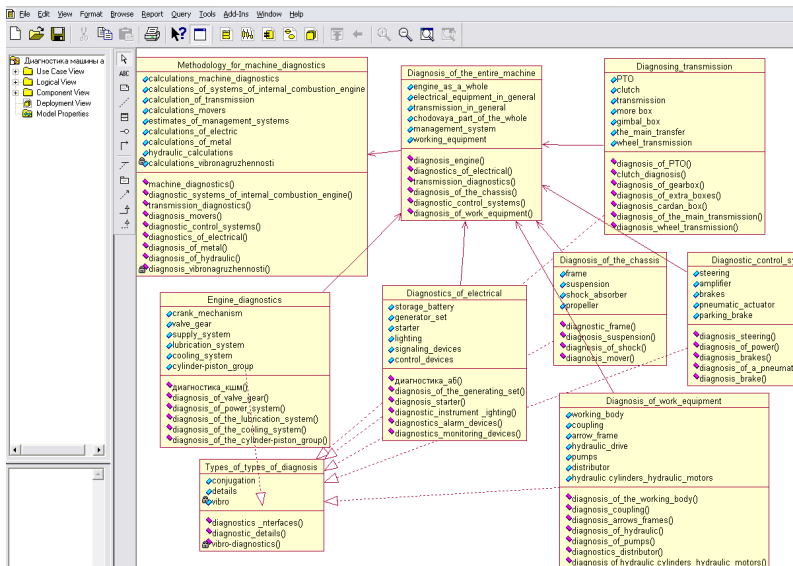
Ширина отвала от м

Сбросить фильтр поиска

Поиск

Код	Модель	Масса, кг	Двигатель	Рабочий объем, см ³	Мощность, л.с.	Колесная база, мм	Длина, мм	Ширина отвала, мм	Высота, мм
1	Комбайн G0530A-2C	13720	560182	5900	157	5918	8433	3658	3099
2	Комбайн G0510R-1	10700	56095L	5900	145	5780	7830	3710	3485
3	Селекция 125	12700	2206	5960	161	5920	5310	3650	3300
4	Селекция 1400	12620	2006	6050	178	5920	8310	3660	3360
5	Селекция 120H NA	12519	3116 D1T	6000	185	5870	8260	3660	3110

Fig. 6 The result of the project - the creation of a calculation base of rotary machines for research of the river



Pic. 7 The class diagram (Class diagram)

Conclusion

Thus, in the proposed study, we developed a methodology for applying modern information technologies IBM Rational Rose Enterprise based on UML (Unified Modeling Language), which allows us to reduce the time spent on the design and analysis of special machines for researching the river bed. An example of a new calculation of the base of rotor-propeller submarines is received.

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Biopectin-天然抑菌剂
BIOPECTIN - A NATURAL BACTERIOSTATIC AGENT

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抽象。果胶物质的保护和预防性质今天在胃肠道，代谢系统和心血管系统的各种疾病的治疗中被积极使用。开发和创造用于生产果胶的创新技术，寻找新的含果胶原料的替代类型具有重要意义。果胶研究的有前途的领域之一是使用酶，生物果胶从植物来源生产果胶。本文致力于通过酶法从黑加仑，柑橘和苹果榨汁，西葫芦，胡萝卜和南瓜中获得的果胶的感官，生化，理化和卫生微生物指标的研究以及抑菌能力的研究。生物果胶。根据所有研究的结果，发现所有生物果胶，无论其提取来源如何，均表现出抑菌特性。生物果胶的抑菌能力是开发和生产具有治疗和预防特性的食品的基础。

关键词：生物果胶，抑菌能力，卫生和微生物指标，病原微生物。

Abstract. *The protective and prophylactic properties of pectin substances are actively used today in the treatment of various diseases of the gastrointestinal tract, metabolic system and cardiovascular system. The development and creation of innovative technologies for the production of pectin, the search for new alternative types of pectin-containing raw materials are relevant. One of the promising areas of research on pectin is the production of pectin from plant sources using enzymes, biopectin. This article is devoted to the study of organoleptic, biochemical, physico-chemical and sanitary-microbiological indicators of pectins obtained by the enzymatic method from blackcurrant, citrus and apple squeezes, zucchini, carrots and pumpkins, as well as the study of the bacteriostatic ability of biopectins. According to the results of all studies, it was found that all biopectins, regardless of the source of their extraction, exhibit bacteriostatic properties. The bacteriostatic ability of biopectins serves as the basis for the development and creation of food products with therapeutic and prophylactic properties.*

Keywords: *biopectin, bacteriostatic ability, sanitary and microbiological indicators, pathogenic microorganisms.*

Introduction

Poor nutrition of most people leads to overweight, metabolic disorders, and diseases of the cardiovascular system and gastrointestinal tract. This is due to insufficient consumption of foods containing dietary fiber, and in particular pectin substances [1, 11].

Pectin substances are natural anionic polysaccharides obtained from the cell walls of higher plants. Pectins (E440) – are a group of high molecular weight heteropolysaccharides that make up the cell walls and intercellular formations of higher plants [3]. Herbal products - pectin substances - are recognized by WHO as completely toxicologically safe.

According to the recommendations of the Ministry of Health of the Russian Federation, the daily need for pectin is 3-4 g per day, and for people living in unfavorable areas, it is 15-16 g per day [10].

The great importance of pectins in various sectors of the food industry (oil and fat, bakery, confectionery, dairy industries, the production of beverages and food additives), pharmaceuticals and the cosmetics industry has been established [5, 6, 7].

In pharmaceuticals, pectins are used in long-acting drugs, in biologically active food supplements that help lower cholesterol, stimulate intestinal motility, remove toxic substances, reduce the risk of cancer, and stimulate the growth of beneficial intestinal microflora.

In medicine, pectins are used in the creation of new biomaterials to prevent adhesion formation after surgical interventions [3, 4, 11]. Pectin substances have a wide range of favorable physiological effects on the human body: the complexing ability of pectins, based on the interaction of pectin molecules with metal ions, including heavy and radioactive metal ions; removal of cholesterol from the body; reduction of allergic effects, regulation of metabolism and normalization of the functions of the gastrointestinal tract; antitumor, antimetastasis, antimicrobial and other types of activities [8]. The orientation of the physiological actions of pectin substances depends, first of all, on their qualitative composition, which is determined by the type of raw material from which they are derived. The most common pectin-containing raw materials are apples, citrus squeezes, sugar beets [1].

But it is worth noting that the range of pectin-containing additives and products is very limited. This is primarily due to the acute shortage of pectin in the Russian food industry.

Pectin deficiency is due to the fact that in Russia there is no production of pectin of sufficient capacity to meet the needs of food enterprises [9]. About 95% of all pectin in the Russian market is imported [7]. The world's leading producers of pectin are the companies: Herbstreith & Fox (Germany), Cargill (France), CP Kelco (Denmark), Danisco (Czech Republic), Andre Pectin (China). According to the results of 2018, the German company Herbstreith and Fox (41%) became the leader in the supply of pectin to Russia.

Theoretical background

One of the promising methods for producing pectin is its isolation by enzymatic hydrolysis from waste from various plant materials. Enzyme-derived pectin is biopectin. The study of the pharmacological properties of biopectin is relevant today. In this regard, the aim of this work is to study the bacteriostatic ability of biopectin in relation to various microorganisms. In the course of the work, the following tasks were set: analysis of the scientific and technical literature on this topic; determination of organoleptic, physico-chemical and biochemical parameters of biopectins; determination of sanitary and microbiological indicators of biopectins; study of the influence of biopectins on microorganisms that cause purulent-inflammatory diseases;

Research procedure

At the first stage of the work, organoleptic, physicochemical and biochemical tests were carried out in order to establish the qualitative characteristics of the biopectins used and the possibility of further research.

Next, the determination of the sanitary-microbiological indicators of biopectins was carried out. The total number of bacteria was determined by counting colonies of mesophilic aerobic and facultative anaerobic microorganisms grown on solid nutrient agar at 30 °C for 72 hours. And the amount of yeast and molds contained in biopectins was carried out by inoculation on Saburo medium at a temperature of 24 °C for 5 days.

At the final stage of the work, the effect of biopectins on microorganisms causing purulent-inflammatory diseases was studied. For the study, they took secretion from a purulent wound, transferred to physiological saline and inoculated on meat peptone agar (MPA). The experiment was carried out at a temperature of 37 °C. For the control experiment, instead of a biopectin solution, physiological saline was used.

Results and its discussion

The results of biochemical, organoleptic and physico-chemical tests are presented in table 1.

It was established that the citrus and apple biopectins used comply with the requirements of GOST 29186 [2]. There is no normative and technical documentation for blackcurrant, carrot, squash, and pumpkin biopectins, since they are isolated from plant material that does not have industrial significance. These types of biopectins have acceptable physico-chemical parameters. Squash pectin has the highest degree of esterification, and blackcurrant pectin has the smallest degree of esterification.

Sanitary and microbiological indicators of pectins were monitored for the following groups of microorganisms: MAFAnM and BGKP; opportunistic microorganisms, which, for example, include *Escherichia coli*; microorganisms causing food spoilage (yeast and molds). Table 2 shows the results of this test.

Table 1 - the Main indicators of biopectins

Indicator	Type of raw material from which biopectin is derived					
	Black currant	Citrus	Apple	Squash	Carrot	Pumpkin
Moisture content,%	4,70	5,59	4,90	4,50	5,20	4,70
Ash content, %	1,60	1,70	1,50	1,20	1,60	1,30
pH of 1% solution	3,20	3,10	3,40	4,00	3,50	4,00
The content of acetyl groups,%	2,10	1,20	1,30	0,17	1,30	0,62
The content of carboxyl groups,%	17,30	10,00	11,3	2,32	2,98	2,57
The content of methoxy groups,%	6,70	9,20	8,30	10,05	11,15	10,89
The degree of esterification,%	63,00	72,00	68,00	81,20	78,90	80,90
The content of pectic acid,%	40,00	45,00	46,00	37,0	40,00	39,00
The content of vitamin C, mg/100 g	85,00	21,20	10,70	2,80	3,50	-
Mass fraction of ballast substances,%	32,00	29,00	29,90	29,50	30,20	30,00
Gelation temperature, °C	60,00	84,00	84,00	79,00	74,00	78,00
Appearance	powder					
Color	maroon	pale yellow	cream	light yellow	light orange	yellow
Taste	absent					
Smell	absent					

Table 2 – Sanitary and microbiological indicators of biopectins

Type of Pectin	MAFAnM CFU/g (not more)	E. coli bacteria		Yeast CFU/g (not more)	Mold mushrooms CFU/g (not more)
		Kessler growth	Fermentation titer		
Apple	2,1*10 ⁴	Absent	>0,1	—	9
Citrus	3,0*10 ⁴	Absent	>0,1	—	13
Blackcurrant	8,0*10 ⁴	Absent	>0,1	—	11
Carrot	2,6*10 ⁴	Absent	>0,1	—	13
Pumpkin	5,0*10 ⁴	Absent	>0,1	—	7
Squash	1,1*10 ⁴	Absent	>0,1	—	19

In the studied biopectins, all sanitary and microbiological indicators are within normal limits.

Studies have been conducted on the effect of biopectins on pathogenic microorganisms of the contents of purulent wounds. The effects of apple and citrus pectins on microorganisms are shown in table 3.

Table 3 - The effect of biopectins on pathogenic microorganisms that cause purulent-inflammatory diseases

	Apple pectin		Citrus pectin	
		CFU/cm ³		CFU/cm ³
Immediate	Control	2,8*10 ⁶	Control	3,0*10 ⁶
	1% pectin	2,8*10 ⁶	1% pectin	3,1*10 ⁶
	5% pectin	2,7*10 ⁶	5% pectin	3,0*10 ⁶
In 2 hours	Control	2,8*10 ⁶	Control	3,3*10 ⁶
	1% pectin	2,7*10 ⁶	1% pectin	3,0*10 ⁶
	5% pectin	1,0*10 ⁶	5% pectin	2,2*10 ⁶
In 4 hours	Control	3,0*10 ⁶	Control	3,9*10 ⁶
	1% pectin	2,3*10 ⁶	1% pectin	2,8*10 ⁶
	5% pectin	8,0*10 ⁵	5% pectin	9,0*10 ⁵
In 24 hours	Control	3,6*10 ⁶	Control	4,6*10 ⁶
	1% pectin	1,6*10 ⁶	1% pectin	1,3*10 ⁶
	5% pectin	1,1*10 ⁵	5% pectin	3,6*10 ⁵
In 48 hours	Control	4,2*10 ⁶	Control	5,3*10 ⁶
	1% pectin	7,0*10 ⁵	1% pectin	9,0*10 ⁵
	5% pectin	5,0*10 ⁴	5% pectin	8,4*10 ⁴
In 72 hours	Control	4,8*10 ⁶	Control	6,2*10 ⁶
	1% pectin	4,0*10 ⁵	1% pectin	7,3*10 ⁵
	5% pectin	2,0*10 ⁴	5% pectin	2,8*10 ⁴

The effect of blackcurrant and carrot biopectins is reflected in table 4.

Figure 1 and 2 illustrate the effects of pumpkin and squash biopectins on pathogens.

Based on the data obtained, we can say that all the studied biopectins, regardless of type, exhibit a bacteriostatic effect on pathogenic microorganisms. The action manifests itself already 2 hours after the start of the experiment. By the 72nd hour of the experiment, a significant decrease in the amount of pathogenic microflora is observed, and the best results were achieved using 5% blackcurrant biopectin.

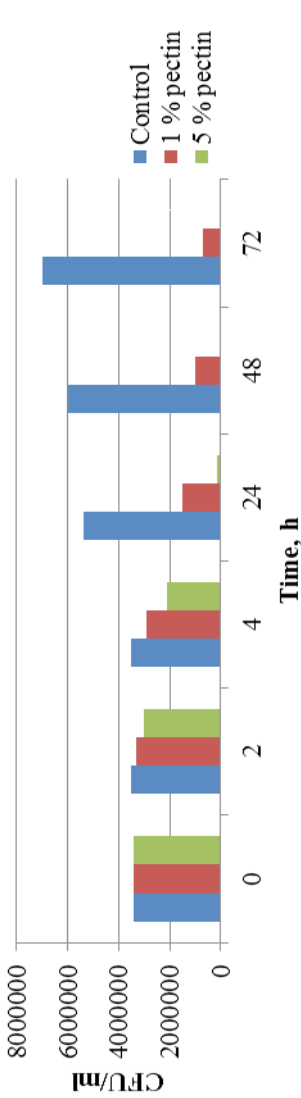


Figure 2 - Effect of pumpkin pectin on pathogenic microorganisms

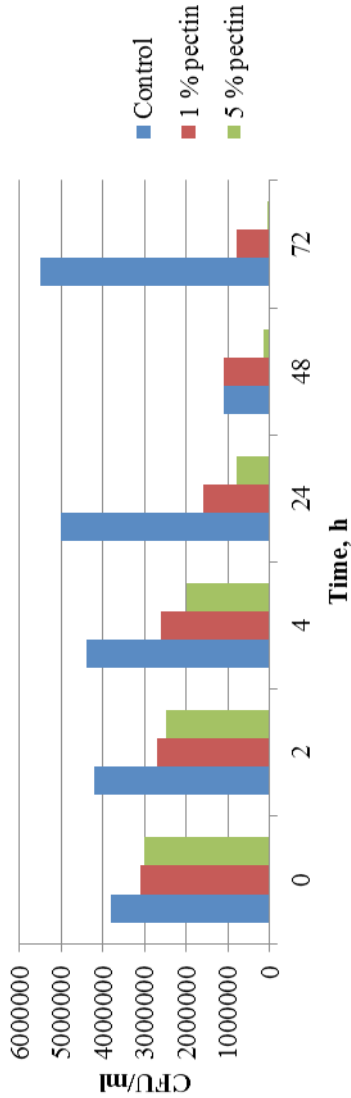


Figure 3 - Effect of squash pectin on pathogenic microorganisms

Conclusions:

1. The studied biopectins by to the main quality indicators comply with the requirements of regulatory documentation;
2. The biopectins used comply with the sanitary and microbiological requirements;
3. All biopectins, regardless of type, exhibit bacteriostatic ability in relation to pathogenic microorganisms;
4. Biopectin obtained from blackcurrant is distinguished by the highest bacteriostatic properties;
5. A wide range of pharmacological properties of biopectins, including their bacteriostatic ability, serves as the basis for the creation of food products with therapeutic and prophylactic properties.

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在护发产品技术中使用草药提取物的科学和实践依据
**SCIENTIFIC AND PRACTICAL BASIS FOR THE USE OF HERBAL
EXTRACTS IN THE TECHNOLOGY OF HAIR CARE PRODUCTS**

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抽象。蒽的衍生物是某些植物的特定生物活性物质。它们具有广泛的生理作用。这就是为什么本文的主题是研究在化妆品中使用这些物质的可能性。研究对象为沙棘皮，圣约翰草和大黄根。对酚类物质的存在进行了定性分析：蒽衍生物，单宁和类黄酮。获得了阳性反应，可以判断活性物质的化学结构。定量结果表明，蒽化合物的含量最高（大黄素为5.33%）和单宁（最大含量为12，单宁为57%）位于大黄的根部。圣约翰草中的类黄酮含量最高（按芦丁计为6%，为28%）。这项工作还确定了最佳的提取参数，从而提供了最大的主要活性物质收率。开发了四种洗发剂配方：样品№1 - 含鼠李树皮提取物的洗发水，样品№2 - 含圣约翰草提取物的洗发水，样品№3 - 含大黄根提取物的洗发水，样品№4（对照）- 不添加提取物。根据测试结果，大黄根提取物的洗发水效果最佳。大黄提取物洗发水的定性指标符合法规要求。

关键词：沙棘皮，大黄根，圣约翰草，蒽衍生物，单宁，类黄酮，洗发水。

Abstract. *Derivatives of anthracene are specific biologically active substances of certain plants. They have a wide range of physiological actions. That is why the subject of this article is the study of the possibility of using these substances in cosmetics. Buckthorn bark, St. John's wort grass and rhubarb root were used as objects of study. A qualitative analysis was carried out for the presence of phenolic substances: anthracene derivatives, tannins and flavonoids. Positive reactions were obtained that made it possible to judge the chemical structure of the active substances. Quantitative results showed that the highest content of anthracene compounds (5.33% in terms of istisine) and tannins (12, 57% in terms of tan-*

nin) is in the root of rhubarb. The highest content of flavonoids (6, 28% in terms of rutin) in *St. John's wort* grass. The work also established the optimal extraction parameters, providing the greatest yield of the main active substances. Four shampoo formulations were developed: sample № 1 — shampoo with buckthorn bark extract, sample № 2 — with *St. John's wort* herb extract, sample № 3 — with rhubarb root extract, sample № 4 (control) — without adding extracts. According to the test results, shampoo with rhubarb root extract became the best. Qualitative indicators of shampoo with rhubarb extract comply with the requirements of regulatory documents.

Keywords: buckthorn bark, rhubarb root, *St. John's wort* grass, anthracene derivatives, tannins, flavonoids, shampoo.

Introduction

Today, cosmetic products are primarily considered as a means of delivering biologically active substances (BAS) to the skin, oral cavity, hair, nails, etc. The form of BAS application in most cases depends on the technology of a particular cosmetic product. As practice shows, the most technologically advanced form is extracts. Of particular interest are extracts of medicinal plants, the benefits of which were known in the distant past.

Literature review

Hair care products, shampoos, balms, conditioners, etc., support hair in optimal condition, give it an attractive appearance, and are also able to provide therapeutic and preventive actions [1]. The effectiveness of hair care products is due to the presence in their composition of assets - biologically active substances. Promising sources of such substances are medicinal plants.

Medicinal plants synthesize a huge amount of substances that, as a rule, are not formed in the human body, and also have a complex chemical structure. In addition to primary synthesis substances, proteins, fats, carbohydrates, etc., medicinal plants contain secondary synthesis substances (terpenoids, glycosides, phenolic compounds, etc.), which have multifaceted physiological effects on the human body [8].

Among the wide range of BASs, phenolic glycosides are of particular interest. Phenolic glycosides is an extensive group of natural compounds, which is characterized by decomposition under the action of various agents on the carbohydrate part (glycon) and phenolic aglycon [9].

The following pharmacological properties of phenolic glycosides are of practical importance for hair care products: the ability to interact with keratin, the main protein of the hair, and the reduction in the rate of damage caused by aggressive substances, such as hydrogen peroxide contained in hair dyes. As well as capillary-strengthening activity, which helps to stimulate metabolic processes in the blood vessels that feed the hair. This type of activity allows you to strengthen

the hair, improves hair nutrition, stimulates their growth [6]. The antibacterial and bacteriostatic effects of phenolic glycosides can eliminate and prevent the occurrence of seborrhea, which is associated with an imbalance in the microflora of the scalp, excessive growth of fungi of the genus *Malassezia* [5,7].

Numerous studies have shown that cosmetics with natural extracts have functional advantages compared to products based on synthetic components [10].

An extract – is a dosage form obtained by extracting (drawing) the active components or component from medicinal raw materials using an extractant, by the form of which extracts are separated by water, alcohol, oil, etc. [2]. The main technological process for the extraction of biologically active substances from plant materials is extraction. The extraction of medicinal plant material (MPM) is accompanied by diffusion of BAS from the internal structures of the material particle [11].

Based on this, the creation of cosmetics based on extracts of medicinal raw materials is an urgent and promising area of scientific activity.

In this regard, the aim of this work is to obtain plant extracts from these plants and their use in hair care products. To achieve the goal, the following tasks were set:

1. Analysis of scientific and technical literature on this topic;
2. Physico-chemical, qualitative and quantitative studies of MPM;
3. Determination of optimal extraction parameters of MPM;
4. Development of formulations of hair care products with extracts obtained;
5. Analysis of the qualitative characteristics of laboratory samples of shampoos.

Research procedure

At the first stage of the work, an analytical screening of MPM containing phenolic glycosides was carried out. It is not by chance that buckthorn bark, St. John's wort grass and rhubarb root were the objects of this study. This raw material is affordable and cost effective. This is due to the fact that these plants are widely distributed in the middle and southern bands of Russia in wild and cultivated form.

To confirm the quality of MPM, an organoleptic analysis was carried out, the mass fraction of moisture and extractives in the raw material was determined, and a qualitative and quantitative analysis of the main BAS MPM was carried out.

An extraction process was used to isolate the main active substances (AS) from MPM. For the most complete transition of the active substances into the extract, the optimal extraction parameters were selected. The transition of the main active substances was controlled by quantitative analysis of anthracene derivatives, since these compounds are a unique component of this MPM [7].

Shampoo formulations were developed in which quality indicators were investigated.

Results and its discussion.

The data of organoleptic analysis, determination of the mass fraction of moisture and extractives in raw materials fully comply with the requirements of the GF XI issue 2 [4]. Therefore, the MPM used in the work is benign.

All MPM samples tested positive for active ingredients (AS). The reaction to anthracene compounds showed that 1,4-dioxoanthraquinones predominate in buckthorn, condensed derivatives prevail in St. John's wort, and 1,8-dioxoanthraquinones in rhubarb. Analysis for the presence of tannins showed that St. John's wort contains mixed tannins. According to the reactions of Zaprometov and Gage, it was found that St. John's wort grass is distinguished by the presence of flavones, flavanols, chalcones, but Aurons predominate, also in the root of rhubarb. Pyrocatechins and flavonoids with a pyrocatechol moiety are present in buckthorn bark.

Quantitative pharmacopoeial analysis by the photoelectrocolorimetric method showed that the largest number of anthracene derivatives in the rhubarb root (5, 33% in terms of istizin).

It was determined by a titrimetric quantitative method that the highest content of tannins was noted in the root of rhubarb (12.57% in terms of tannin). The spectrophotometric method allowed us to determine the high content of flavonoids in St. John's wort (6.28% in terms of rutin).

It was decided to use the extract in liquid form. Liquid extracts are conveniently applied to cosmetics having an aqueous phase or consisting only of an aqueous phase.

The digestion method was used (a modified maceration method carried out by heating). Table 2 presents a set of studied extraction parameters.

Table 2 - Parameters of the MPM extraction process

Temperature, °C	Hydromodule	Duration of one stage, min	Type of extractant
50	1:5	15	Water - alcohol mixture (70%)
60	1:10	30	
70	1:15	45	

Foreign Pharmacopoeias establish control of extracts from anthracene-containing raw materials using a quantitative analysis of anthracene derivatives. Using this method, the effectiveness of the past extraction was evaluated under certain conditions.

The highest content of anthracene derivatives was observed in rhubarb root extracts - 4.04% in terms of 8-O-β-D-glycoside of emodin. The influence of various extraction parameters on the content of anthracene derivatives in the rhubarb root extract is illustrated in Figures 1,2 and 3.

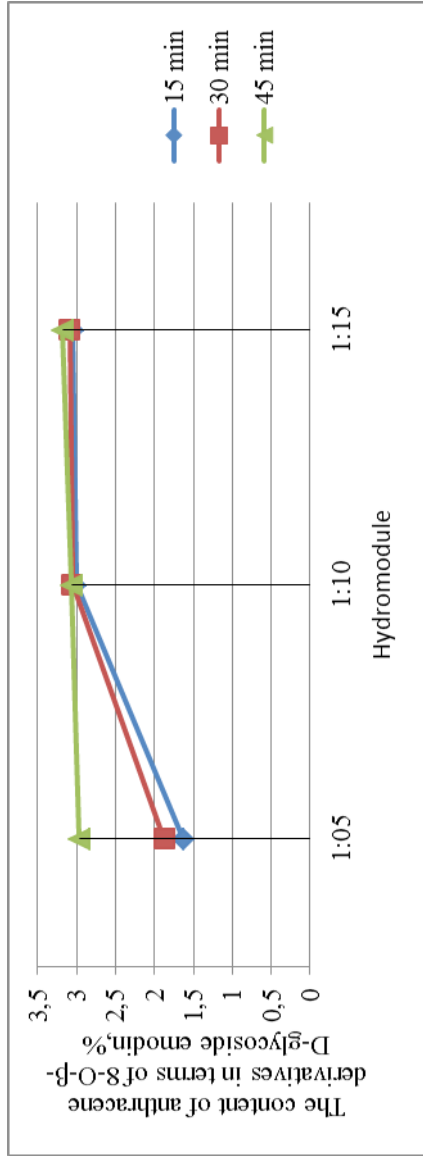


Figure 1 - Effect of the duration of extraction and the hydromodule on the yield of anthracene derivatives at 50 °C

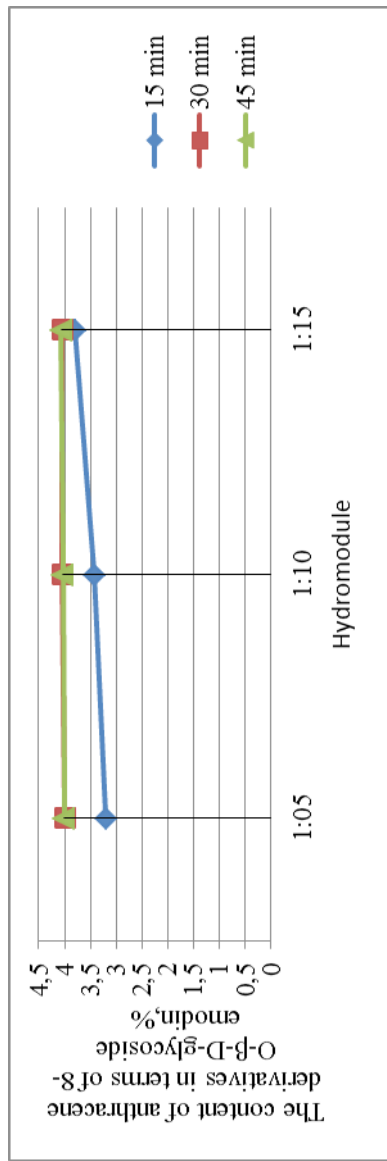


Figure 2 - Effect of the duration of extraction and the hydromodule on the yield of anthracene derivatives at 60 °C

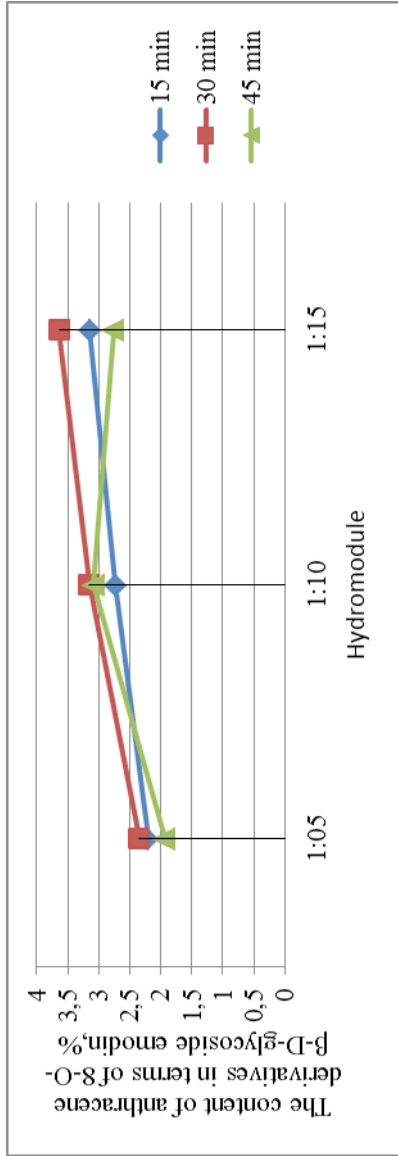


Figure 3 - Effect of the duration of extraction and the hydromodule on the yield of anthracene derivatives at 70 °C

With hydromodules 1:15 and 1:10, a higher quantitative content of anthracene derivatives is observed. Moreover, with a hydromodule 1:15, the BAS content is slightly higher than at 1:10 or does not differ at all. In this case, the consumption of extractant does not lead to a significant further increase in the content of anthracene derivatives, so it is unreasonably high. Therefore, the optimal ratio of raw materials and extractant is 1:10.

The lowest BAS yield is observed with a single extraction step of 15 minutes. Therefore, this time is not enough for a more complete diffusion of BAS from the cell walls of plant materials. The highest yield is observed with a duration of extraction of 30 and 45 minutes. The difference in results is also not significant. Prolonged heating is undesirable, since BAS can decompose, as indicated by the low content of anthracene derivatives with a duration of one extraction step of 45 minutes and a temperature of 70 °C. Based on this, 30 minutes is the optimal duration of one MPM extraction step.

With an increase in the extraction temperature from 50 °C to 70 °C, a direct dependence of the increase in the yield of active substances is observed. An exception is the measurement results of extracts obtained at a temperature of 70 °C and a duration of 45 minutes. The decrease in the amount of BAS is due to high and prolonged heating, which leads to the decomposition of active substances. The best results were obtained at a temperature of 60°C; therefore, this temperature is optimal for the implementation of the MPM extraction process. Based on the foregoing, the optimal extraction parameters are: temperature - 60°C, the duration of one extraction step - 30 minutes, the hydromodule - 1:10.

When developing the shampoo formulation, the following components were used: cocoamidopropyl betaine, “Coconut” surfactant, hydroxyethyl cellulose (HXC), citric acid, sodium chloride, BAS extracts from MPM obtained in laboratory conditions, distilled water.

To achieve shampoo quality indicators that meet the requirements of regulatory and technical documentation, we determined the optimal concentration of each prescription component entering into the shampoo, affecting its organoleptic and physico-chemical parameters. The following optimal concentrations of prescription components were established: cocoamidopropyl betaine - 25.00%, “Coconut” surfactant - 3.00%, HXC - 2.00%, plant extract BAS - 5.00%.

4 shampoo samples were obtained: sample № 1 — shampoo with buckthorn bark extract, sample № 2 — with St. John's wort herb extract, sample № 3 — with rhubarb root extract, sample № 4 (control) —without adding extracts. Table 3 presents the organoleptic characteristics of shampoos, and table 4 reflects the physico-chemical characteristics.

Table 3 - Organoleptic characteristics of shampoos with herbal extracts

Indicator	Laboratory samples of shampoos				NTD requirements
	1	2	3	4	
Appearance	Homogeneous single-phase gel-like liquid mass without impurities				Homogeneous single-phase or multiphase liquid (gel or creamy mass, liquid or thick) without impurities
Color	Light yellow	Light brown	Beige	White	Color specific to the product name
Smell	Light grassy	Light woody	Light woody	Almost absent	Smell specific to the product name

The results obtained fully comply with the requirements of GOST 31696 [3].

Table 4 - Physico-chemical parameters of shampoos with addition of plant extracts

Indicator	Shampoo with the addition of a plant extract									Control		
	Buckthorn bark			St. John's wort grass			Rhubarb root					
	H ₀	H ₅	Y	H ₀	H ₅	Y	H ₀	H ₅	Y	H ₀	H ₅	Y
Foaming ability:												
distilled water	145	136	0,94	143	137	0,96	148	143	0,97	145	138	0,95
hard water	138	132	0,91	140	133	0,95	145	142	0,98	141	139	0,98
Mass fraction of chlorides,%	4,00			4,15			4,03			3,88		
PH value	6,69			6,05			5,62			6,83		

Based on the data of physical and chemical tests, we can conclude that all samples of shampoos have indicators that meet the requirements of GOST 31696 [3].

It should be noted that the best sample is a shampoo with rhubarb root extract, since it is this sample that has the best foaming ability, and also has an acid pH that favorably affects the scalp and hair, especially in the presence of various diseases, in particular seborrhea.

Conclusions

The following conclusions were obtained:

1. according to the results of quantitative analysis, the root of rhubarb is the richest source of anthracene derivatives and tannins;
2. optimal parameters of raw material extraction: temperature - 60°C, duration of one extraction step - 30 minutes, hydromodule 1:10, extractant - water-alcohol mixture of 70% concentration;
3. all samples of shampoos with addition of plant extracts comply with the requirements of normative documentation on the main quality indicators; therefore, the introduction of extracts does not impair the quality characteristics of hair care products;

4. according to the results of physical and chemical tests, shampoo with the addition of rhubarb root became the best;

5. use of extracts of medicinal raw materials improves the consumer properties of shampoos, gives them therapeutic and prophylactic properties.

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食品工业用高分子复合材料
POLYMER COMPOSITE MATERIAL FOR FOOD INDUSTRY

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抽象。聚合物越来越多地挤出木材，金属和天然纤维等熟悉的材料。其原因是聚合物材料相对于传统材料具有许多优点：提高了对腐蚀性环境的耐化学性，高强度指示剂以及产品运行的耐久性。应该注意的是，聚合物材料也被积极地用于食品工业。

聚合物包装的使用正在达到全球范围。改进生产技术和配方可以使您创建性能得到改善的新型聚合物复合材料，从而带动聚合物工业的快速发展。

为了赋予必要的性能，将填料引入聚合物材料中。通过将这种添加剂引入聚合物中，可以控制所获得的材料的性质，例如粘度，密度，透明度，杀菌性和其他重要性质。

文章考虑了硅藻土对基于低压聚乙烯的复合材料成品操作性能的影响。

研究表明，所获得的复合材料在操作过程中重要的所有波长区域均具有最高的光反射和吸收特性，具有杀菌性能，并且已经证明，在填充钨铁矿的聚合物中，其移动会发生变化。观察到热降解的开始温度向更高的温度。该复合材料具有更高的操作和物理机械性能。

关键字：聚合物复合材料 (PCM)，聚合物，低压聚乙烯，绿铁矿。

Abstract. Polymers are increasingly crowding out familiar materials such as wood, metals, and natural fibers. The reason for this is a number of advantages of polymer materials over classic ones: increased chemical resistance to aggressive environments, high strength indicators, and durability in the operation of products. It should be noted that polymeric materials are also actively used in the food industry.

The use of polymer packaging is reaching global proportions. Improving production technologies and formulations allows you to create new polymer composites with improved properties, which gives the rapid growth of the polymer industry.

In order to impart the necessary properties, fillers are introduced into the polymeric material. By introducing such additives into the polymer, it is possible to control the properties of the material obtained, for example, viscosity, density, transparency, bactericidal and other important properties.

The article considers the influence of shungite on the operational properties of the finished composite based on low-pressure polyethylene.

The research results showed that the composite obtained provides the highest characteristics with respect to light reflection and absorption for all wavelength regions that are important during operation, has bactericidal properties, and it has been proved that in the shungite-filled polymer, a shift in the temperature of the onset of thermal degradation towards higher temperatures is observed. The composite acquires higher operational and physico-mechanical properties.

Keywords: *polymer composite material (PCM), polymer, low-pressure polyethylene, shungite.*

Introduction. In today's world the use of polymer packaging has reached a global scale. As production technologies and chemical formulations evolve and improve, new polymer composites are being created with greatly improved properties, and this process is driving the fast paced growth of the polymer industry.

There is a large variety of fillers that are added to polymer materials to give them the desired properties. By adding the fillers into the polymer, one can control the properties of the resulting composite, e.g. viscosity, density, transparency, bactericidal properties and other important characteristics.

Main part. We have decided to create our composite polymer material on the basis of low pressure polyethylene and the naturally occurring mineral shungite[1].

Shungite was selected for use as the filler because this mineral consists entirely of bipolar high dispersion particles (fig.1).

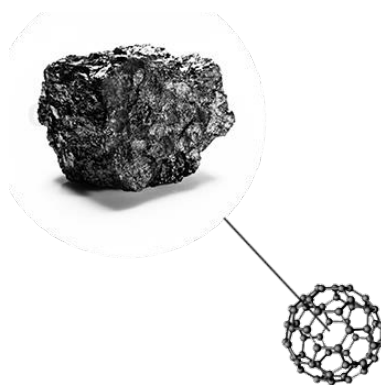


Fig. 1 Shungite structure

This unique property of this mineral makes it very easy to use it as a filler in a broad range of polymer materials. The presence of fullerene-like structures results in a high concentration of paramagnetic centers (1019 spin/g) in the mineral. The high concentration of paramagnetic centers results in shungite exhibiting increased activity in oxidation reduction reactions, making it a promising candidate for use in polymer material as an additive that can improve their resistance to oxidate as well as resistance to high temperatures [2]. PCM (polymer composite materials) filled with shungite are highly wear-resistant compared to other polymer composites, e.g. at similar dispersion and filling degrees quartz filler is inferior to shungite in physical and mechanical properties.

The suggested uses for the new composite polymer are in construction and food industries so it must have bactericidal properties, it must be strong enough, resistant to high temperature and light.

The operation, physical and mechanical properties of the new composite polymer were studied using film samples with shungite content of between 1.0 and 10% and on bars with shungite content of between 10 and 40%.

The ability of the samples to resist fungal contamination was evaluated based on five-point scale found in GOST 9.048-89 (table 1) for how fast fungi grow on the material.

Table 1 - Assessing the pace of fungal infection

Score	Description for the score
0	No spores or conidia found under a microscope
1	Spores and some mycelium can be seen under a microscope
2	A lot of mycelium and spores can be seen under a microscope
3	Mycelium can be seen with the naked eye or some spores can be spotted and are clearly seen under a microscope
4	Fungi covering at least 25% of the tested surface that can be easily seen with the naked eye
5	Fungal growth covering over 25% of the tested surface seen easily with the naked eye

All samples of the material proved to be resistant to all nine types of fungal materials tested thereon whereas resistance score for associated fungal materials never exceeded 0–3 points (table 2).

The bactericidal and antimycological activity of the new composite were determined by the ion-radical activity of schungite, as well as by the presence of fullerenes in its composition, which is extremely important when creating materials for the food industry, since according to GOST recommendations these should be resistant to aggressive biological environments [3].

Table 2 - Composite polymer fungal resistance

Type of fungi	Growth degree in points			
	HDPE	HDPE + 5% shungite	PMMA+10% shungite	PMMA+26% shungite
AspergillusterreusThom	4	3	2	2
AspergillusnigervanTieghem	3	2	2	1
Aspergillusoryzae (Ahlburg) Cohn	2	0	0	0
PenicilliumchrysogenumThom	4	2	1	0
TrichodermaviridePersoon	4	3	3	2
Associated fungi	2	0	0	0

Without determining the thermal stability of the composite polymer, it is impossible to establish the correct interval for its processing, which must be between its fluidity and destruction temperature, neither is it possible to correctly assess its properties important for its use. Chemical transformations that reduce the mass of the sample are caused by thermal and thermo-oxidative degradation, due to a decrease in the molecular weight resulting from the breaking of chemical bonds in the macromolecules, the release of volatile degradation products, as well as a change in color and a decrease in PCM strength, etc. [4]. Differential thermal analysis found that as the content of shungite increases, the destruction temperature increases accordingly (figures 1-2). It should be noted that the destruction temperature for low pressure polyethylene is 320 °C, when 3% shungite is added, this temperature goes up to 438.7°C, and with 26% shungite it reaches 441.6 °C.

TG /%
PE-shungite 3%
DSK/(MW/mg)
Temperature /°C
Peak : 417,4 °C
Change in mass:
Residual mass 228 %

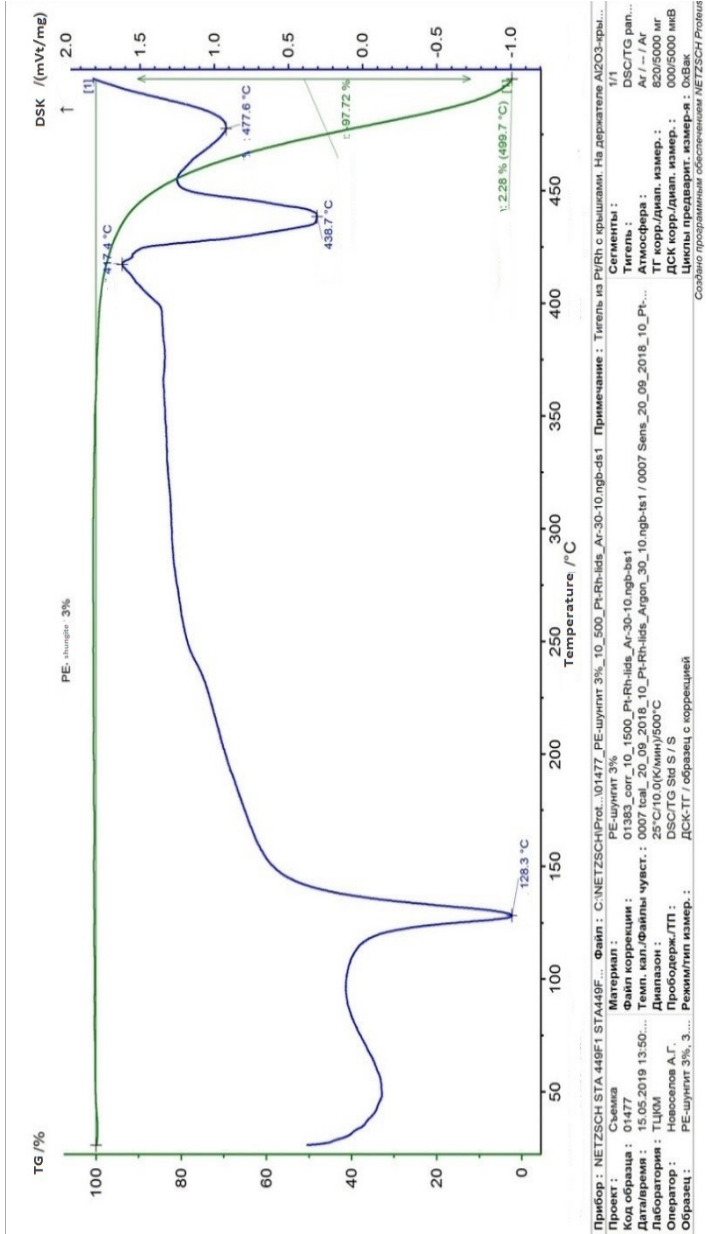


Fig 1. Differential thermal analysis of HDPE + 3% shungite

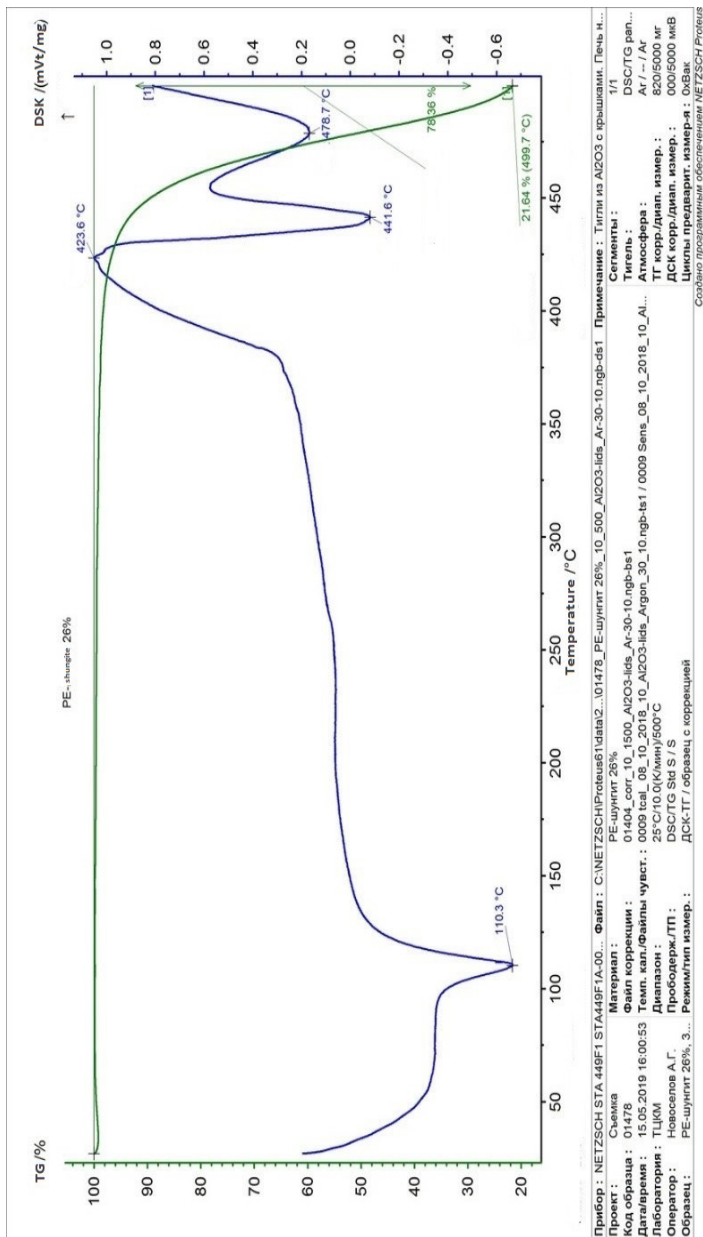


Fig 2. Differential thermal analysis for HDPE +20% shungite

TG /%
PE-shungite 3%
DSK/(MW/mg)
Temperature /°C
Peak : 417,4 °C
Change in mass:
Residual mass 228 %

Packing materials, including packing film get exposed to ultraviolet radiation when used for storage [5]. Resistance to the photo ageing effects is a must for this type of composite polymer.

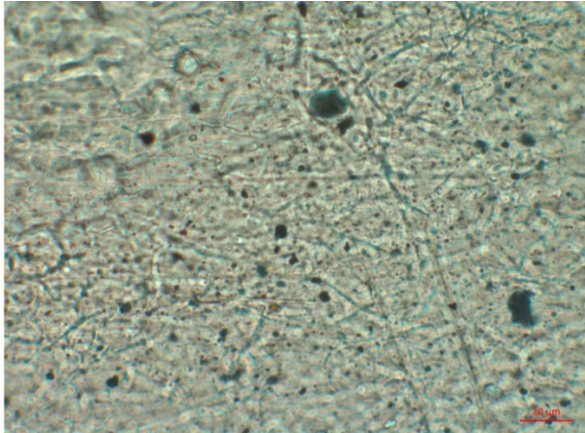
When polymers are used as packing materials for food stuffs the standard measure to improve their resistance to light radiation involves adding light reflective and/or light absorbing agents to the polymer. For our purposes shungite performs both these functions [6-8].

Studies of the resistance of the samples to ultraviolet were carried out using a VSE-UV.c table-top vacuum unit. Samples were kept in ultraviolet (300–400 nm) for 3 cycles of 8 hours each, and no changes or defects were observed therein (fig. 3), which is evidence of the material's high resistance to sunlight. No photo ageing was found in samples that were kept in extreme ultraviolet (120–10 nm) for 24 hours (fig. 3-6).

An important mechanical property of composite polymers is the yield strength. In our tests we measured the load and elongation of a universal sample at the moment its yield strength was reached [9].

As can be seen in fig. 7, as shungite content in the composite polymer increases so does its yield strength. It should be noted that the greater the yield strength, the greater loads the material can withstand. Thus, 40% shungite in a composite polymer results in peak resistance to loads, however, more energy will be required to process this composite.

Conclusions. Having analyzed the results of our tests we can conclude that by introducing shungite into the polymer matrix we can improve the properties of a composite material. The new material we have developed is resistant to photo ageing effects and also has bactericidal properties which allows it to be used as a packing material in the food industry.



*Fig 3. 2% shungite film
after exposure to 20 nm radiation*



*Fig 4. 2% shungite film after exposure
to 200 nm radiation*

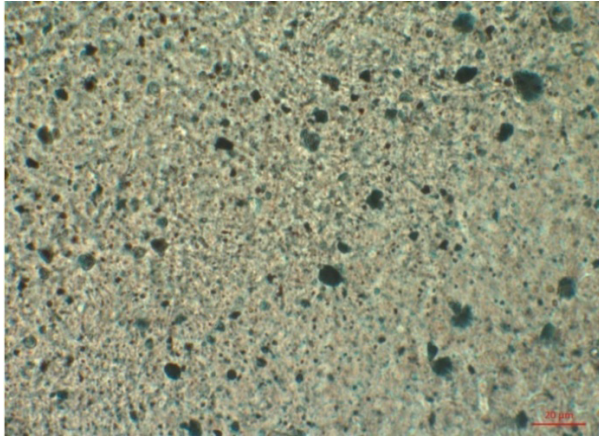


Fig 5. 4% shungite film after exposure to 20 nm radiation

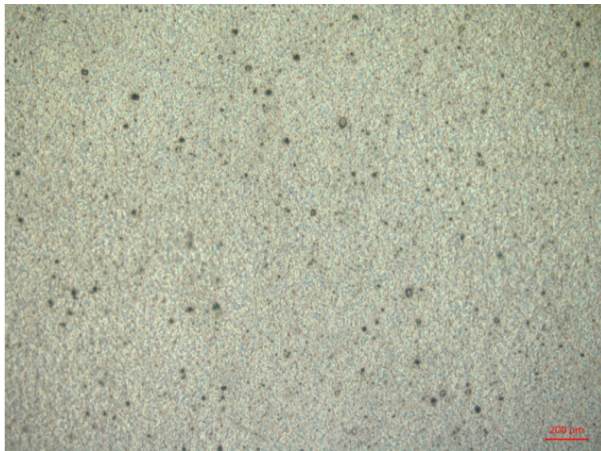


Fig 6. 4% shungite film after exposure to 200 nm radiation

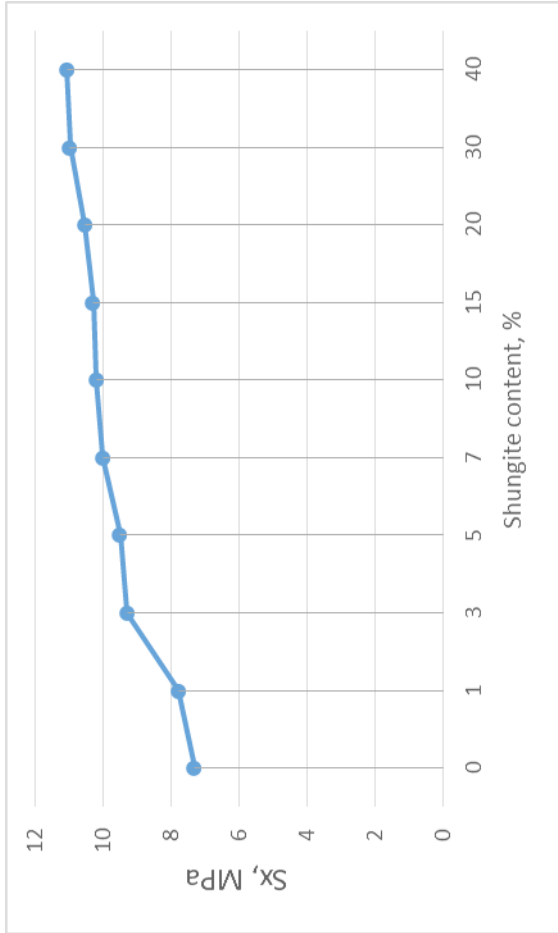


Figure 7 The correlation between yield strength and shungite content

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科学出版物

上合组织国家的科学研究：协同和一体化

国际科学大会的材料

（2019年10月29日。中国北京）

编辑A. A. Siliverstova

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2019年11月056日。中国北京。
USL。沸点：98.7。 订单253. 流通500份。

在编辑和出版中心印制
无限出版社

